Aging-as-Leveler for Mental Health?:

Stressful Life Transitions and CES-D Trajectories in Late-Life

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Abstract

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Due to declining mortality rates and other demographic transformations, individuals aged 65 and above make up a larger share of the population within the United States than ever before, yet vast inequality remains in the trajectories of health and quality of life within the aging process (Abramson 2015; Ailshire and Crimmins 2011). Sex, race/ethnicity, and socioeconomic status are consistently linked to disparate rates of mortality and chronic health conditions such as diabetes, hypertension, and coronary heart disease (Kahng, Dunkle, and Jackson 2004). A driver of health inequities throughout the life course in U.S. is access to basic resources, such as a basic income and medical insurance (Cummings and Jackson 2008).

As such, redistributive policies which become available to individuals in late-life, such as Social Security and Medicare, designed to limit inequality through the provision of the basic resources of income and medical coverage, may serve to reduce health disparities in late-life (Adler and Newman 2002; Beckett 2000; Brown, O'Rand, and Adkins 2012). By providing basic resources previously unavailable to individuals at the lower end of the socioeconomic

distribution, these redistributive policies may decrease resource disparities between individuals in the lowest- and highest- socioeconomic strata (Adler and Newman 2002). In addition, regardless of this aimed redistribution of resources, biological features of aging also act to narrow the health gap. Specifically, it is hypothesized mortality selection among the most disadvantaged individuals, and delayed onset of illness for the most advantaged individuals, result in the convergence of health statuses among late-life adults (Brown et al. 2012; Brown, Richardson, and Hargrove 2016).

While resource disparities important for physical health may decrease in late-life (Adler and Newman 2002), the cumulative burden and stress proliferation experienced by disadvantaged groups throughout the life course have been shown to continually widen health gaps as individuals age (Thoits 2010). As a result, theories about whether and how age serves to reduce, maintain, or widen health disparities have emerged. The “aging-as-leveler” hypothesis posits inequalities in health reduce across the lifespan due to reductions in resource inequality that occur with increasing age (Brown et al. 2012; Brown, Richardson, and Hargrove 2016; House, Lantz, and Herd 2005). The “cumulative disadvantage” hypothesis posits that inequality increases throughout the lifespan due to the ever-present and compounding impacts of stress, discrimination, and resource deprivation, resulting in increased morbidity and mortality among the most disadvantaged (DiPrete and Eirich 2006; Willson, Shuey, and Elder 2007). Centered in the middle of this aging framework is the “persistent inequality” hypothesis, in which health disparities are hypothesized to remain constant across the life course due to the competing effects of cumulative disadvantage with reductions in resource inequality in late-life (Cummings and Jackson 2008; Ferraro and Farmer 1996), and thus, increasing age does not reduce or widen health disparities observed in the early and middle years of life (Ferraro and Farmer 1996).

Recent sociological scholarship explores these theories for physical health outcomes. Brown and colleagues (2016) find age serves to reduce health disparities, lending weight to the aging-as-leveler hypothesis. However, the authors additionally find evidence for the cumulative disadvantage and persistent inequality hypotheses when analyses focus on different physical health outcomes, racial/ethnic group comparisons, and lifespan of analysis (Brown et al. 2012). Similarly, research by Ferraro and Farmer (1996) provides evidence for the persistent inequality hypothesis for Black-White disparities in mortality and for serious medical conditions such as heart failure and disabilities. Yet, the authors find additional evidence for all three theories depending upon the physical health outcome being measured and analytical methodology being utilized (Ferraro and Farmer 1996). Indeed, scholars note these theories are not necessarily competing frameworks, but each provide insight into the multitude of ways resources and disadvantage interact throughout the life course to impact health, and disparities in health, as individuals age.

As explorations of these theories focus on physical health disparities in morbidity and mortality, little is known about how these theories can help to understand trajectories of mental health outcomes in late-life. Prevalence of clinical depression and depressive symptoms in late-life are repeatedly found to be on-par with, or less than, the prevalence observed in midlife (Blazer 2003; Charles, Reynolds, and Gatz 2001), with an estimated 8%-16% of elderly adults experiencing depressive symptoms (Blazer, Swartz, and Woodbury 1988; Murrell, Himmelfarb, and Wright 1983), compared to 10%-18% across the life course (Hasin, Goodwin, and Stinson 2005; Williams et al. 2007). While the prevalence of depression is not shown to increase in late-life, the negative consequences of depression and depressive symptoms increase with age (Blazer 2003; Fiske, Wetherell, and Gatz 2009). Depression is shown to significantly hinder quality of life in elderly adults and is associated with functional limitations, reduced self-rated health, and limited perceptions of social support (Blazer 2003). As a result,

the causes, consequences, and relationship of depression with the causes and consequences of physical health disparities in late-life warrant investigation (Fiske et al. 2009).

My dissertation utilizes the aging-as-leveler, persistent inequality, and cumulative disadvantage perspectives to analyze and explore social factors associated with, and trajectories of, CES-D depressive symptoms using data from eight waves of the Health and Retirement Study (1998 to 2012). In the first empirical chapter, I test the notion that specific life transitions – caregiving and paid labor – are "inherently stressful" and "similarly stressful" across sex and race groups in late-life, while expanding upon understandings of how positive and negative social support moderate the association among specific life transitions and CES-D depressive symptoms. In sum, the first empirical chapter informs if – and the mechanisms through which – life transitions and social support are associated with CES-D depressive symptoms across sex and race groups in late-life. In the second empirical chapter, I assess if unhealthy coping behaviors mediate the association between caregiving transitions and CES-D depressive symptoms in late-life, and if the magnitude of observed associations vary across sex and race. These first two empirical chapters serve to build a comprehensive understanding of if and how mental health disparities exist across sex and race groups, to build a foundation for exploring theories of reduction, persistence, or widening of disparities in late-life for mental health later in this dissertation.

In the third empirical chapter, I model trajectories of CES-D depressive symptoms and functional limitations to provide assessment of the aging-as-leveler, persistent inequality, and cumulative disadvantage hypotheses for both a mental health and physical health outcome. This chapter explores the roles of survivorship and baseline levels of mental and physical health as individuals enter the late-life period to inform assessment of CES-D depressive symptoms and functional limitation trajectories across sex and race groups. This exercise provides context to discussions of the aging-as-leveler, persistent inequality, and cumulative disadvantage

hypotheses by focusing on how attrition due to death and baseline mental and physical health statuses shape observations of inequality across sex and race in late-life.

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Chapter 1 Introduction

"Any idiot can handle a crisis – it's this day-to-day living that wears you out."

– Anton Chekhov

Introduction

It is projected that individuals aged 65 and above will constitute 21.7% of the United States population by 2040, growing from 14.1% of the United States population in 2013 (Administration on Aging 2014). Due to declining mortality rates, individuals aged 65 and above make up a larger share of the population within the United States than ever before (Abramson 2015; Ailshire and Crimmins 2011). As such, aging has become a more common experience for individuals, and more of us can expect to live beyond age 65 today than for any previous generation (Abramson 2015; Ailshire and Crimmins 2011).

While more individuals can expect to live into old age than at any other point in history, vast inequality remains in the trajectories of mental and physical health and quality of life within the aging process (Abramson 2015). This increase in longevity paired with the reality of continued inequalities in health going into old age has sparked questions and research into the aging experience (Ailshire and Crimmins 2011). This dissertation serves to build a comprehensive understanding of pathways and trajectories of mental health in late-life. Specifically, this dissertation assesses theories of reduction, persistence, or widening of disparities across sex and race groups in late-life for mental health. This chapter introduces key themes and theories in the literature related to features of mental health disparities across sex and race groups in late-life and introduces the three empirical questions explored in the remainder of this dissertation.

"Similarly Shaped Problems"

Despite evidence suggesting health disparities remain throughout the aging process (Abramson 2015), some scholars argue late-life is a time when adults encounter what Bordieu described as "similarly shaped problems" (Abramson 2015). The idea of "similarly shaped problems" in late-life assumes that all individuals endure declines in functional abilities, cognitive function, and other medical events associated with late-life morbidity and mortality (Abramson 2015). More specifically, holders of this viewpoint see late-life as a time when disparities in morbidity and mortality observed in earlier periods of life dissipate. Unlike earlier periods, when vast disparities in physical and mental health and mortality are observed across groups based on factors such as race/ethnicity, wealth, and education, during the late-life period, everyone will eventually experience illness and death, and therefore, a reduction in differences attributable to base status and sociodemographic characteristics. The assumption that individuals face similar trajectories of morbidity and mortality in late-life stems from observations of a narrowing in disparities across health and wellness outcomes during this stage (Adler and Stewart 2010; A. E. Willson, Shuey, and Elder 2007).

In this way, the late-life period provides a unique lens to understand if and how disparities observed during earlier periods of the life course play out in old age (Abramson 2015). Particularly, the late-life period allows researchers to empirically test theories of life course trajectories of mental and physical health. This dissertation will contrast the continued disparities perspective – which assumes that inequalities and disadvantage compound over the life course – to the "similarly shaped problems" perspective – which assumes there is both a physiological drive toward similarity and a more equal distribution of outcomes and resources during late-life. This assessment aims to provide insight into the mechanisms driving continued stratification, should stratification continue to be observed.

"Aging-As-Leveler"

To properly explore theories of mental and physical health disparities in the late-life period, attention must be paid to social policies becoming available in this life stage. An important driver of health inequities in the United States throughout the life course is access to basic resources, such as sufficient financial resources and medical insurance (Link and Phelan 1995). As such, it is possible that the existence of social policies, such as Social Security and Medicare, may "level the playing field" among individuals during late-life (Beckett 2000; Brown, O'Rand, and Adkins 2012). Social Security and Medicare are structured to limit inequality in the late-life period, relative to earlier life stages, through the provision of the basic resources of income and medical coverage (Adler and Newman 2002; Beckett 2000; Brown et al. 2012). By providing basic resources previously unavailable to individuals at the lower end of the socioeconomic distributation, these redistributive policies provide a net increase in basic resources available to individuals at the lowest end of the socioeconomic hierarchy, and also, may act to decrease resource disparities between individuals in the lowest- and highest-socioeconomic strata (Adler and Newman 2002). However, it should be noted there is limited evidence for the effectiveness of these programs in redistributing wealth, and thus, only modest impacts on inequality are observed (Liebman 2002).

With a reduction in disparities of resources important for physical health, and likely also mental health (Adler and Newman 2002), redistributive policies in late-life may serve to reduce general health disparities in this period (Adler and Newman 2002; Beckett 2000; Brown et al. 2012). However, the ability of programs such as Social Security and Medicare to reduce the impact of early health on later health is difficult to discern. Scholars widely recognize that disadvantaged individuals have higher rates of morbidity and mortality throughout the life course, and as such, are much more likely to be sick or die before reaching old age than are their peers (Abramson 2015; Brown, Richardson, and Hargrove 2016).

While resource disparities important for physical health decrease in late-life (Adler and Newman 2002), the cumulative burden and stress proliferation experienced by disadvantaged groups throughout the life course have been shown to continually widen health gaps as individuals age (Thoits 2010). As a result, theories about whether age serves to reduce, maintain, or widen health disparities have emerged. Proponents of the "aging-as-leveler" hypothesis posit inequalities in health reduce across the lifespan due to reductions in resource inequality that occur with increasing age (Brown et al. 2012, 2016; House, Lantz, and Herd 2005). Alternatively, proponents of the "cumulative disadvantage" hypothesis hold that inequality increases throughout the lifespan due to the ever-present and compounding impacts of stress, discrimination, and resource deprivation, resulting in increased morbidity and mortality among the most disadvantaged (DiPrete and Eirich 2006; A. Willson, Shuey, and Elder 2007).

Centered in the middle are proponents of the "persistent inequality" hypothesis, in which health disparities are hypothesized to remain constant across the life course due to the competing effects of cumulative disadvantage with reductions in resource inequality in late-life (Cummings and Jackson 2008; Ferraro and Farmer 1996), and thus, increasing age does not reduce or widen health disparities observed in the early and middle years of life (Ferraro and Farmer 1996). As recent explorations of these theories have focued on physical health disparities in morbidity and mortality, little is known about how these theories can help to understand trajectories of mental health outcomes. There is room for the extensive literature on the role of aging on physical health disparities to inform research assessing the role age plays on trajectories of mental health disparities throughout the life course, particularly, in the late-life period (Brown et al. 2016).

Mental Health

A feature of late-life health less explored than physical health is mental health, and is the subject of this research volume. Depression among late-life adults is a major public health problem. The prevalence of depression among late-life adults is often reported to be lower than the prevalence of depression among adolescents and midlife adults (Fiske, Wetherell, and Gatz 2009). Yet, the problem of depression among late-life adults may be understated. Particularly, researchers report that 70-90 percent of depression among late-life adults goes undiagnosed (Koenig 1999). Symptoms of late-life depression are often not recognized by patients (Mills and Henretta 2001). More than half of individuals experiencing late-life major depression are reported to have never been afflicted with depression previously (Fiske et al. 2009). This "late onset depression", compared to "early onset depression" experienced by individuals before reaching old age, is not only difficult to recognize by patients, but by medical professionals as well (Fiske et al. 2009). Often in late-life, depressive symptoms are ascribed as other medical problems (Koenig 1999).

The negative consequences of depression and depressive symptoms compound with age (Blazer 2003; Fiske et al. 2009). Depression in late-life is associated with disability, major health conditions such as diabetes, and even death (Hicken et al. 2013; Barry et al. 2008). Myriad functional disorders and chronic health conditions are consistently found to be co-morbid with mental health disorders among late-life populations (Blazer 2003; Carney and Freedland 2003; Fiske et al. 2009; Mills and Henretta 2001; Muramatsu, Yin, and Hedeker 2010). The functional restrictions, loss of identity, social connections and resources associated with adjustment to, and management of, health limitations are theorized to increase symptoms of depression and depressed mood (Fiori and Jager 2011; Muramatsu et al. 2010). In addition to physical health limitations negatively impacting mental health status, depression and depressed

mood have been found to negatively impact physical health status, as well (Fiske et al. 2009). Thus, the physical health toll resulting from these conditions can compound when depression goes undiagnosed and untreated (Blazer 2003; Fiske et al. 2009).

Interestingly, even as depression rates decline throughout the late-life period, public health and social sciences researchers find depressive symptoms are positively associated with factors of aging and longevity (Blazer 2003). Particularly, heightened prevalence of depression and depressive symptoms are attributed to: higher levels of functional limitations, physical impairment and chronic health conditions; lower sex-ratio due to women's greater life expectancy; and, lower socioeconomic resources among the "oldest old" relative to those more recently retired or still working (Blazer 2003; Fiori and Jager 2011; Mills and Henretta 2001). The simultaneous reduction in depression rates as features associated with depression rise warrant investigation into the pathways linking social life and physical health to mental health outcomes during the late-life period.

Stress and Health

Sociological examinations of health and health disparities over the past several decades have extensively emphasized the impact of social context on risk factors for disease (Link and Phelan 1995). Particularly, recent scholars have documented and highlighted the social patterning of disease (Link and Phelan 1995). Sociological models attempt to understand how an individual's characteristics and context interact with stressors to impact health (Piccolo et al. 2015). Research has consistently found disparities in both mental and physical health tend to fall along sex, racial/ethnic, and socioeconomic lines (Link and Phelan 1995).

One area of burgeoning interest in the study of social conditions as a cause of disease is in the social stress literature. Particularly, there is strong and growing evidence for the relationship between exposure to social stressors and poor mental and physical health

outcomes, including diabetes, stroke, heart disease and depression (Link and Phelan 1995; Massey 2004). Particularly, the sociological study of stress on health conceptualizes features of the social stress process – particularly the distribution of stressors and the ability to cope with their consequences – as socially patterned (Aneshensel 1992; Pearlin 1989).

The experience of stress directly impacts physical and mental health through the body's stress response system. The stress response process includes systems such as the autonomic nervous systems and hypothalamo-pituitary-adrenal (HPA) axis, which adapt to enable individuals to respond to challenges through physiological changes (Nurius, Uehara, and Zatzick 2013). The body's ability to maintain homeostasis through responding to changing environmental demands is referred to as “allostasis” (Lantz et al. 2005; McEwen 1998; McEwen and Lasley 2002; Nurius et al. 2013).

Social stress research indicates that individuals with lower socioeconomic status experience heightened allostatic load burden than do individuals with greater socioeconomic resources (Hawkley et al. 2011). Specifically, Hawkley and colleagues (2011) found that allostatic load mediates the observed association between socioeconomic status and mortality rates, with 35% of the variation in mortality across socioeconomic groups being attributed to levels of allostatic load (Hawkley et al. 2011).

Despite well-documented associations between socioeconomic indicators and allostatic load, the pathways connecting socioeconomic status to allostatic load are not yet fully documented or understood (Hawkley et al. 2011). Research identifying indicators associated with both socioeconomic status and allostatic load provide some understanding to these pathways (Hawkley et al. 2011). Five main pathways have been recognized from these association studies (See Figure 1.1): stress (Glei et al. 2007; Weinstein et al. 2003), psychosocial indicators (Glei et al. 2007; Maselko et al. 2007; Seeman et al. 2002), social support and social

networks (Maselko et al. 2007; Seeman et al. 2002), coping behaviors (Glei et al. 2007), and health behaviors (Schnorpfeil et al. 2003).

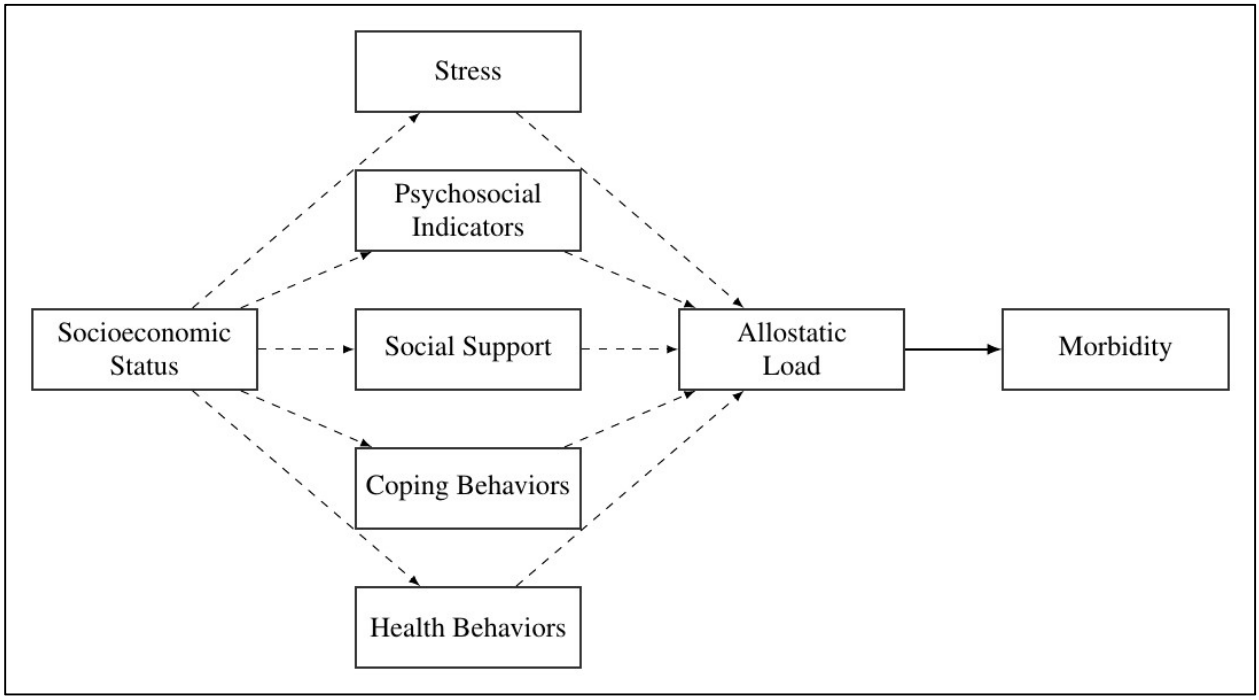

Figure 1.1 Theorized pathways between SES, allostatic load, and morbidity.

Deregulated hormones and associated responses of excessive allostatic load, such as inflammation, cause "wear and tear" on the body (Hawkley et al. 2011; Shonkoff et al. 2012; Wheaton and Montazer 2010). Stress researchers highlight that allostatic load leads to dysregulation in myriad systems within the body, impacting the brain and a wide array of bodily organs (Hawkley et al. 2011; Shonkoff et al. 2012). As a result, repeated cycles of allostasis deteriorate physical and mental health (Gehlert et al. 2008; Massey 2004; Nurius et al. 2013). This view of the stress/health relationship lends support for continued health disparities.

Extended periods of allostasis resulting from experiences of social stressors increase the likelihood an individual will experience the onset of a chronic health condition (Geronimus et al. 2015; Seeman et al. 1997). Indeed, chronic health conditions are now understood as a consequence, not a cause, of hormonal dysregulation associated with allostatic load (Hawkley

et al. 2011). As a result, allostatic load is assessed as an index of cumulative "wear and tear" across myriad systems of the body, and utilized as a preclinical indicator of health risk (Gruenewald et al. 2009). Research has thus identified chronic conditions, such as hypertension and diabetes, as well as poorer cognitive functioning, as consequences of heightened stress exposure and allostatic load (Hawkley et al. 2011; Seeman et al. 1997). This identification allows for assessment of the pathways linking stress exposure to physical health decline, and particularly, to disparities in health status and health trajectories (Hawkley et al. 2011).

The heightened deterioration of physical health among women and racial/ethnic minorities, relative to men and Whites, is posited to stem from institutional-, social-, and familial- constraints imposed on these groups (Brown et al. 2016). Specifically, heightened stress exposure throughout the life course contributes to both physical health decline and hindered ability to manage the implication of functional limitations in old age among these groups (Brown et al. 2016). As heightened allostatic load across the life course is associated with aging, frailty, decreased resistance to illness, and physical deterioration (Gruenewald et al. 2009; Hayward et al. 2000; Wheaton and Montazer 2010), cumulative stress exposure is posited to account for a large share of the physical health disparities observed across sociodemographic groups (Brown et al. 2016; Gruenewald et al. 2009).

Social Support

If allostatic load is a featured mechanism by which stress affects health, then social support is a feature that directly reduces stress, moderates the effects of stress, or promotes health directly. Scholars have long posited that social support is a valuable resource for the prevention of and management of stressful events and experiences (Link and Phelan 1995). As such, social support has been continually linked to positive mental health, physical health and general well-being (Kessler 1979; Thoits 2010; Umberson, Chen, and House 1996). The term

"social support" utilized by social science researchers incorporates many unique dimensions. Particularly, social support includes the number of ties, the efficacy of social ties in providing resources, and the source and direction of social support (Fiori and Jager 2011).

Availability of social support is linked to better health outcomes, including lower rates of depression, morbidity, and mortality (House, Umberson, and Landis 1988; Kawachi and Berkman 2001). Taylor and Aspinwall (1996) provide an additional theoretical explanation for the ways social support promotes health and well-being, which is delineated into three primary mechanisms: (1) appraisal support, (2) tangible resources, and (3) emotional support (Taylor and Aspinwall 1996). Appraisal support refers to an individual in one's social network first assessing the severity and circumstances of a stressor, and then providing information on resources or coping behaviors which may serve to ameliorate the negative consequences associated with the stressor. Tangible assistance refers to support through providing financial, information, and material resources which can serve to buffer severity or consequences of the stressor. Lastly, emotional support refers to the emotional and personal assurance an individual provides to someone in their social network to remind them of their worth (Taylor and Aspinwall 1996). Taken together, these three elements provide insight into how social support can moderate the deleterious mental health consequences of stressful life experiences.

Strong social support – including strong and/or extended family ties and religiosity – is associated with improved mental health outcomes throughout the life course, particularly for racial/ethnic minority women (Williams 2002). Strong social support is hypothesized to buffer the negative physical and mental health consequences of social stressors. As posited by House and colleagues (1985) and Taylor and Aspinwall (1996), social support can serve to both mediate and moderate the negative consequences of social stressors on health outcomes through tangible and emotional resources or support (House et al. 1985; Taylor and Aspinwall

1996). Conversely, weak social support – measured as few close relationships, few network ties, and limited perceived ability to rely upon one's network for resources and support – is linked to elevated levels of depressive symptoms across the life course (Kawachi and Berkman 2001).

Social Support in Late-Life

Positive social support is not as strongly associated with depression for late-life adults as it is for midlife adults (Fiske et al. 2009). Yet, it is important for researchers to note the strength of the association between social support and depression changes throughout the late-life period. For "oldest old" adults, there is increased need for the tangible resources and practical support afforded by social support relative to younger ages within the late-life period (Fiske et al. 2009). "Oldest old" adults tend to have higher levels of functional limitations and cognitive declines, and thus require additional help with self-care and life management than they required at the beginning of their late-life period (Fiske et al. 2009).

While social support becomes increasingly important over the course of the late-life period, the size of social networks tends to dwindle over the same time-period (Abramson 2015). Deaths among parents, sibling, friends, and other peers become more frequent over the course of an adult's life, with particularly elevated rates in one's later years (Abramson 2015). As such, "oldest old" adults experience the cumulative burden of needing greater levels of social support – particularly for tangible resources and assistance – yet have a smaller network from which the support can be drawn (Abramson 2015; Fiske et al. 2009). Widowhood or living alone is associated with worse mental health outcomes, and features of loneliness associated with these relationship statuses and living arrangements are particularly important for depression and depressive symptoms in late-life (Blazer 2003; Perreira et al. 2005).

Supporting the general framework of "similarly shaped problems", the general and common experience of the loss of an individual in one's social network, often through death,

can greatly impact the ability of late-life adults to maintain activities of their day-to-day life. For instance, instrumental support often received in late-life include assistance scheduling appointments or taking medication, delivering groceries, meals, or medical needs, and transportation to appointments, events, or social activities (Abramson 2015). As such, late-life adults can lose tangible help they received in terms of nutrition and physical health medicine, and in addition, the loss of their ability to travel to social gatherings. Research shows seniors tend to go out socially less often following the loss of a network tie that previously provided them with transportation to social outings or church services (Abramson 2015). While many adults have the option of taking public transportation, individuals with physical disabilities, functional limitations or cognitive decline may find this option difficult to navigate (Abramson 2015).

Supporting the notion of continued disparities, social network ties dwindle in late-life generally, yet, disparities exist in the slope of this trajectory across groups (Abramson 2015). Late-life adults with higher levels of education are shown to maintain social network ties at greater levels than their lower-educated counterparts (Abramson 2015). Additionally, adults with higher levels of education tend to have fewer functional limitations, chronic health conditions, and disability in late-life than individuals with lower educations levels. As such, higher socioeconomic status adults are doubly advantaged by having fewer restrictions on their mobility and independence, yet still have more social network ties to draw from in case of need (Abramson 2015).

Coping Behaviors

In addition to social support, coping behaviors may also serve to mediate the effects of stress or impact health directly. *Coping* refers to behaviors in which individuals attempt to avoid or ameliorate the negative impacts of life's problems (Aneshensel 1992; Pearlin 1989;

Thoits 1995). Research finds that unhealthy coping behaviors, including alcohol use, tobacco use, and overeating, are utilized to buffer the negative mental health effects associated with stress exposure (Collins 2001; Jackson, Knight, and Rafferty 2010; Mezuk et al. 2010; Schwartz and Meyer 2010; Williams 2001). The methods used to manage stress are influenced by an individual's (1) social context, including race/ethnicity, sex, and age, (2) cultural and social norms influencing or promoting specific behaviors, and (3) environmental context, including access to information and resources (Mezuk et al. 2013). Coping behaviors are socially patterned (Meyer, Schwartz, and Frost 2008). For instance, an individual's physical or neighborhood context can influence negative health coping behaviors, such as through widespread availability of alcohol or tobacco products. Thus, in addition to the negative physiological impacts of the body's stress-response system itself, negative health behaviors used to cope with stress, such as alcohol and tobacco use, further drive the relationship between stress and health outcomes (See Figure 1.2) (Collins 2001).

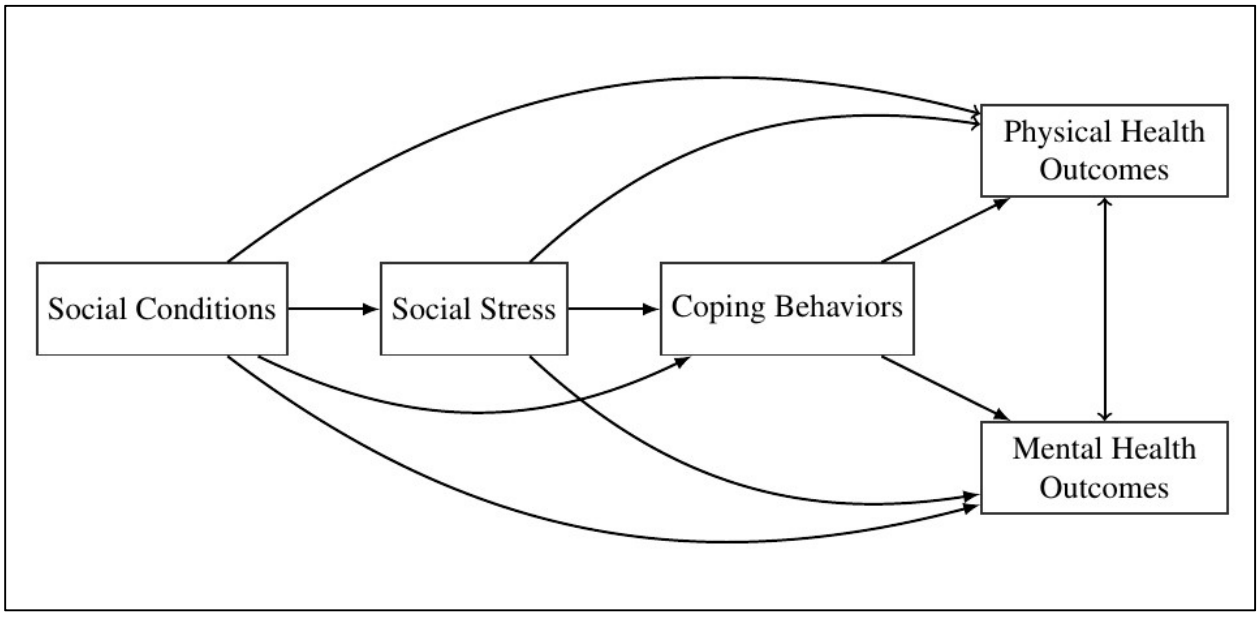

Figure 1.2 Hypothesized relationship between social conditions, social stress, coping behaviors, physical health outcomes and mental health outcomes.

Coping Behaviors in Late-Life

While the use of unhealthy behaviors to cope with distress has been well documented in the midlife period, their role during late-life is yet to be fully understood. Engagement in the unhealthy behaviors commonly associated with stressors in earlier life stages – such as alcohol use and overeating behaviors – require further examination among late-life adults. For alcohol use, studies of older adults indicate alcohol consumption tends to decline with age (Merrick et al. 2008; Moore, Endo, and Carter 2003; Moos et al. 2009), although many adults continue to engage in heavy drinking behavior in excess of the American Geriatrics Society (AGS) recommendations[1] throughout the late-life period (Kirchner et al. 2007; Merrick et al. 2008; Moore et al. 2003; Moos et al. 2009). Further, for overeating behaviors, the comorbidity observed between obesity and depression earlier in the life course may not hold during late-life. Particularly, appetite loss is a common symptom of depression and a cause of weight loss among depressed late-life adults (Blazer 2003; Fiske et al. 2009; Tiemeier 2003). Thus, the use of these behaviors to cope with distress in late-life requires further examination.

Late-Life as Distinct Period

As stated earlier, one of the themes of this volume guiding the empirical work is late-life as a distinct phase with potentially different processes, events, and trajectories relevant to health, and specifically, mental health. While the methods through which individuals cope with stressors in the late-life period differ from earlier stages in the life course, so do the roles and transitions that mark stressor experiences. Particularly, transitions in roles entering the late-life period mark this period as substantively distinct from other stages in adulthood. The years of

[1] Nutritional guidelines from the American Geriatrics Society (AGS) define heavy drinking behavior for adults 65 years and older as averaging more than 7 drinks per week, more than 1 drink per day, or more than 3 drinks in one setting (AGS 2008).

transition between midlife and late-life are rife with role transitions, reformation of identity, loss of network ties, and physical and cognitive decline (Abramson 2015; Burke 1996; Elder, George, and Shanahan 1996; Fiske et al. 2009; Perreira and Sloan 2001). The notion of role transitions marking late-life as a distinct period builds from the work of Arnett (2000) regarding emerging adulthood. Arnett argues the emerging adulthood period, spanning from the late teen years to the early twenties, encapsulates frequent and drastic changes to daily life and identity (Arnett 2000).

Differing from the emerging adulthood period, the transition into the late-life stage often resembles a dismantling of curated identities surrounding love, work, and interaction with the world (Brown and McGill 1989; Burke 1996; Gross 1970). The late-life period is one often marked by loss; loss of kin, roles, function, and agency. Perhaps the greatest contrast between emerging adulthood and the transition to the late-life stage is that changes often occur because of one's own volition in the former, and because of circumstance in the latter.

Intersectionality

As the transition into the late-life stage is marked with additional and unique stressful circumstances and transitions, it is important for researchers to note the social patterning, co-occurrence, and cascading nature of stressful life experiences. Stressful life events generally do not occur in isolation (Pearlin 1989). Individuals facing multiple forms of disadvantage face what is referred to as a "double disadvantage" in which their multiple exposures to stressors, discrimination, and structural forms of deprivation combine to cause heightened mental or physical health outcomes relative to singly disadvantaged individuals (Grollman 2014).

Individuals facing "double disadvantage" are shown to have heightened rates of depression, poor health status, and functional limitations relative to individuals not facing that double burden (Grollman 2014). For example, while the effects of job loss are likely worse for

disadvantaged individuals relative to their more advantaged counterparts, the likelihood of experiencing that job loss is already greater for individuals with lower human and social capital, such as those with lower levels of education (Rambur et al. 2005). Further, multiply disadvantaged individuals may bear additional burdens because of circumstances experienced by those in their networks (Almeida 2005; Kawachi and Berkman 2001). Known as "network stressors", the burden of excess emotional support, time, and tangible resources can cause an individual to feel distress and are socially patterned (Almeida 2005). As such, a full understanding of the impacts of stressors on mental and physical health outcomes must capture the social contexts in which stressful experiences occur.

Research has found that the multitude of stress exposures is not only additive, but is interactive with other features of social status positions, such as race/ethnicity, wherein stress operates differently and at different magnitudes for individuals based on their characteristics, contexts and circumstances (Kessler and Neighbors 1986). This conception of stress as interactive based upon features of social status position is fundamental to the intersectionality hypothesis (Brown et al. 2016; Collins 2000). Kessler and Neighbors (1986) found an interaction between race and socioeconomic status in predicting psychological stress resulting from stressful experiences, such as discrimination (Kessler and Neighbors 1986), and the direct effect of race on health remains even when socioeconomic status is controlled (House and Williams 2000). Race can be considered both a chronic stressor and a source of acute stress through experiences and threats of discrimination, negative self-views, and diminished perceived and actual social status largely tied to historical injustices (Mezuk et al. 2013; Neblett, Terzian, and Harriott 2010). In this way, the relationship between race and stress is mediated by social and environmental context (Mezuk et al. 2013).

In current literature, much of the difference in the experience of stress across sex, race/ethnicity, and socioeconomic status are not well-understood as individuals experiencing stress are often treated as a homogenous group in stress research (Perreira and Sloan 2001). Recent work is helping to develop the literature on factors contributing to health disparities across groups. First, research by Grollman (2014) provides an important framework for understanding the impact of multiple types of discrimination and stressors on mental and physical health for individuals occupying multiple disadvantaged statuses (Grollman 2014). This piece is particularly important for the field of social stress research as it provides compelling evidence that occupying multiple disadvantaged statuses results in specific and heightened stress exposures that differ from merely an "additive" approach, as if the statuses were independent.

Similarly, Cummings and Jackson (2008) expand our understanding of the role of intersectionality and multiple disadvantaged statuses through their assessment of sex and racial/ethnic disparities in self-assessed health from 1974 to 2004 (Cummings and Jackson 2008). The authors found that Black women have the lowest levels of self-reported health and the weakest educational returns to health compared to Black males, White females, and White males. The work by Cummings and Jackson (2008) is particularly important as it assesses various factors attributed to health disparities between sex and racial/ethnic groups over time, such as increasing levels of women's labor force participation over the past several decades, to assess how changing social and economic landscapes differentially impact health in relation to intersectionality. Lastly, Jackson and colleagues' (2010) work on the role of unhealthy coping behaviors in relation to stress and health outcomes is an important example of how current social stress research must conceptualize and assess various pathways through which stress, behaviors and environments impact mental and physical health for various groups (Jackson et al. 2010).

Research Overview

While recent research has begun to identify different factors and pathways leading to mental and physical health disparities between sex and race groups at older ages, the current state of the literature does not fully or confidently explain these patterns. Particularly, the literature needs a greater understanding of factors contributing to mental health outcomes and how disparities in mental health status evolve throughout the life course, particularly in the later life stage.

This dissertation aims to improve upon current understanding of how social support, life role transitions, and unhealthy coping behaviors are associated with depressive symptoms – as measured by the Centers for Epidemiologic Study of Depression (CES-D) scale – across race/ethnicity and sex in the late-life period. From information gathered on these topics, this dissertation explores the aging-as-leveler hypothesis by assessing if age serves to level or reduce, versus widen or maintain, mental health disparities across the late-life period.

The first two empirical chapters of this dissertation focus on strengthening existing understandings of how social support, life transitions, and unhealthy coping behaviors are associated with levels of CES-D depressive symptoms in late-life and disparities therein. The third empirical chapter explores the aging-as-leveler hypothesis for CES-D depressive symptoms in late-life.

Data Source

Data on individuals, households, and spouses come from the 1998-2012 waves of the Health and Retirement Study (HRS). The HRS is a nationally representative and longitudinal survey of U.S. adults over 50 years of age, with surveys conducted every two years. The HRS began in 1992 and consists of five birth cohorts. Entering the study in different calendar years,

the birth cohorts include the original HRS sample (1931-1941 birth cohorts), the Assets and Health Dynamics among the Oldest Old (1890-1923 birth cohorts), Cohort of Depression (1924-1930 birth cohorts), War Babies (1942-1947), and Early Baby Boomers (1948-1953 birth cohorts) (Luo et al. 2012).

Each cohort sampled respondents by identifying housing units utilizing a consistent stratified, multistage area probability design, and oversamples Blacks, Hispanics, and Florida residents (Ofstedal et al. 2011). HRS identified eligible household members based upon age and birth cohort. In the original HRS cohort, spouses of eligible respondents were interviewed regardless of age. Spouses and partners were interviewed or re-interviewed in subsequent waves, regardless of inclusion in previous waves of data collection. This allows for the interview or re-interview of spouses who declined interviews previously, or for the addition of new spouses or partners into the study sample (Ofstedal et al. 2011).

Chapter 2

The first empirical chapter (Chapter 2) focuses on life transitions and social support in association with CES-D depressive symptoms across sex and race groups in late-life. The chapter begins by first reviewing literature on caregiving and paid labor roles as related to identity and psychological well-being. Second, this chapter connects these discussions to issues of social support and social stressors, including the debated nature of change as inherently stressful, and issues of sex- and race- based disparities in socioeconomic resources and mental health, discussed in this dissertation's introductory chapter. Following this discussion, this chapter utilizes negative binomial regression models to measure and assess the association of caregiving and paid labor transitions and positive and negative social support with CES-D depressive symptoms across sex and race groups in late-life. Additionally, this chapter tests the

theory that change is inherently stressful, and the role of positive and negative social support as moderators between life transitions and CES-D depressive symptoms in late-life.

Chapter 3

The second empirical chapter (Chapter 3) focuses on coping behaviors which may act as buffers against the negative mental health consequences of life transitions, social support, and sociodemographic characteristics. The chapter begins by first reviewing literature on unhealthy coping behaviors – specifically alcohol consumption and overeating behaviors – as mediators of social stress and mental health outcomes. Second, this chapter connects these discussions to sex- and race- based disparities in unhealthy coping behaviors. This chapter then utilizes path analysis to analyze the role of alcohol use and overeating behaviors as potential mediators in the pathway between caregiving transitions and CES-D depressive symptoms by sex and race in late-life.

Chapter 4

The third empirical chapter (Chapter 4) explores the aging-as-leveler, peristent inequality, and cumulative disadvantage hypotheses for CES-D depressive symptoms in late-life. This chapter begins by discussing mental and physical health trajectories during the late-life period. Second, this chapter reviews literature on competing evidence and theories surrounding whether mental health disparities along sex and racial lines decrease, remain stable, or increase throughout the life course. Following this discussion, this chapter uses growth model analysis to explore the aging-as-leveler, persistent inequality, and cumulative disadvantage hypotheses for trajectories of CES-D depressive symptoms across sex and race in late-life across eight waves of the HRS (1998 to 2012). Specifically, this chapter models trajectories of CES-D depressive symptoms and functional limitations across the late-life period,

and calculates correlations between trajectories of CES-D depressive symptoms and functional limitations in late-life.

Conclusion

Overall, the following three empirical chapters focus on the mental health processes and trajectories that characterize the unique late-life period. The works fill a gap in the literature by adding to the general knowledge of health in this distinctive life stage by moving beyond physical health to explore depressive symptoms during late-life. In addition, the works specifically juxtapose competing frameworks of similarly shaped problems and cumulative disadvantage to better understand why observed differences in mental health outcomes may be reduced, maintained, or widen during the late-life period.

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Chapter 2 Life Transitions, Social Support, and CES-D Depressive Symptoms in Late-Life

Introduction

It is projected that individuals aged 65 and above will constitute 21.7% of the United States population by 2040, growing from 14.1% of the United States population in 2013 (Administration on Aging 2014). Due to declining mortality rates, individuals aged 65 and above make up a larger share of the population within the United States than ever before (Abramson 2015; Ailshire and Crimmins 2011). As such, aging has become a more common experience for individuals, and more of us can expect to live to old age today than for any previous generation (Abramson 2015; Ailshire and Crimmins 2011).

While more individuals can expect to live into old age than at any other point in history, vast inequality remains in the trajectories of health and quality of life within the aging process (Abramson 2015). Particularly, the increase in longevity overall, paired with the reality of continued inequalities in health going into old age, has sparked questions and research into the aging experience (Ailshire and Crimmins 2011).

Quality of Life in Old Age

As more individuals today are living to see old age, some scholars have argued that late-life is a time when adults encounter what Bordieu described as “similarly shaped problems” (Abramson 2015). The idea of “similarly shaped problems” in late-life assumes that all individuals endure declines in functional abilities, cognitive function, and other medical events associated with late-life morbidity and mortality (Abramson 2015). More specifically, holders of this viewpoint see late-life as a time when disparities in morbidity and mortality observed in earlier periods of life dissipate. Unlike earlier periods, when large disparities in physical and mental health and mortality are observed across groups based on factors such as

race/ethnicity, wealth, and education, during the late-life period, everyone will eventually experience illness and death, and therefore, a reduction in differences attributable to base status characteristics such as race/ethnicity and socioeconomic status. Further, "similarly shaped problems" in late-life may extend not only to a reduction in socioeconomic-based disparities, but sex-based disparities as well. Role experiences and stressors shown to vary by sex in earlier life periods may become more similar for men and women following retirement and/or the raising of children.

In this way, the late-life period provides a unique lens to understand if and how disparities observed during earlier periods of the life course play out in old age (Abramson 2015). Particularly, starting from the assumption that individuals all face "similarly shaped problems" – the premise being there is both a physiological drive toward similarity and a more equal distribution of outcomes and resources – during late-life, deviations from that expectation may provide valuable insight into the mechanisms driving continued stratification, should stratification continue to be observed.

The assumption that individuals face similar trajectories of morbidity and mortality in late-life stems from observations of a narrowing in disparities across health and wellness outcomes during this stage (Adler and Stewart 2010; Willson, Shuey, and Elder 2007). Levels of self-rated health, self-rated cognitive function, and prevalence of depression and depressive symptoms decline with age (Fiori and Jager 2011; Perreira et al. 2005). It is interesting to note prevalence rates of depression and depressive symptoms decline as adults enter late-life (Fiori and Jager 2011; Perreira et al. 2005), while at the same time, individuals in late-life have high rates of stressors and other risk factors, such as declining physical and cognitive functioning, found to be associated with depression and other poor mental health outcomes (Fiori and Jager 2011; Fiske, Wetherell, and Gatz 2009; Perreira et al. 2005). Particularly, the majority of

individuals in late-life experience some form of disability or cognitive or physical health decline, bereavement, and limited availability of social support or social interaction (Fiske et al. 2009; Perreira et al. 2005).

Quality of Life in Old Age: by Sex

While rates of depression decline overall, research continually finds women report higher levels of depressive symptoms and greater prevalence of clinical depression in late-life than do men (Fiori and Jager 2011). Initial explorations from social stress researchers attributed observed differences to varying levels of exposure and vulnerability to stressors by sex (Turner and Turner 1999), as research shows exposure and vulnerability to stressful experiences are associated with depression and depression symptoms throughout the life course (Turner, Wheaton, and Lloyd 1995). Specifically, researchers posited women tend to be exposed to more stressors, and are more vulnerable to the mental health consequences associated with stress exposure (Turner and Turner 1999). However, more recent work finds women have comparable levels of exposure to stressors as do men (Harkness et al. 2010; Meyer, Schwartz, and Frost 2008).

There are observed differences in types of stressors to which men and women are exposed, and the use of coping resources utilized by men and women to buffer the negative consequences of stress exposure (Harkness et al. 2010; Meyer et al. 2008). Longitudinal studies lend only moderate support for the notion that exposure to stressors is more strongly associated with major depression for women than for men (Harkness et al. 2010). Instead, researchers posit that the types of stressors to which women are more commonly exposed are more strongly associated with major depression than are the types of stressors to which men are more commonly exposed (Harkness et al. 2010). Particularly, women are more commonly exposed to network stressors, and men are more commonly exposed to work related stressors

(Grzywacz et al. 2004; Harkness et al. 2010). As such, utilizing counts of stressful life events without taking these differences in stressful typology into account do not fully capture the differing stress experiences of men and women (Harkness et al. 2010).

Guiding Questions and Methodology

This chapter will provide a snapshot of how existing understandings of social support and life transitions are associated with CES-D depressive symptoms in late-life. Specifically, the goal of this chapter is four-fold. One – measure the association among specific life transitions, as measured by becoming a caregiver to a grandchild, ailing spouse, or ailing parent, or experiencing a change to paid work status, with levels of CES-D depressive symptoms in late-life. Two – measure the association of both positive and negative social support on levels of CES-D depressive symptoms in late life. Three – test if life transitions are "inherently stressful" through assessment of whether or not life transitions are consistently and significantly associated with elevated levels of CES-D depressive symptoms across sex and race, above and beyond the level of those variables. Four – test an interaction among specific life transitions with both positive and negative indicators of social support to assess if positive and/or negative social support moderate the association among specific life transitions and levels of CES-D depressive symptoms. Models are split by sex and race to assess if the associations among specific life transitions, social support, and CES-D depressive symptoms differ across groups.

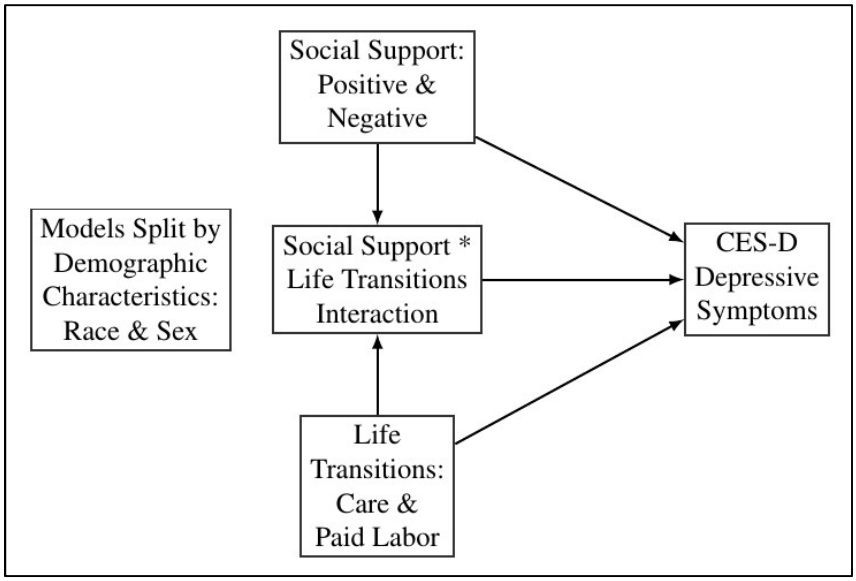

Figure 2.1 Hypothesized relationship between social support, life transitions, and CES-D depressive symptoms.

Social Support

Factors protective of mental health status include social support and network stability, both of which decline throughout the late-life period (Perreira et al. 2005). So, it is interesting to note declining prevalence of depression occurring at the same time in life when there is a decrease in these protective factors (Perreira et al. 2005). Social support is consistently highlighted to buffer the association among life stressors and mental and physical health outcomes in late-life (Fiske et al. 2009). Specifically, having larger social networks and more close relationships is linked to decreased levels of depressive symptoms (Kawachi and Berkman 2001).

Social Support Models

Scholars have long posited that social support is a valuable resource for the prevention and management of stressful events and experiences (Link and Phelan 1995). As such, social support has been continually linked to positive mental health, physical health and general well-being (Kessler 1979b; Thoits 2010; Umberson, Chen, and House 1996). The ability of social

support resources to aid management of stressful events in late-life is shown in studies of seniors living in supportive homes and engaging in community-based services. In a recent study, Muramatsu and colleagues (2010) find informal support from non-spouse family and friends aid in lowering rates of depression and depressive symptoms, which the authors attribute to informal social support buffering the impact of stressor on mental health outcomes (Muramatsu, Yin, and Hedeker 2010). Two main models of social support's role in the stress-health relationship, proposed by Cohen and Wills (1985), have been asserted and tested in the literature: the main effect model and the stress-buffering model (Cohen and Wills 1985; Kawachi and Berkman 2001).

In the main-effects model, social support is proposed to directly impact mental health by providing a general sense of well-being and stability to individuals with supportive networks (Cohen and Wills 1985). Additionally, social networks provide information and motivation for health-promoting behaviors, such as exercise, proper nutrition, and abstinence from cigarette smoking and other toxic substances (Kawachi and Berkman 2001). Engagement in health-promoting behaviors serves to improve both physical and mental health outcomes (Kawachi and Berkman 2001). Research lends support to the notion individuals with greater levels of social support are more compliant with medical regimens and are more likely to engage in healthful behavioral practices (Taylor and Aspinwall 1996). In this way, the main effect model of social support indicates social support is beneficial for the mental and physical health outcomes of individuals regardless of whether they are exposed to stressful events or experiences (Kawachi and Berkman 2001; Taylor and Aspinwall 1996). Thus, social support is hypothesized to directly impact physical and mental health outcomes through the structural aspects of social support, such as network size, structure, and social integration (Kawachi and Berkman 2001).

In the stress-buffering model, however, social support is posited to only benefit the mental and physical health outcomes of individuals once they are already exposed to stressful events or experiences (Kawachi and Berkman 2001; Taylor and Aspinwall 1996). Specifically, the stress-buffering model views social support as a social "fund", as social support allows individuals to draw upon the resources of their social networks in times of need (Thoits 2010). House and colleagues (1985) and Taylor and Aspinwall (1996) posit social support buffers the negative consequences of social stressors on health outcomes through appraisal, tangible, and emotional resources or support (House et al. 1985; Taylor and Aspinwall 1996). Appraisal support refers to an individual in one's social network first assess the severity and circumstances of a stressor, and then provide information on resources or coping behaviors which may serve to ameliorate the negative consequences associated with the stressor. Tangible assistance refers to support through providing financial, information and material resources which can serve to buffer severity or consequences of the stressor. Lastly, emotional support refers to the emotional and personal assurance an individual provides to someone in their social network to remind them of their worth (Taylor and Aspinwall 1996). Through these various resources, social support is hypothesized to buffer the negative physical and mental health consequences of social stressors through the functional aspects of social support (Kawachi and Berkman 2001).

Sex Differences in Social Support

Research highlights social support's moderating effect on the association of stressful life events on mental health outcomes among adults in late-life (Fiske et al. 2009). While social support is consistently shown to bolster psychological well-being, social network ties can also be detrimental to mental health. Individuals with strong social network ties can feel distress because of circumstances experienced by those in their networks (Almeida 2005; Kawachi and

Berkman 2001). In addition to the extensive research finding that social networks provide support to individuals in times of need, researchers and scholars have also long noted that social networks can cause individuals to experience considerable strain (Belle 1982; Fiori and Jager 2011; Kawachi and Berkman 2001; Rutter 1985). For example, if a family member or friend loses their job, one may feel the need to help them financially or emotionally. Known as "network stressors", the burden of emotional support, time, and tangible resources can cause an individual to feel distress (Almeida 2005).

Women are more negatively affected by stressors related to their social networks than are men (Conger et al. 1993; Mills and Henretta 2001; Turner and Turner 1999). Women experience stress from their social networks both from reacting to a negative life event experienced by a loved one, as well as being more reactive than men to social strains and social and care obligations (Kessler 1979b). In patriarchal societies where women are primarily responsible for the emotional and physical care of kin, women are more likely than men to subsume the emotional burden of network stressors (Brown, Richardson, and Hargrove 2016). Referred to as the "contagion of stress", women are more likely than men to suffer the negative mental, emotional, and tangible consequences of stressful life events experienced by individuals in their network (Kawachi and Berkman 2001). Women's social networks tend to be larger, closer, and more emotionally intimate than men's social networks, and as a result, women more often exchange social support – as measured by giving and receiving social support and resources – than do men (Belle 1987; Fiori and Jager 2011). This unequal exchange of social support by sex, specifically in terms of providing social support, is coined the "support gap" (Belle 1987). The gap is particularly prominent in dyadic relationships, such as spousal relationships, wherein women overwhelmingly provide more social support than they receive, and men receive more social support than they provide (Belle 1987; Kawachi and Berkman 2001).

At all ages, women report higher levels of stress, worry and sadness than do men (Stone et al. 2010). Thus, differences in actual support received from social network ties is posited to be a key reason for the disparate rates of distress and depression observed among women relative to men. (Kawachi and Berkman 2001). Social network ties may actually increase distress among women, whereas it is overwhelmingly beneficial for levels of distress and depression among men (Kawachi and Berkman 2001). Research indicates limited social support is associated with greater prevalence of depression and depressive symptoms for older men, but not for older women (Blazer 2003). Despite these strains and sex differences, researchers generally concur social support provides a net benefit to mental and physical health (Kawachi and Berkman 2001).

Care Role

A burgeoning area of research in the literature on stress and depression in late-life centers on the impact of spousal disability and impairment on an individual's mental health (Muramatsu, Yin, and Hedeker 2010). Previous research has highlighted that an individual's increasing age, physical health conditions, and mental health conditions all negatively impact spouse's mental health (Muramatsu et al. 2010; Nolen-Hoeksema & Ahrens, 2002). These associations are often attributed to the distress associated with caring for an ailing spouse.

The distress associated with caring for an ailing spouse or family member is posited to result from the functional actions of caregiving, above and beyond the emotional effects of having an ill loved-one (Aneshensel 1996). For caregivers of dementia patients, for example, the actions of assisting and monitoring the dementia patient can be time consuming, exhausting, and emotionally and physically draining (Aneshensel 1996). Caregiving stress is posited to lead to emotional distress in a multitude of ways. The demands of caregiving are often at odds with

other life responsibilities in terms of time commitments and financial resources (Amirkhanyan and Wolf 2006).

Particularly, family caregivers often have other familial or work demands and obligations for which they are responsible, on top of providing functional and emotional care for the ill patient. As a result, the competing demands overburden caregivers and can cause emotional distress (Aneshensel 1996). Research finds family caregivers employed in the paid labor force frequently find their familial caregiving responsibilities interrupt work responsibilities, and thus, caregiving stress can cause work-related problems, and caregivers thusly experience job stress, in addition to caregiving stress (Aneshensel 1996).

Stress theorists understand caregiving stress as a complex and multi-dimensional process (Amirkhanyan and Wolf 2006). There is heightened awareness of the distinct patterns of primary stressors and secondary stressors for caregivers. Primary stressors in this context refer to the emotional toll of having an ailing loved-one. Secondary stressors, then, are the difficulties and burdens the caregiver experiences as a result of providing care. As such, stress associated with missing a day of work due to a care emergency, and perhaps a needed paycheck from that day of work, are examples of secondary stressors resulting from care duties (Amirkhanyan and Wolf 2006).

Research finds caregivers suffer from twice as many depressive symptoms, on average, than do their non-caregiving counterparts (Elder, George, and Shanahan 1996). This psychiatric burden overwhelmingly falls onto the shoulders of women. Daughters are twice as likely to become caregivers to an ailing parent than are sons (Amirkhanyan and Wolf 2006; Meyer et al. 2008), and the heightened caregiving burden for women is not limited to only their own parents. When a son assumes a caregiving role for an ailing parent, it is his wife or partner who tends to perform most of the caregiving duties (Cantor 1983; Elder et al. 1996).

Gendered expectations for caregiving responsibilities play an important role in women's increased likelihood to become caregivers relative to men and place heightened responsibility on women for parental caregiving (Amirkhanyan and Wolf 2006; Moen 1997). The expectation for responsibility is so normative for women, that not only do caregiving women experience greater levels of depressive symptoms relative to non-caregivers, but non-caregiving women with ailing parents experience greater levels of depressive symptoms relative to non-caregiving men with ailing parents (Amirkhanyan and Wolf 2006). This finding is interpreted as the unwillingness or inability to assume one's "responsibility" for parental care takes a greater psychological toll on women than for men, as it is a larger part of women's expectations and identity than it is for men (Moen 1997).

The burden of caregiving is not only unequally distributed based upon sex or gender, but also upon socioeconomic status. When an ailing parent, or their family, cannot afford to hire functional assistants or for residence in a senior living community, the family is understood to be responsible for their daily care. In this way, women of lower socioeconomic status are more likely than women of higher socioeconomic status to be providing functional care for an ailing parent and/or caring for them in their own home (Abramson 2015).

Cohort, age, and period effects are important to consider for researchers in this domain for several reasons (Elder et al. 1996). First, increased lifespan has served to increase the prevalence and duration of elderly care in the United States. As the demands of caregiving overwhelming fall upon the shoulders of women, increases in longevity have resulted in increased caregiving responsibilities over time. At the same time, women have taken a greater role in the paid workforce, with women of more recent cohorts being more likely to be employed in the paid labor force than women of previous generations (Elder et al. 1996; Moen, Robison, and Fields 1994).

However, gendered expectations in family roles have not adapted to accommodate women's paid labor roles (Elder et al. 1996). As a result, women in more recent cohorts are more likely to face a multitude of burdens, often placing familial duties, paid labor duties, and caregiving responsibilities at competition with one another, than are women of older cohorts (Elder et al. 1996; Moen et al. 1994). Researchers refer to this as "dual role occupancy" when individuals, particularly women, have primary work- and familial- obligations for which they are responsible (Meyer et al. 2008). Dual role occupancy is additionally understood in the literature as "role overload" (Meyer et al. 2008). Implicit in the performance of multiple roles is the understanding that those roles may often be in competition against one another for time and resources (Meyer et al. 2008). As a result of role overload, gender is an important indicator of stratification in role-related distress (Meyer et al. 2008). Late-life adults, particularly individuals over 65 years of age, are less likely to be engaged in the paid labor force than young adults or those in midlife, and thus, less likely to assume multiple roles simultaneously. Understanding the social stress and mental health implications of being a caregiver in late-life, when this dynamic has shifted, requires further examination.

Job Role

Job stress is consistently found to negatively impact mental health outcomes (Ramirez et al. 1996). Extensive research into the mental health outcomes among lawyers highlight the role of job stress in increasing depressive symptoms and feelings of burnout (Kobasa 1982; Niedhammer et al. 1998). Karasek's job-stress model (1979) is one of the most widely-cited models explaining the association between job stress and mental health outcomes (Karasek 1979; Wallace 2005). The job-stress model highlights two key feature linking job stress to health outcomes: (1) excessive demands placed on the worker, and (2) limited decision latitude and perceived control (Karasek 1979). In this way, the job-stress model links job stress among

workers with limited decision latitude to poor physical health outcomes (Karasek 1979). Late-life adults, particularly individuals over 65 years of age, are less likely to be engaged in the paid labor force than young adults or those in midlife. As a result, understanding social stress drivers of distress among late-life adults as they move out of the paid labor force requires further examination.

Late-Life Transitions as Stressors

A current limitation in the measurement of social stress lies in the debate regarding if life changes are inherently stressful. A long and continuing debate in the social stress field centers on if change itself is central to why life events are stressful, or if undesirability of a given life event is necessary for the stress experience (Brown and Harris 1978; Dohrenwend 1973; Holmes and Rahe 1967; Pearlin 1989; Thoits 1995). As the social stress field continues to overwhelmingly use life-events checklists derived from an assumption about change as dangerous, our current understanding of the impact of stress is grounded in this assumption.

The original life-events checklist developed by Holmes and Rahe (1967) assumes that all change is stressful as it taxes individuals' biological stress response systems through required adaptation (Holmes and Rahe 1967). However, other theorists and supporting research hold that changes that are undesired or unscheduled are the most harmful to mental and physical health through the stress process (Brown and Harris 1978; Pearlin 1989). In this way, understanding the context in which life events and changes occur is central to assessing the impact of those changes on mental and physical health outcomes.

A transition that is often viewed as inherently stressful is retirement. However, individuals of lower socioeconomic status may be less likely to retire, retire at older ages, and/or in response to illness or disability. Additionally, they may *experience* retirement

differently because of lower savings and benefits relative to their higher socioeconomic status counterparts. As such, contextual factors relating to the choice/ability to retire, and the experience of retirement related to health and financial stability must be considered when assessing the role of the retirement transitions in the stress and CES-D depressive symptom relationship.

Identity & Late-Life Transitions

One way to conceptualize late-life transitions as potentially inherently stressful stems from the association between care roles and job roles with personal identity. Identity theory posits that individuals' self-concept is largely tied to one's role identity (Burke 1996; Goffman 1959). In this context, a role can be one's position within the family, the workplace, or other facet of the social structure. According to Goffman (1959), the socially- and personally-constructed meaning surrounding one's role forms the basis for an individual's view of themselves (Goffman 1959). In this way, individuals use their role within the social structure to provide meaning, expectations, and value to their personal identity.

Self-concept being tied to social roles has specific benefits. Individuals can utilize commonly-held expectations surrounding their roles to inform behavior (Burke 1996). For instance, understanding oneself as a "wife" or "husband" based upon socially-constructed views of those roles allows individuals to understand societal and familial expectations for their roles, behaviors, responsibilities, and restrictions connected to their position within this role (Burke 1996).

Identity theory is utilized in the social stress literature to understand how changes to one's role in the social structure is associated with experiences of stress or negatively mental states. Particularly, when individuals experience a change in a role, such as through losing or

changing jobs, or getting married or divorced, their self-concept changes as well (Burke 1996). Identity theory purports that role disruptions will lead to distress, feelings of uncertainty, and behavioral changes (Brown and McGill 1989; Burke 1996; Gross 1970).

Specifically, feelings of incongruence can occur (Burke 1996; Gross 1970). When one's self-concept no longer aligns with their role, individuals can be left feeling uncertain about their expectations, place, and value (Burke 1996; Gross 1970). Social stress research utilizing identity theory has observed that incongruence can lead to physical, mental, and emotional distress, as individuals must redefine their own identity and self-concept in the absence of previously-held role expectations and/or navigate the meanings and expectations associated with a new role (Brown and McGill 1989; Burke 1996).

The heightened stress exposure experienced by women relative to men has been attributed to sex role theory, which posits that gender stratification and socialization increase women's exposure to stress by way of their social networks (Aneshensel, Rutter, and Lachenbruch 1991; Kessler 1979a; Pearlin 1989; Turner and Turner 1999). Specifically, women's identity formation is more strongly tied to their social networks and intimate relationships that make them more vulnerable to the stressful life events experienced by family members and friends (Turner and Turner 1999). This is seen in that most often cited forms of daily stress for women are (1) interpersonal stressors and (2) network stressors (Grzywacz et al. 2004). Research has found that, especially for women, greater stress exposure is associated with poorer mental health outcomes including greater depressive symptoms (Turner and Turner 1999).

Late-Life as Distinct Period

Transitions in roles entering the late-life period mark this period as substantively distinct from other stages in adulthood. The years of transition between midlife and late-life are rife with role transitions, reformation of identity, loss of network ties, and physical and cognitive decline (Abramson 2015; Burke 1996; Elder et al. 1996; Fiske et al. 2009; Perreira and Sloan 2001). This theory builds from the work of Arnett (2000) regarding emerging adulthood. Arnett argues the emerging adulthood period, spanning from the late teen years to the early twenties, encapsulates frequent and drastic changes to daily life and identity (Arnett 2000). Demographic and normative shifts occurring since the mid-twentieth century altered expectations for individuals in their late teen years to early twenties to enter marriage and parenthood during this period (Arnett 2000). As a result, marriage and parenthood are now delayed into later years, and the emerging adulthood period is marked by self-exploration forming one's identity, particularly in the realms of love, work, and worldviews (Arnett 2000). However, it should be noted, Arnett concedes this period is culturally constrained, and as such, not all individuals can engage in self-exploration for identity formation during this period. Arnett argues this period is volatile in consequence.

Transition into the late-life period, conversely, often resembles a dismantling of these curated identities surrounding love, work, and interaction with the world (Brown and McGill 1989; Burke 1996; Gross 1970). The late-life period is one often marked by loss; loss of kin, roles, function, and agency. Perhaps the greatest contrast between emerging adulthood and the transition to the late-life period is that changes often occur as a result of one's own volition in the former, versus as a result of circumstance in the latter. While the period encompassing retirement is often referred to in the literature as "mature adulthood" (ages 50-80), the years directly surrounding major life transitions out of one's midlife identity may be a distinct period worthy of exploration. The specific ages associated with this period will differ per individuals'

specific life pathways, as it seeks to define the life course in terms of stages and transitions transformative to one's identity.

Research Motivations

While recent research has begun to identify different factors and pathways leading to mental and physical health disparities between sex and race groups at older ages, the current state of the literature does not fully or confidently explain these patterns (Fiori and Jager 2011). Particularly, the literature needs a greater understanding of factors contributing to mental health outcomes in relation to social support and role transitions in the late-life period. In this paper, I look at the specific effects of caregiving and paid labor transitions, and the roles of positive and negative social support, as they relate to CES-D depressive symptoms in late-life. I specifically focus on these caregiving and paid labor transitions from a role identity framework, allowing for a greater sociological understanding of the mechanisms by which transitions may be "inherently stressful" for individuals in late-life, and if early late-life marks a unique stage warranting distinct theoretical and empirical exploration.

Data and Methods

Using negative binomial regression models, this chapter will provide a snapshot of how existing understandings of social support and life transitions are associated with CES-D depressive symptoms in late-life. Specifically, the goal of this chapter is four-fold. One – measure the association among specific life transitions, as measured by becoming a caregiver to a grandchild, ailing spouse, or ailing parent, or experiencing a change to paid work status, with levels of CES-D depressive symptoms in late-life. Two – measure the association of both positive and negative social support on levels of CES-D depressive symptoms in late life. Three – test the theory that life transitions are "inherently stressful" through assessment of whether or not life transitions are consistently and significantly associated with elevated levels of CES-D

depressive symptoms across sex and race, above and beyond the level of those variables. Four – test an interaction among specific life transitions with both positive and negative indicators of social support to assess if positive and/or negative social support moderate the association among specific life transitions and levels of CES-D depressive symptoms. Models are split by sex and race to assess if the associations among specific life transitions, social support, and CES-D depressive symptoms differ across groups.

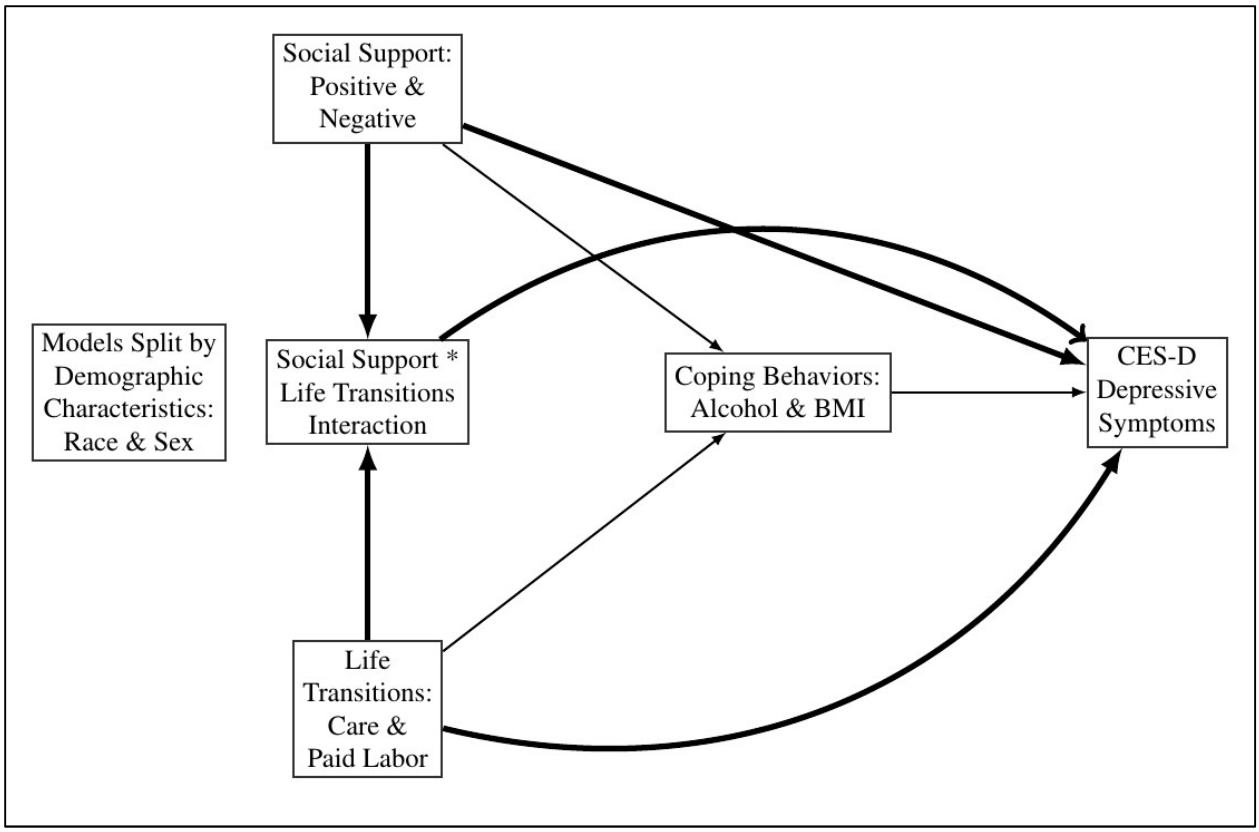

Figure 2.2 Hypothesized relationship between social support, life transitions, coping behaviors, and CES-D depressive symptoms. Focus of this chapter indicated with bolded pathways.

Health and Retirement Study

This study utilizes data from the 2010 and 2012 Health and Retirement Study (HRS) and the 2012 Health and Retirement Study Leave-Behind Psychosocial Questionnaire. The HRS is a nationally representative and longitudinal survey of U.S. adults over 50 years of age, with

surveys conducted every two years. The HRS began in 1992 and consists of five birth cohorts, entering the study in different calendar years. This study incorporates data from three cohorts; the HRS sample (1931-1941 birth cohorts), aged 51 to 61 at the beginning of the HRS study, the Aging and Health in America (AHEAD) sample (born 1923 or earlier) and the Children of Depression (CODA) sample (1924-1930 birth cohorts) (Ofstedal et al. 2011).

Beginning in 2004, the HRS added an additional psychosocial "leave-behind" questionnaire to obtain additional information from respondents not included in the Core questionnaire. A random subsample of HRS respondents is selected and receive the questionnaire following the in-person Core interview. The questionnaire is self-administered, and has a response rate of about 90%, for those given the questionnaire. This analysis utilizes measures exclusive to the psychosocial leave-behind questionnaire, so restricts the HRS sample to only those receiving and answering the questionnaire (Clarke et al. 2008).

In this analysis, only primary respondents are included in the sample. This analysis will focus on non-Hispanic Black and White differences only. The sample utilized in this analysis included 1,473 individuals from the HRS cohort, 778 individuals from the AHEAD cohort and 1,362 individuals from the CODA cohort. In sum, the analysis includes 3,613 individuals.

Statistical Analyses

Data management, sample weighting and statistical analyses were conducted in R, version 3.3.1. Sample weights were applied using HRS guidelines, and provide adjustments for birth cohort, sex, race/ethnicity, attrition, and mortality (HRS n.d.). Multiple imputation (5 imputations) was conducted utilizing R's Amelia package to impute missing values on other covariates. A linear time effect was assumed for the imputation models. Multiple imputation allows for complete cases to be utilized, limiting omitted variable bias and to obtain robust standard errors (Rubin 1996).

Negative binomial regression models were utilized to first measure the association among specific life transitions, as assessed by becoming a caregiver to a grandchild, ailing spouse, or ailing parent, or experiencing a change to paid work status, with levels of CES-D depressive symptoms in late-life (Models 1a-c). Second, negative binomial regression models are used to measure the association of both positive and negative social support on levels of CES-D depressive symptoms in late-life (Models 2a-c). Third, caregiving roles and paid work status are added as covariates to the negative binomial regression models to test the theory that life transitions are "inherently stressful", by assessing if life transitions are consistently and significantly associated with elevated levels of CES-D depressive symptoms, above and beyond that of ones' status related to caregiving or paid labor (Models 3a-c). Lastly, interaction terms among caregiving and paid labor transitions with both positive and negative indicators of social support is added to the negative binomial regression models to assess if positive and/or negative social support moderate the association among specific life transitions and levels of CES-D depressive symptoms (Models 4a-f).

Weighted negative binomial regression models were conducted using R's generalized linear modeling function with a negative binomial distribution. Negative binomial models were selected based upon the count of CES-D depressive symptoms not being normally-distributed among this sample, but instead more closely resembling a negative binomial distribution (see Figure 2.3).[2],[3] To calculate model coefficients and results independently by sex and race, models

[2] Weighted multivariate linear regression models were conducted using R's linear modeling function with models split by sex and race groups. Results from the multivariate linear regression models were substantively similar to the negative binomial regression models, so were excluded from the analysis. See Tables 2.7-2.11 in Appendix 2A.

[3] To measure the association between covariates and the probability of experiencing clinical depression (measured as reporting 4+ CES-D depressive symptoms), weighted linear probability models were conducted using R's generalized linear modeling function with a quasi-binomial distribution. The quasi-binomial distribution includes an extra parameter, compared to the binomial distribution, to account for additional variance. This approach is computationally synonymous with calculating models utilizing robust standard errors. Results from the linear probability models were substantively similar to the negative binomial regression models, so were excluded from the analysis. See Tables 2.12-2.16 in Appendix 2A.

were split by sex -and race- utilizing a wrapper function from R's dplyr package. This wrapper function splits the dataset into sex- and race- specific datasets while estimating the regression models independently from those data. All models control for the sociodemographic characteristics of age, wealth, income, and education.

Measures

CES-D Depressive Symptoms

The primary outcome measure of this study of depressive symptom score was measured utilizing the Centers for Epidemiologic Study of Depression (CES-D) scale. The 8-item version of the CES-D included in the HRS asks respondents yes or no questions relating to feelings experienced "much of the time during the past week". The feelings included in the scale are: "felt depressed", "everything was an effort", "sleep was restless", "was happy" (reverse coded), "felt lonely", "enjoyed life" (reverse coded), "felt sad", and "could not get going". Loneliness is posited to operate differently and independently from other measures of depressive symptoms among older populations (Cacioppo, Hughes, and Waite 2006; Luo et al. 2012). As such, this analysis utilizes a shortened measure of the CES-D scale outcome in which loneliness is excluded (Luo et al. 2012). "Yes" CES-D symptom responses from the remaining indicators were summed to create a CES-D score, with higher scores representing elevating levels of depressive symptoms, with a maximum score of depressive symptoms of 7.

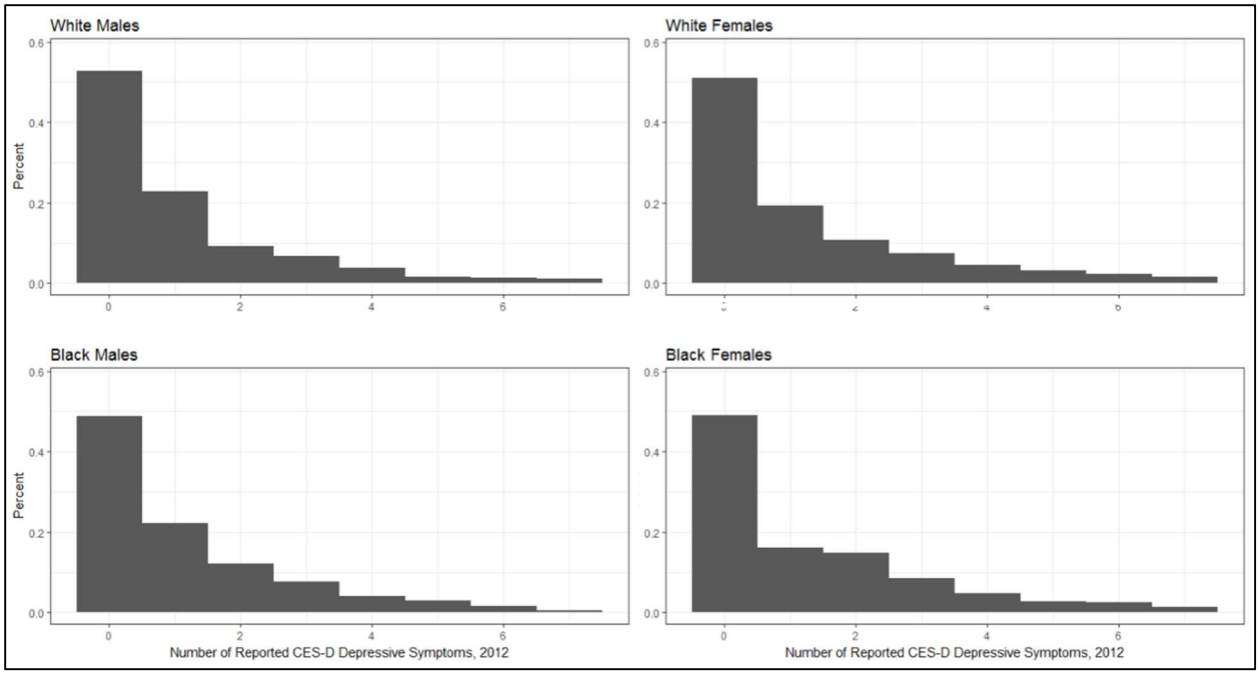

Figure 2.3 CES-D Depressive Symptoms by Sex and Race: Health and Retirement Study, 2012. Upper: White Males and White Females. Lower: Black Males and Black Females.

Demographic Information

Age is measured in years. This analysis focuses on differences between non-Hispanic Black and non-Hispanic White respondents. As such, Race is measured as non-Hispanic Black and non-Hispanic White.

Socioeconomic Status

Education is measured as years of education. Education is included in the model as individuals with higher levels of education report larger social networks and lower levels of depressive symptoms than individuals with lower levels of education (Ajrouch, Blandon, and Antonucci 2005; Fiori and Jager 2011). Income is measured as total household income. Income is included in the model as individuals with higher incomes report larger, more connected, and more supportive social networks and lower levels of depressive symptoms than individuals with lower incomes (Fiori and Jager 2011; Krause 2001). However, income may not be a strong

indicator of financial well-being in late-life, as many individuals are retired. As such, this study also uses wealth as an indicator of financial stability. Due to a positively skewed distribution of income among the HRS sample, income is logged in this analysis. Wealth is measured using a RAND HRS wealth extract, which combines total wealth holdings (including real estate, transportation, business, and investments holdings), net of mortgage loans and other debts. Due to a positively skewed distribution of wealth among the sample, positive wealth is logged in this analysis. Negative wealth values (debt) are converted to near-zero values (0.0000001) before logging (Smith and Cicchetti 1974).

Social Support

Respondents were asked a series of questions for positive and negative social support from spouses, children, family, and friends. Positive social support is assessed using the HRS questions asking respondents how much they agree on a scale of 1 to 4 (1 = a lot, 2 = some, 3 = a little, and 4 = not at all) with the statements about their social network branch, including if the respondent feels their social network "understands the way they feel", "can rely on them" and "can open up to them". The indicators are reverse-coded so higher values represent more positive social support. Negative social support is assessed using the HRS questions asking respondents how much they agree (not at all, a little, some, or a lot) with the statements about their social network branch, including if the respondent feels their social network "makes too many demands on them", "criticizes them", "lets them down when counting on them" and "gets on nerves". Indicator scores from each social network branch (spouses, children, family, and friends) are averaged to create a summary measure of social support, with higher scores representing more negative social support.

Caregiving

Spouses

Spousal disabilities are measured using the HRS measure of instrumental activities of daily living (IADL) tasks, in which individuals are asked to report if they have any difficulty in performing the physical tasks of using a telephone, taking medication, handling money, shopping, or preparing meals. Respondents are assessed as spousal caregivers if their spouse has at least one functional disability.

Parents

Respondents are asked if they provided 100 hours or more of assistance in the past 12 months for a parent or parent-in-law with errands, household chores or transportation. “Yes” responses are assessed as respondents being providers of parental care.

Grandchildren

Respondents are asked if they provided 100 hours or more of assistance for grandchildren or great-grandchildren in the past 12 months. “Yes” responses are assessed as respondents being providers of grandchild or great-grandchild care.

Any Family Member

A comprehensive binary measure is constructed in which respondents are a caregiver of any family member if they are assessed as being caregivers for at least one of the spouse, parent, or grandchild care groups.

Retirement from Paid Labor

Retirement is measured by being “completely” or “partly” retired.

Life Transitions

Caregiving transitions are indicated by being a caregiver in 2012 for a spouse, parent, or grandchild, when the respondent did not report being a caregiver for that care group in 2010. Paid labor transitions are indicated by being completely or partly retired in 2012, when the respondent did not report being retired in 2010.

Results

The weighted characteristics of the HRS 2012 data are reported in Table 2.1. The weighted HRS sample includes 987 White males (27.3%), 1,999 White females (55.3%), 172 Black males (4.8%) and 455 Black females (12.6%).

Among White males, the average age is 82.33 years and the distribution of cohort membership is 21.1% AHEAD, 40.8% CODA, and 38.1% HRS. The socioeconomic status indicators include average completed education of 12.83 years, an income of $59,503.77 and wealth equal to $637,648.66. 30.2% of White males report being caregivers to a grandchild (7.6%), parent (8.0%) or spouse (16.0%), and 96.5% report being retired. Since the prior wave of data collection (2010), 37.7% of White males experienced a caregiving transition and 3.6% experienced a paid labor transition. The average score for positive social support and negative social support was 3.24 and 1.32, respectively. The average number of reported CES-D depressive symptoms was 1.03, and 8.3% of White males meet the criteria for clinical depression.

Among White females, the average age is 83.02 years and the distribution of cohort membership is 24.1% AHEAD, 41.9% CODA, and 34.0% HRS. The socioeconomic status indicators include average completed education of 12.19 years, an income of $32,453.28 and

wealth equal to $346,556.24. 37.7% of White females report being caregivers to a grandchild (7.6%), parent (14.7%) or spouse (17.8%), and 96.3% report being retired. Since the prior wave of data collection (2010), 50.3% of White females experienced a caregiving transitions and 3.8% experienced a paid labor transition. The average score for positive social support and negative social support was 3.33 and 1.30, respectively. The average number of reported CES-D depressive symptoms was 1.72, and 11.8% of White females meet the criteria for clinical depression.

Among Black males, the average age is 78.63 years and the distribution of cohort membership is 8.7% AHEAD, 23.8% CODA, and 67.4% HRS. The socioeconomic status indicators include average completed education of 10.5 years, an income of $35,211.63 and wealth equal to $145,811.48. 27.3% of Black males report being caregivers to a grandchild (8.7%), parent (7.0%) or spouse (16.3%), and 95.3% report being retired. Since the prior wave of data collection (2010), 41.6% of Black males experienced a caregiving transitions and 8.7% experienced a paid labor transition. The average score for positive social support and negative social support was 3.26 and 1.46, respectively. The average number of reported CES-D depressive symptoms was 1.15, and 9.3% of Black males meet the criteria for clinical depression.

Among Black females, the average age is 79.58 years and the distribution of cohort membership is 16.0% AHEAD, 17.8% CODA, and 66.2% HRS. The socioeconomic status indicators include average completed education of 11.36 years, an income of $22,317.15 and wealth equal to $76,154.11. 38.9% of Black females report being caregivers to a grandchild (15.4%), parent (9.0%) or spouse (18.5%), and 93.8% report being retired. Since the prior wave

of data collection (2010), 56.6% of Black females experienced a caregiving transitions and 6.3% experienced a paid labor transition. The average score for positive social support and negative social support was 3.33 and 1.47, respectively. The average number of reported CES-D depressive symptoms was 1.30, and 11.6% of Black females meet the criteria for clinical depression.

The highest average levels of years of education and wealth are observed among White males, followed by White females, Black males, and Black females. Highest average levels of income are observed among White males, followed by Black males, White females, and Black females. The differences in these three indicators across group are statistically significant (p<0.001).

Additionally, there are statistically significant differences in average number of reported CES-D depressive symptoms, with Black females (1.30) reporting the highest CES-D score, followed by White females (1.23), Black males (1.15), and White males (1.03) (p=0.009). There are statistically significant differences in percentage of respondents meeting criteria for clinical depression based upon CES-D score, with White females (11.8%) having the highest percentage, followed by Black females (11.6%), Black males (9.3%), and White males (8.3%) (p=0.029).

Table 2.1 Descriptive Characteristics by Sex and Race: Health and Retirement Study, 2012

	White		Black		
	Male	**Female**	**Male**	**Female**	
N (3613)	987	1999	172	455	
	Mean (SD) or N (%)	Mean (SD) or N (%)	Mean (SD) or N (%)	Mean (SD) or N (%)	p-value
Age	82.33 (6.88)	83.02 (6.92)	78.63 (6.20)	79.58 (7.38)	<0.001
Cohort					<0.001
AHEAD	208 (21.1)	482 (24.1)	15 (8.7)	73 (16.0)	
CODA	403 (40.8)	837 (41.9)	41 (23.8)	81 (17.8)	
HRS	376 (38.1)	680 (34.0)	116 (67.4)	301 (66.2)	
Socioeconomic Status					
Education (Years)	12.83 (3.41)	12.19 (3.12)	10.50 (3.92)	11.36 (3.22)	<0.001
Income	59,503.77 (164,460.97)	32,453.28 (38,957.55)	35,211.63 (43,163.19)	22,317.15 (43,107.03)	<0.001
Wealth	637,648.66 (1,979,638.12)	346,556.24 (939,024.17)	145,811.48 (358,146.27)	76,154.11 (146,951.90)	<0.001
Caregiving Roles					
Any	298 (30.2)	753 (37.7)	47 (27.3)	177 (38.9)	<0.001
Grandchild	75 (7.6)	151 (7.6)	15 (8.7)	70 (15.4)	<0.001
Parent	79 (8.0)	293 (14.7)	12 (7.0)	41 (9.0)	<0.001
Spouse	158 (16.0)	355 (17.8)	28 (16.3)	84 (18.5)	0.572
Retired	952 (96.5)	1925 (96.3)	164 (95.3)	427 (93.8)	0.084
Life Transitions					
Caregiving	357 (37.7)	969 (50.3)	67 (41.6)	250 (56.6)	<0.001
Paid Labor	34 (3.6)	73 (3.8)	14 (8.7)	28 (6.3)	0.002
Social Support					
Positive	3.24 (0.41)	3.33 (0.41)	3.26 (0.47)	3.33 (0.39)	<0.001
Negative	1.32 (0.33)	1.30 (0.36)	1.46 (0.32)	1.47 (0.37)	<0.001
CES-D Symptoms	1.03 (1.53)	1.23 (1.72)	1.15 (1.54)	1.30 (1.17)	0.009

Tables 2.2-2.6 present results from sex- and race-split negative binomial regression models assessing the association of covariates on CES-D depressive symptom count among the HRS sample. In Model 1a, paid labor transitions are associated with lower CES-D scores for White males. In Model 1b, caregiving transitions are associated with higher CES-D scores for White males and White females. In Model 1c, when controlling for caregiving transitions, paid labor transitions remain associated with significantly lower CES-D scores for White males. When

controlling for paid labor transitions, caregiving transitions remain associated with significantly higher CES-D scores for White males and White females.

In Model 2a, positive social support is associated with lower CES-D scores for White males, White females, and Black females. In Model 2b, negative social support is associated with higher CES-D scores for all sex and race groups. In Model 2c, when controlling for negative social support, positive social support remains associated with significantly lower CES-D scores for White females. When controlling for positive social support, negative social support remains associated with significantly higher CES-D scores for all sex and race groups.

In Model 3a, the direction and magnitude of the significant association of paid labor transitions with CES-D score for White males does not change when retirement status is controlled. In Model 3b, the direction of the significant association of caregiving transitions with CES-D score for White females does not change when caregiving status is controlled, although the magnitude of the association is reduced. For White males, however, when caregiving status is controlled, caregiving transitions are no longer significantly associated with CES-D score. Indeed, caregiving transitions are not significantly associated with CES-D score for any sex or race group when caregiving status is included in the model. In Model 3c, the direction and magnitude of the significant association of paid labor transitions with CES-D does not differ for White males when caregiving transitions, caregiving status, and retirement status are controlled. However, when caregiving transitions, caregiving status, and retirement status are controlled, caregiving transitions are no longer statistically associated with CES-D score for White males or females.

In Model 4a, an interaction between positive social support and paid labor transitions is not associated with significantly different CES-D scores for any sex and race group. In Model 4b, an interaction between negative social support and paid labor transitions is not associated with significantly different CES-D scores for any sex and race group. In Model 4c, interactions between positive social support and paid labor transitions, and negative social support and paid labor transitions, are not associated with significantly different CES-D scores for any sex and race group when paid labor transitions, positive social support, negative social support, and both interactions are included in the model.

In Model 4d, an interaction between positive social support and caregiving transitions is not associated with significantly different CES-D scores for any sex and race group. In Model 4e, an interaction between negative social support and caregiving transitions is not associated with significantly different CES-D scores for any sex and race group. In Model 4f, interactions between positive social support and caregiving transitions are not associated with significantly different CES-D scores for any sex and race group when caregiving transitions, positive social support, negative social support, and both interactions are included in the model. Interactions between negative social support and caregiving transitions are not associated with significantly different CES-D scores for any sex and race group when caregiving transitions, positive social support, negative social support, and both interactions are included in the model.

Table 2.2 Life Transitions on CES-D Depressive Symptoms, 2012

	Model 1a				Model 1b				Model 1c			
	White		Black		White		Black		White		Black	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Age	-0.01 (-0.03, 0.01)	-0.02 (-0.03, -0.01)	-0.02 (-0.08, 0.03)	-0.03 (-0.06, 0)	-0.01 (-0.03, 0.01)	-0.02 (-0.03, -0.01)	-0.02 (-0.08, 0.03)	-0.03 (-0.05,0)	-0.01 (-0.03, 0)	-0.02 (-0.03, -0.01)	-0.02 (-0.08, 0.03)	-0.03 (-0.0, 0)
Wealth (Log)	0 (-0.02, 0.02)	-0.01 (-0.02, 0)	0 (-0.03, 0.03)	-0.02 (-0.03, 0)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	0 (-0.03, 0.03)	-0.02 (-0.03, 0)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	0 (-0.03, 0.03)	-0.02 (-0.03, 0)
Income (Log)	-0.06 (-0.1, -0.01)	0 (-0.04, 0.04)	-0.02 (-0.12, 0.07)	-0.01 (-0.07, 0.05)	-0.06 (-0.11, -0.02)	0 (-0.04, 0.04)	-0.03 (-0.12, 0.06)	-0.01 (-0.07, 0.05)	-0.06 (-0.11, -0.02)	0 (-0.04, 0.04)	-0.03 (-0.12, 0.06)	-0.01 (-0.07, 0.05)
Education	-0.04 (-0.08, -0.01)	-0.03 (-0.06, -0.01)	-0.06 (-0.14, 0.01)	-0.04 (-0.11, 0.02)	-0.04 (-0.08, -0.01)	-0.03 (-0.06, 0)	-0.06 (-0.14, 0.01)	-0.04 (-0.1, 0.02)	-0.04 (-0.08, -0.01)	-0.03 (-0.06, -0.01)	-0.06 (-0.14, 0.01)	-0.04 (-0.1, 0.02)
Recent Caregiving Transition					0.24 (0.01, 0.48)	0.26 (0.1, 0.42)	0.29 (-0.31, 0.88)	0.13 (-0.24, 0.5)	0.25 (0.02, 0.49)	0.26 (0.1, 0.42)	0.3 (-0.3, 0.89)	0.13 (-0.24, 0.5)
Recent Paid Labor Transition	-0.86 (-1.64, -0.08)	-0.14 (-0.55, 0.28)	-0.17 (-1.23, 0.9)	-0.17 (-0.97, 0.64)					-0.89 (-1.66, -0.11)	-0.14 (-0.54, 0.27)	-0.2 (-1.26, 0.86)	-0.18 (-0.98, 0.63)
(cons)	1.99	2.41	2.79	3.15	1.95	2.42	2.67	2.98	2.09	2.45	2.77	2.98
AIC	1928.5	4187	240.56	681.93	1929.4	4177.2	239.76	681.65	1926.2	4178.8	241.62	683.46

Source: Health and Retirement Study, 2010-2012.

Note: Coefficients with 95 percent confidence intervals in parentheses.

Table 2.3 Social Support on CES-D Depressive Symptoms, 2012

	Model 2a				Model 2b				Model 2c			
	White		Black		White		Black		White		Black	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Age	0	-0.02	-0.03	-0.03	0	-0.01	-0.02	-0.02	0	-0.01	-0.02	-0.02
	(-0.02, 0.01)	(-0.03, -0.01)	(-0.08, 0.02)	(-0.05, 0)	(-0.02, 0.02)	(-0.02, -0)	(-0.07, 0.03)	(-0.05, 0)	(-0.01, 0.02)	(-0.02, -0)	(-0.07, 0.03)	(-0.05, 0)
Wealth (Log)	0	-0.01	-0.01	-0.01	0	-0.01	-0.01	-0.01	0	-0.01	-0.01	-0.01
	(-0.01, 0.02)	(-0.02, 0)	(-0.03, 0.02)	(-0.03, 0)	(-0.01, 0.02)	(-0.02, 0)	(-0.03, 0.01)	(-0.03, 0)	(-0.01, 0.02)	(-0.02, 0)	(-0.03, 0.02)	(-0.03, 0)
Income (Log)	-0.06	0	-0.03	-0.02	-0.07	0.01	-0.04	-0.01	-0.06	0	-0.04	-0.02
	(-0.11, -0.02)	(-0.04, 0.04)	(-0.12, 0.07)	(-0.08, 0.04)	(-0.11, -0.02)	(-0.03, 0.04)	(-0.13, 0.05)	(-0.07, 0.05)	(-0.11, -0.02)	(-0.03, 0.04)	(-0.12, 0.05)	(-0.07, 0.04)
Education	-0.04	-0.03	-0.06	-0.05	-0.04	-0.03	-0.06	-0.04	-0.04	-0.03	-0.06	-0.04
	(-0.07, 0)	(-0.05, 0)	(-0.13, 0.02)	(-0.11, 0.01)	(-0.07, -0.01)	(-0.06, 0)	(-0.13, 0.02)	(-0.1, 0.02)	(-0.07, 0)	(-0.05, 0)	(-0.13, 0.02)	(-0.1, 0.02)
Pos Soc Support	-0.33	-0.49	-0.26	-0.47					-0.19	-0.28	-0.09	-0.32
	(-0.59, -0.06)	(-0.67, -0.31)	(-0.87, 0.36)	(-0.91, -0.03)					(-0.47, 0.08)	(-0.47, -0.09)	(-0.7, 0.53)	(-0.78, 0.14)
Neg Soc Support					0.66	0.85	0.99	0.65	0.6	0.74	0.95	0.55
					(0.35, 0.98)	(0.64, 1.05)	(0.15, 1.82)	(0.19, 1.11)	(0.27, 0.93)	(0.52, 0.96)	(0.09, 1.82)	(0.07, 1.03)
(cons)	2.4	3.63	3.93	4.68	0.25	0.47	1.44	1.73	0.8	1.41	1.68	2.92
AIC	2010.1	4309.3	258.65	690.07	2000.1	4278.9	253.89	687.34	2000.1	4273.3	255.8	687.62

Source: Health and Retirement Study, 2010-2012.

Note: Coefficients with 95 percent confidence intervals in parentheses.

Table 2.4 Caregiving and Paid Labor Status, Life Transitions, Social Support on CES-D Depressive Symptoms, 2012

	Model 3a				Model 3b				Model 3c			
	White		Black		White		Black		White		Black	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Age	-0.01 (-0.03, 0.01)	-0.02 (-0.03 -0.01)	-0.02 (-0.08, 0.03)	-0.03 (-0.06, 0)	-0.01 (-0.03, 0)	-0.02 (-0.04, -0.01)	-0.02 (-0.08, 0.03)	-0.03 (-0.06, 0)	-0.01 (-0.03, 0)	-0.03 (-0.04, -0.01)	-0.03 (-0.08, 0.03)	-0.03 (-0.06, 0)
Wealth (Log)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	0 (-0.03, 0.03)	-0.02 (-0.03, 0)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	0 (-0.03, 0.03)	-0.01 (-0.03, 0)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	0 (-0.03, 0.03)	-0.01 (-0.03, 0)
Income (Log)	-0.06 (-0.1, -0.01)	0 (-0.03, 0.04)	-0.02 (-0.12, 0.07)	-0.01 (-0.07, 0.05)	-0.06 (-0.11, -0.02)	0 (-0.04, 0.04)	-0.03 (-0.12, 0.06)	-0.01 (-0.07, 0.05)	-0.06 (-0.11, -0.02)	0 (-0.03, 0.04)	-0.03 (-0.12, 0.06)	-0.01 (-0.07, 0.05)
Education	-0.04 (-0.08, -0.01)	-0.03 (-0.06, -0.01)	-0.06 (-0.14, 0.01)	-0.04 (-0.11, 0.02)	-0.04 (-0.08, -0.01)	-0.03 (-0.06, -0.01)	-0.06 (-0.14, 0.01)	-0.04 (-0.11, 0.02)	-0.04 (-0.07, -0.01)	-0.03 (-0.06, -0.01)	-0.06 (-0.14, 0.01)	-0.04 (-0.11, 0.02)
Caregiver					0.2 (-0.06, 0.46)	0.45 (0.28, 0.62)	0.13 (-0.55, 0.81)	0.29 (-0.09, 0.67)	0.2 (-0.06, 0.46)	0.46 (0.29, 0.63)	0.12 (-0.56, 0.8)	0.29 (-0.09, 0.68)
Retired	0.16 (-0.52, 0.84)	0.5 (0.02, 0.97)	0.17 (-1.32, 1.66)	0.09 (-0.8, 0.99)					0.11 (-0.56, 0.79)	0.57 (0.09, 1.04)	0.14 (-1.34, 1.62)	0.16 (-0.73, 1.04)
Recent Caregiving Transition					0.18 (-0.07, 0.43)	0.11 (-0.05, 0.28)	0.27 (-0.34, 0.88)	0.06 (-0.31, 0.44)	0.19 (-0.06, 0.44)	0.12 (-0.04, 0.29)	0.28 (-0.33, 0.89)	0.07 (-0.31, 0.44)
Recent Paid Labor Transition	-0.82 (-1.62, -0.02)	0.05 (-0.39, 0.48)	-0.13 (-1.24, 0.97)	-0.12 (-0.97, 0.72)					-0.86 (-1.65, -0.06)	0.09 (-0.34, 0.51)	-0.17 (-1.27, 0.92)	-0.1 (-0.93, 0.74)
(cons)	1.86	1.97	2.65	3.06	1.96	2.42	2.66	3.11	2.01	1.96	2.64	2.98
AIC	1930.3	4185	242.51	683.89	1929.1	4151.4	241.62	681.46	1927.8	4149.8	245.45	685.19

Source: Health and Retirement Study, 2010-2012.

Note: Coefficients with 95 percent confidence intervals in parentheses.

Table 2.5 Paid Labor Transitions and Social Support on CES-D Depressive Symptoms, 2012

	Model 4a				Model 4b				Model 4c			
	White		Black		White		Black		White		Black	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Age	-0.01 (-0.02, 0.01)	-0.02 (-0.03, -0.01)	-0.02 (-0.08, 0.03)	-0.03 (-0.05, 0)	0 (-0.02, 0.01)	-0.01 (-0.03, 0)	-0.01 (-0.07, 0.04)	-0.02 (-0.05, 0.01)	0 (-0.02, 0.01)	-0.01 (-0.02, 0)	-0.01 (-0.07, 0.04)	-0.02 (-0.05, 0.01)
Wealth (Log)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	0 (-0.03, 0.03)	-0.01 (-0.03, 0)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	0 (-0.03, 0.02)	-0.01 (-0.03, 0)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	0 (-0.03, 0.02)	-0.01 (-0.03, 0)
Income (Log)	-0.06 (-0.1, -0.01)	0 (-0.04, 0.04)	-0.02 (-0.12, 0.07)	-0.01 (-0.07, 0.05)	-0.06 (-0.1, -0.02)	0.01 (-0.03, 0.04)	-0.03 (-0.11, 0.05)	-0.01 (-0.07, 0.05)	-0.06 (-0.1, -0.02)	0.01 (-0.03, 0.04)	-0.03 (-0.12, 0.05)	-0.01 (-0.07, 0.04)
Education	-0.04 (-0.08, -0.01)	-0.03 (-0.06, 0)	-0.06 (-0.14, 0.02)	-0.05 (-0.11, 0.02)	-0.04 (-0.08, -0.01)	-0.03 (-0.06, 0)	-0.07 (-0.14, 0.01)	-0.04 (-0.1, 0.02)	-0.04 (-0.08, -0.01)	-0.03 (-0.06, 0)	-0.07 (-0.14, 0.01)	-0.04 (-0.1, 0.02)
Recent Paid Labor Transition	-1.93 (-8.55, 4.68)	-1.2 (-4.87, 2.47)	0.01 (-6.96, 6.97)	0.96 (-6.95, 8.88)	-2.63 (-5.85, 0.6)	0.67 (-0.96, 2.29)	0.41 (-3.96, 4.78)	-1.2 (-4.15, 1.76)	-4.41 (-12.29, 3.47)	-0.01 (-4.57, 4.55)	1.9 (-5.73, 9.53)	-5.22 (-18, 7.56)
Pos Soc Support	-0.34 (-0.61, -0.07)	-0.49 (-0.67, -0.31)	-0.12 (-0.84, 0.61)	-0.45 (-0.9, 0)					-0.22 (-0.49, 0.06)	-0.27 (-0.46, -0.08)	0.24 (-0.48, 0.96)	-0.31 (-0.78, 0.15)
Neg Soc Support					0.63 (0.31, 0.95)	0.85 (0.64, 1.06)	1.13 (0.28, 1.97)	0.61 (0.14, 1.09)	0.56 (0.22, 0.89)	0.74 (0.52, 0.97)	1.23 (0.33, 2.13)	0.51 (0.02, 1)
Pos X PL Transition	0.34 (-1.7, 2.37)	0.33 (-0.77, 1.42)	-0.06 (-2.2, 2.09)	-0.3 (-2.57, 1.97)					0.5 (-1.55, 2.55)	0.17 (-0.96, 1.29)	-0.42 (-2.42, 1.57)	0.99 (-1.94, 3.92)
Neg X PL Transition					1.17 (-0.9, 3.25)	-0.54 (-1.79, 0.71)	-0.36 (-3.1, 2.38)	0.61 (-1.18, 2.4)	1.3 (-0.79, 3.4)	-0.44 (-1.75, 0.86)	-0.44 (-3.22, 2.34)	1.01 (-1.24, 3.27)
(cons)	2.72	3.62	3.08	4.49	0.62	0.44	0.39	1.7	1.26	1.36	-0.48	2.9
AIC	1926.3	4165.8	244.42	681.99	1915.6	4135.4	237.47	678.38	1917.2	4132.4	240.99	680.56

Source: Health and Retirement Study, 2010-2012.

Note: Coefficients with 95 percent confidence intervals in parentheses.

Table 2.6 Caregiving Transitions and Social Support on CES-D Depressive Symptoms, 2012

	Model 4d				Model 4e				Model 4f			
	White		Black		White		Black		White		Black	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Age	-0.01 (-0.02, 0.01)	-0.02 (-0.03, -0.01)	-0.02 (-0.07, 0.03)	-0.03 (-0.05, 0)	0 (-0.02, 0.01)	-0.01 (-0.03, 0)	-0.01 (-0.06, 0.04)	-0.02 (-0.05, 0.01)	0 (-0.02, 0.01)	-0.01 (-0.02, 0)	-0.01 (-0.06, 0.04)	-0.02 (-0.05, 0.01)
Wealth (Log)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	0 (-0.03, 0.03)	-0.01 (-0.03, 0)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	0 (-0.03, 0.02)	-0.01 (-0.03, 0)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	0 (-0.03, 0.02)	-0.01 (-0.03, 0)
Income (Log)	-0.06 (-0.11, -0.02)	0 (-0.04, 0.04)	-0.03 (-0.12, 0.06)	-0.01 (-0.07, 0.05)	-0.07 (-0.11, -0.02)	0.01 (-0.03, 0.04)	-0.03 (-0.11, 0.05)	-0.01 (-0.07, 0.05)	-0.07 (-0.11, -0.02)	0.01 (-0.03, 0.04)	-0.05 (-0.13, 0.03)	-0.01 (-0.07, 0.05)
Education	-0.04 (-0.07, -0.01)	-0.03 (-0.06, 0)	-0.06 (-0.13, 0.01)	-0.04 (-0.1, 0.02)	-0.04 (-0.08, -0.01)	-0.03 (-0.06, 0)	-0.07 (-0.14, 0)	-0.04 (-0.1, 0.02)	-0.04 (-0.07, -0.01)	-0.03 (-0.05, 0)	-0.07 (-0.14, 0)	-0.04 (-0.1, 0.02)
Recent Caregiving Transition	0.94 (-0.9, 2.77)	0.56 (-0.62, 1.75)	2.63 (-1.84, 7.09)	-0.34 (-3.23, 2.56)	0.4 (-0.51, 1.3)	0.29 (-0.28, 0.86)	0.03 (-2.53, 2.58)	-0.61 (-2.07, 0.85)	1.4 (-0.92, 3.72)	0.54 (-1.06, 2.13)	3.98 (-1.63, 9.58)	-1.77 (-5.49, 1.94)
Pos Soc Support	-0.28 (-0.6, 0.05)	-0.43 (-0.68, -0.19)	0.26 (-0.71, 1.23)	-0.55 (-1.16, 0.06)					-0.12 (-0.46, 0.22)	-0.23 (-0.49, 0.02)	0.72 (-0.25, 1.69)	-0.48 (-1.11, 0.14)
Neg Soc Support					0.69 (0.29, 1.09)	0.85 (0.56, 1.13)	1.01 (-0.08, 2.09)	0.4 (-0.31, 1.12)	0.65 (0.22, 1.07)	0.75 (0.45, 1.06)	1.34 (0.17, 2.51)	0.26 (-0.49, 1)
Pos X Care Transition	-0.21 (-0.78, 0.35)	-0.1 (-0.45, 0.26)	-0.72 (-2.08, 0.64)	0.14 (-0.73, 1.02)					-0.28 (-0.86, 0.3)	-0.07 (-0.45, 0.31)	-1.03 (-2.35, 0.29)	0.32 (-0.58, 1.22)
Neg X Care Transition					-0.12 (-0.76, 0.52)	-0.04 (-0.44, 0.37)	0.1 (-1.5, 1.71)	0.45 (-0.47, 1.37)	-0.19 (-0.86, 0.48)	-0.05 (-0.49, 0.38)	-0.28 (-1.92, 1.37)	0.54 (-0.43, 1.5)
(cons)	2.48	3.47	1.48	4.65	0.46	0.48	0.5	1.89	0.75	1.26	-2.49	3.69
AIC	1926.4	4156.3	242.55	681.44	1918.3	4126.8	237.21	678.17	1919.1	4123.8	238.57	680.03

Source: Health and Retirement Study, 2010-2012.

Note: Coefficients with 95 percent confidence intervals in parentheses.

Discussion and Conclusions

Discussion

In this study, I strengthen understandings of how life transitions and social support are associated with CES-D depressive symptoms across sex and race groups in late-life. Results from this study show experiencing a paid labor transition is associated with better mental health outcomes, as measured as count of CES-D depressive symptoms, only for White males. This finding is consistent with understanding of socioeconomic disparities in late-life across sex and race groups. Specifically, the most advantaged individuals are more likely to retire by choice, versus disability, and have more resources to sustain their lifestyle during their retired years than their less-advantaged peers. Experiencing a caregiving transition is associated with worse mental health outcomes for White males and females, but not Black males or females. This race difference could be due to the trials of becoming a caregiver being more disruptive to the experiences or autonomy of Whites in late-life, or to cultural differences in family obligations.

Positive social support is associated with better mental health outcomes for White males, White females, and Black males. This finding is consistent with literature highlighting that larger and stronger network connections can be detrimental to mental health for Black women. Research shows Black women are more susceptible to distress stemming from individuals in their networks, as well as being more susceptible to the care and needs of those within their networks. As such, the protective nature of strong ties – measured as positive social support – may not meaningfully improve mental health for Black women beyond increased distress or burden which may stem from network connections.

Social network burden, such as excessive demands or criticism from one's social network – measured as negative social support – is associated with worse mental health outcomes for all sex and race groups. This finding is consistent understandings of excessive

social burden as detrimental to mental health outcomes. This study shows negative social support is associated with worse mental health outcomes for all sex and race groups even when positive social support is controlled, highlighting the meaningful role of negative social support in understanding mental health outcomes in late-life.

This study shows the direction and magnitude of the association between experiencing a paid labor transition and CES-D depressive symptoms does not change for White males when paid labor status is controlled. This finding lends support for the notion of life transitions as "inherently stressful" for this group. For White males, this finding indicates *becoming* retired is more stressful than *being* retired. As such, this finding lends support to identity theory's notion of leaving one's paid labor role as disruptive to one's identity and self-perceptions, and thus, mental health status and stability for this group. However, the association between experiencing a caregiving transition and CES-D depressive symptoms does not remain significantly associated with CES-D score for White males or females when caregiving status is controlled. This finding does not lend support for the notion of life transitions as "inherently stressful" for these groups. This finding indicates *being* a caregiver is more stressful than *becoming* a caregiver.

Interactions between positive social support with life transitions, and negative social support with life transitions, are not associated with differences in CES-D depressive symptoms for any sex and race group. This finding indicates positive or negative social support does not moderate the association between life transitions and mental health outcomes for any group – specifically – for groups for whom life transitions were independently associated with different counts of CES-D depressive symptom; White males for paid labor transitions, and White males and females for caregiving transitions.

Conclusions

In this paper, I argue transitions in roles entering the late-life period make this time substantively distinct from other adult stages. Further, I argue sex and race differences exist in the meaning and effect of transitional experiences on mental health outcomes in late-life. The results of this study show sex and race differences in the association of life transitions and social support with mental health outcomes in late-life. Indeed, the mental health outcomes of White males and females are more strongly associated with life transitions than are those of Black males and females. As such, this study lends evidence to the notion the years between midlife and late-life are rife with role transitions and reformation of identity (Abramson 2015; Burke 1996; Elder et al. 1996; Fiske et al. 2009; Perreira and Sloan 2001), but this varies across groups. This finding highlights the need for exploration of buffers and trajectories of stressors and mental health statuses across sex and race groups during the late-life period, which may help elucidate explanations for this disparity.

Previous research indicates a transition often viewed as inherently stressful is retirement. This study finds evidence for shifts in CES-D depressive symptoms following a transition into retirement, net of retirement status, only for White males. Some theorists posit individuals who are less accustomed to scarcity or disruptive change exhibit more symptoms of distress than do individuals who have experienced greater challenges and disruptions throughout the life course (Abramson 2015). Due to their relative privilege compared to the other sex and race groups, White males may have stronger identity connections to their careers, and as such, feel heightened distress associated with retirement than other sex and race groups. Further, the disruption of a paid labor transition may constitute a greater relative challenge for White males than for other sex and race groups, who may be more accustomed, and thus less vulnerable, to life disruptions. Thus, while problems may be “similarly” shaped in late-life, individuals may be differentially able to adjust to their new circumstances based upon

sociodemographic characteristics and associated past experiences. For White males, transitions into the late-life period may resemble a more disruptive dismantling of their curated identities surrounding work and sense-of-self (Brown and McGill 1989; Burke 1996; Gross 1970).

Further, this study highlights the important role of negative social support when assessing mental health outcomes in late-life. The ability of individuals in the late-life period – regardless of sex or race – to withstand excess demand from their social networks may diminish during the late-life period, making the role of negative social support more meaningful for their mental health status than positive social support in their later years. As such, future research assessing correlates and trajectories of mental health status in late-life should incorporate this measure.

This research does not lend support for a moderating effect of social support on the association between stressful life events on mental health outcomes among adults in late-life (Fiske et al. 2009). Prior research finds social support bolsters psychological well-being, yet, social network ties can also be detrimental to mental health. Individuals with strong social network ties can feel distress because of circumstances experienced by those in their networks (Almeida 2005; Kawachi and Berkman 2001). Known as "network stressors", the burden of emotional support, time, and tangible resources can cause an individual to feel distress (Almeida 2005). This study provides evidence for network stressors' association with CES-D depressive symptoms in late-life, across sex and race groups.

While this study indicates individuals are equally vulnerable to the mental health distress of negative social support regardless of sex or race group, it should be noted women's social networks tend to be larger and more connected than men's social networks (Belle 1987; Fiori and Jager 2011). As such, individuals across sex and race groups may still have unequal exposure to network strains, and as such, the mental health consequences of negative social

support may still have disparate mental health consequences by sex and race (Belle 1987; Fiori and Jager 2011). Particularly in regard to the "contagion of stress", women may be more likely to suffer the negative mental, emotional, and tangible consequences of network-related stressors than are men (Kawachi and Berkman 2001). Future research can help identify the relative effects of exposure and vulnerability to negative social support on mental health outcomes across sex and race groups in late-life.

This article contributes to burgeoning research identifying different factors and pathways leading to mental health disparities between sex and race groups in late-life. Particularly, this article focuses on bolstering the literature on factors contributing to mental health outcomes in relation to social support and role transitions in the late-life period. This article highlights the specific effects of identity, caregiving and paid labor transitions, and the roles of positive and negative social support, as they relate to CES-D depressive symptoms in a distinct and transitional stage of the late-life period.

Limitations

This study is unable to make assertions about causality regarding life transitions and social support on mental health outcomes. While the HRS is a longitudinal study of post-retirement aged adults, this research study focused on a snapshot of the time series to begin assessments of associations between life transitions, social support, and CES-D depressive symptoms in late-life. In future work, additional waves of the HRS data will be incorporated to assess the trajectories of mental health outcomes across the late-life period.

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APPENDIX 2.A

Table 2.7 Multivariate Linear Regression Models: Life Transitions on CES-D Depressive Symptoms, 2012

	Model 1a				Model 1b				Model 1c			
	White		Black		White		Black		White		Black	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Age (/100)	-1.03 (-2.4, 0.34)	-2.85 (-3.94, -1.76)	-2.76 (-6.61, 1.08)	-3.55 (-5.86, -1.24)	-1.11 (-2.49, 0.27)	-2.66 (-3.75, -1.57)	-2.63 (-6.53, 1.27)	-3.62 (-5.94, -1.31)	-1.26 (-2.64, 0.13)	-2.88 (-3.97, -1.79)	-2.9 (-6.8, 1)	-3.6 (-5.92, -1.28)
Wealth (Log)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	0 (-0.02, 0.02)	-0.02 (-0.03, -0.01)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	0 (-0.02, 0.02)	-0.02 (-0.03, -0.01)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	0 (-0.02, 0.02)	-0.02 (-0.03, -0.01)
Income (Log)	-0.11 (-0.16, -0.06)	0 (-0.04, 0.04)	-0.05 (-0.13, 0.03)	-0.01 (-0.06, 0.04)	-0.1 (-0.15, -0.06)	0 (-0.04, 0.04)	-0.05 (-0.13, 0.03)	-0.01 (-0.06, 0.04)	-0.11 (-0.16, -0.06)	0 (-0.04, 0.04)	-0.05 (-0.13, 0.03)	-0.01 (-0.06, 0.04)
Education	-0.05 (-0.08, -0.02)	-0.04 (-0.07, -0.02)	-0.07 (-0.13, -0.01)	-0.05 (-0.1, 0)	-0.05 (-0.08, -0.01)	-0.04 (-0.07, -0.02)	-0.07 (-0.13, -0.01)	-0.05 (-0.1, 0)	-0.05 (-0.08, -0.02)	-0.04 (-0.07, -0.02)	-0.07 (-0.13, -0.01)	-0.05 (-0.1, 0.01)
Caregiving Transition	0.26 (0.05, 0.46)	0.32 (0.17, 0.47)	0.33 (-0.13, 0.79)	0.19 (-0.13, 0.51)					0.27 (0.07, 0.47)	0.32 (0.17, 0.47)	0.33 (-0.13, 0.8)	0.19 (-0.13, 0.51)
Paid Labor Transition					-0.61 (-1.15, -0.08)	-0.16 (-0.55, 0.23)	-0.14 (-0.92, 0.63)	-0.2 (-0.87, 0.47)	-0.63 (-1.17, -0.1)	-0.19 (-0.58, 0.2)	-0.18 (-0.95, 0.6)	-0.2 (-0.87, 0.47)
(cons)	3.48	4.07	4.4	4.86	3.61	4.09	4.43	5.05	3.65	4.11	4.5	4.89

Source: Health and Retirement Study, 2010-2012. *Note:* Coefficients with 95 percent confidence intervals in parentheses.

Table 2.8 Multivariate Linear Regression Models: Social Support on CES-D Depressive Symptoms, 2012

	Model 2a				Model 2b				Model 2c			
	White		Black		White		Black		White		Black	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Age (/100)	-0.39 (-1.75, 0.97)	-2.17 (-3.24, -1.1)	-2.89 (-6.73, 0.95)	-3.26 (-5.51, -1.01)	-0.06 (-1.42, 1.3)	-1.49 (-2.56, -0.43)	-2.11 (-5.85, 1.63)	-2.82 (-5.06, -0.57)	0.1 (-1.27, 1.47)	-1.35 (-2.42, -0.29)	-1.97 (-5.74, 1.81)	-2.68 (-4.92, -0.44)
Wealth (Log)	0.01 (0, 0.02)	-0.01 (-0.02, 0)	-0.01 (-0.03, 0.01)	-0.02 (-0.03, -0.01)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	-0.01 (-0.03, 0.01)	-0.02 (-0.03, -0.01)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	-0.01 (-0.03, 0.01)	-0.02 (-0.03, -0.01)
Income (Log)	-0.11 (-0.16, -0.06)	0 (-0.04, 0.03)	-0.06 (-0.14, 0.02)	-0.02 (-0.07, 0.03)	-0.11 (-0.16, -0.07)	0 (-0.04, 0.04)	-0.07 (-0.15, 0.01)	-0.02 (-0.07, 0.03)	-0.11 (-0.16, -0.07)	0 (-0.04, 0.04)	-0.07 (-0.15, 0.01)	-0.02 (-0.07, 0.03)
Education	-0.04 (-0.07, -0.01)	-0.04 (-0.07, -0.01)	-0.06 (-0.12, 0)	-0.06 (-0.11, 0)	-0.04 (-0.07, -0.01)	-0.04 (-0.07, -0.01)	-0.05 (-0.11, 0)	-0.05 (-0.1, 0)	-0.04 (-0.07, -0.01)	-0.04 (-0.07, -0.01)	-0.05 (-0.11, 0.01)	-0.05 (-0.1, 0)
Pos Soc Support	-0.38 (-0.61, -0.15)	-0.62 (-0.8, -0.44)	-0.38 (-0.88, 0.12)	-0.66 (-1.06, -0.27)					-0.23 (-0.47, 0.01)	-0.34 (-0.53, -0.15)	-0.16 (-0.66, 0.34)	-0.44 (-0.85, -0.03)
Neg Soc Support					0.75 (0.46, 1.04)	1.13 (0.92, 1.35)	1.24 (0.56, 1.93)	0.95 (0.53, 1.38)	0.68 (0.38, 0.97)	0.99 (0.76, 1.22)	1.18 (0.47, 1.89)	0.81 (0.37, 1.26)
(cons)	4.16	5.67	5.87	7.01	1.73	1.56	2.29	2.99	2.42	2.73	2.74	4.56

Source: Health and Retirement Study, 2010-2012. *Note:* Coefficients with 95 percent confidence intervals in parentheses.

Table 2.9 Multivariate Linear Regression Models: Caregiving and Paid Labor Status, Life Transitions, Social Support on CES-D Depressive Symptoms, 2012

	Model 3a				Model 3b				Model 3c			
	White		Black		White		Black		White		Black	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Age (/100)	-1.13 (-2.52, 0.26)	-2.83 (-3.92, -1.73)	-2.67 (-6.59, 1.25)	-3.67 (-6, -1.34)	-1.13 (-2.51, 0.24)	-2.91 (-3.98, -1.84)	-2.81 (-6.68, 1.05)	-3.79 (-6.1, -1.48)	-1.37 (-2.76, 0.02)	-3.12 (-4.2, -2.04)	-2.98 (-6.93, 0.97)	-3.92 (-6.25, -1.59)
Wealth (Log)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	0 (-0.02, 0.02)	-0.02 (-0.03, -0.01)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	0 (-0.02, 0.02)	-0.02 (-0.03, -0.01)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	0 (-0.02, 0.02)	-0.02 (-0.03, -0.01)
Income (Log)	-0.1 (-0.15, -0.06)	0 (-0.04, 0.04)	-0.05 (-0.13, 0.03)	-0.01 (-0.06, 0.04)	-0.11 (-0.16, -0.06)	0 (-0.04, 0.04)	-0.05 (-0.13, 0.03)	-0.02 (-0.07, 0.04)	-0.1 (-0.15, -0.06)	0 (-0.04, 0.04)	-0.05 (-0.13, 0.03)	-0.02 (-0.07, 0.04)
Education	-0.05 (-0.08, -0.01)	-0.04 (-0.07, -0.02)	-0.07 (-0.13, -0.01)	-0.05 (-0.1, 0)	-0.04 (-0.07, -0.01)	-0.04 (-0.07, -0.02)	-0.07 (-0.13, -0.01)	-0.05 (-0.1, 0)	-0.04 (-0.07, -0.01)	-0.04 (-0.07, -0.02)	-0.07 (-0.13, -0.01)	-0.05 (-0.1, 0)
Caregiver					0.23 (0, 0.46)	0.57 (0.4, 0.74)	0.11 (-0.42, 0.64)	0.41 (0.07, 0.75)	0.23 (0, 0.46)	0.58 (0.41, 0.74)	0.1 (-0.44, 0.64)	0.43 (0.09, 0.77)
Retired	0.09 (-0.45, 0.64)	0.55 (0.12, 0.98)	0.14 (-0.95, 1.22)	0.17 (-0.59, 0.93)					0.05 (-0.49, 0.6)	0.58 (0.15, 1)	0.1 (-0.99, 1.19)	0.27 (-0.49, 1.02)
Caregiving Transition					0.19 (-0.03, 0.4)	0.14 (-0.02, 0.3)	0.31 (-0.16, 0.78)	0.1 (-0.23, 0.43)	0.19 (-0.03, 0.41)	0.14 (-0.02, 0.3)	0.31 (-0.17, 0.79)	0.1 (-0.23, 0.43)
Paid Labor Transition	-0.59 (-1.15, -0.03)	0.04 (-0.38, 0.46)	-0.12 (-0.93, 0.69)	-0.15 (-0.86, 0.56)					-0.62 (-1.18, -0.07)	0.02 (-0.39, 0.44)	-0.16 (-0.97, 0.66)	-0.15 (-0.86, 0.56)
(cons)	3.53	3.66	4.32	4.93	3.49	4.01	4.41	5.03	3.62	3.6	4.44	4.87

Source: Health and Retirement Study, 2010-2012. *Note:* Coefficients with 95 percent confidence intervals in parentheses.

Table 2.10 Multivariate Linear Regression Models: Caregiving Transitions and Social Support on CES-D Depressive Symptoms, 2012

	Model 4a				Model 4b				Model 4c			
	White		Black		White		Black		White		Black	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Age (/100)	-0.64 (-2.03, 0.75)	-2.35 (-3.43, -1.27)	-2.19 (-6.08, 1.7)	-3.13 (-5.43, -0.83)	-0.34 (-1.72, 1.05)	-1.63 (-2.71, -0.55)	-1.13 (-4.92, 2.66)	-2.58 (-4.87, -0.29)	-0.18 (-1.57, 1.22)	-1.52 (-2.6, -0.44)	-0.75 (-4.53, 3.03)	-2.46 (-4.75, -0.17)
Wealth (Log)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	0 (-0.02, 0.02)	-0.02 (-0.03, -0.01)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	0 (-0.02, 0.02)	-0.02 (-0.03, -0.01)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	0 (-0.02, 0.02)	-0.02 (-0.03, -0.01)
Income (Log)	-0.11 (-0.16, -0.06)	0 (-0.04, 0.04)	-0.06 (-0.14, 0.02)	-0.02 (-0.07, 0.04)	-0.11 (-0.16, -0.07)	0 (-0.04, 0.04)	-0.06 (-0.14, 0.02)	-0.02 (-0.07, 0.04)	-0.11 (-0.16, -0.07)	0 (-0.04, 0.04)	-0.08 (-0.16, 0)	-0.02 (-0.07, 0.03)
Education	-0.04 (-0.07, -0.01)	-0.04 (-0.07, -0.01)	-0.06 (-0.12, -0.01)	-0.05 (-0.1, 0.01)	-0.04 (-0.07, -0.01)	-0.04 (-0.07, -0.02)	-0.06 (-0.12, -0.01)	-0.05 (-0.1, 0.01)	-0.04 (-0.07, -0.01)	-0.04 (-0.07, -0.01)	-0.06 (-0.12, -0.01)	-0.04 (-0.09, 0.01)
Caregiving Transition	1.33 (-0.31, 2.97)	1.39 (0.18, 2.6)	3.68 (0.14, 7.21)	0.62 (-2.06, 3.3)	0.29 (-0.52, 1.1)	-0.18 (-0.76, 0.39)	-0.64 (-2.67, 1.39)	-1.01 (-2.33, 0.31)	1.66 (-0.41, 3.73)	0.44 (-1.16, 2.04)	4.2 (-0.3, 8.7)	-1.59 (-5.01, 1.83)
Pos Soc Support	-0.31 (-0.59, -0.03)	-0.47 (-0.71, -0.23)	0.31 (-0.4, 1.02)	-0.62 (-1.17, -0.07)					-0.14 (-0.43, 0.15)	-0.26 (-0.51, -0.01)	0.74 (0.01, 1.47)	-0.54 (-1.11, 0.03)
Neg Soc Support					0.75 (0.39, 1.11)	0.95 (0.66, 1.25)	1.06 (0.19, 1.93)	0.54 (-0.11, 1.19)	0.7 (0.32, 1.08)	0.85 (0.54, 1.16)	1.42 (0.49, 2.35)	0.35 (-0.33, 1.03)
Pos X Care Transition	-0.33 (-0.83, 0.17)	-0.32 (-0.68, 0.04)	-1.02 (-2.09, 0.05)	-0.12 (-0.92, 0.68)					-0.38 (-0.9, 0.13)	-0.16 (-0.54, 0.23)	-1.27 (-2.34, -0.21)	0.15 (-0.68, 0.97)
Neg X Care Transition					-0.04 (-0.63, 0.55)	0.36 (-0.06, 0.78)	0.58 (-0.76, 1.92)	0.78 (-0.08, 1.64)	-0.12 (-0.73, 0.49)	0.29 (-0.16, 0.74)	0.12 (-1.25, 1.49)	0.86 (-0.04, 1.76)
(cons)	4.11	5.17	2.99	6.59	1.93	1.78	1.63	3.27	2.3	2.65	-1.46	5.23

Source: Health and Retirement Study, 2010-2012.

Note: Coefficients with 95 percent confidence intervals in parentheses.

Table 2.11 Multivariate Linear Regression Models: Paid Labor Transitions and Social Support on CES-D Depressive Symptoms, 2012

	Model 4d				Model 4e				Model 4f			
	White		Black		White		Black		White		Black	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Age (/100)	-0.72 (-2.12, 0.68)	-2.13 (-3.22, -1.05)	-2.48 (-6.44, 1.48)	-3.21 (-5.52, -0.9)	-0.41 (-1.8, 0.98)	-1.43 (-2.51, -0.34)	-1.13 (-4.94, 2.68)	-2.83 (-5.13, -0.53)	-0.26 (-1.66, 1.15)	-1.29 (-2.37, -0.21)	-1.24 (-5.08, 2.6)	-2.73 (-5.03, -0.43)
Wealth (Log)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	0 (-0.02, 0.02)	-0.02 (-0.03, -0.01)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	0 (-0.02, 0.02)	-0.02 (-0.03, -0.01)	0 (-0.01, 0.02)	-0.01 (-0.02, 0)	0 (-0.02, 0.02)	-0.02 (-0.03, -0.01)
Income (Log)	-0.1 (-0.15, -0.06)	0 (-0.04, 0.04)	-0.05 (-0.13, 0.03)	-0.02 (-0.07, 0.04)	-0.11 (-0.16, -0.06)	0 (-0.04, 0.04)	-0.06 (-0.14, 0.02)	-0.02 (-0.07, 0.04)	-0.11 (-0.16, -0.06)	0 (-0.04, 0.04)	-0.06 (-0.14, 0.02)	-0.02 (-0.07, 0.04)
Education	-0.04 (-0.07, -0.01)	-0.04 (-0.07, -0.01)	-0.07 (-0.13, -0.01)	-0.05 (-0.1, 0)	-0.04 (-0.07, -0.01)	-0.04 (-0.07, -0.02)	-0.06 (-0.12, 0)	-0.05 (-0.1, 0)	-0.04 (-0.07, -0.01)	-0.04 (-0.07, -0.01)	-0.06 (-0.12, 0)	-0.05 (-0.1, 0.01)
Paid Labor Transition	-1.82 (-6.33, 2.68)	-1.81 (-5.36, 1.74)	0.15 (-5.44, 5.74)	0.26 (-6.64, 7.16)	-0.85 (-3, 1.3)	1.02 (-0.58, 2.62)	0.8 (-2.37, 3.97)	-1.74 (-4.31, 0.83)	-2.59 (-8.28, 3.1)	-0.1 (-4.51, 4.31)	2.59 (-3.68, 8.86)	-9.36 (-20.66, 1.94)
Pos Soc Support	-0.4 (-0.64, -0.17)	-0.63 (-0.82, -0.45)	-0.13 (-0.7, 0.44)	-0.66 (-1.08, -0.25)					-0.26 (-0.5, -0.01)	-0.34 (-0.53, -0.14)	0.25 (-0.33, 0.82)	-0.47 (-0.89, -0.05)
Neg Soc Support					0.74 (0.45, 1.03)	1.16 (0.94, 1.38)	1.42 (0.71, 2.13)	0.91 (0.46, 1.36)	0.65 (0.34, 0.96)	1.02 (0.79, 1.25)	1.53 (0.78, 2.28)	0.77 (0.31, 1.23)
Pos X PL Transition	0.38 (-1, 1.76)	0.5 (-0.56, 1.56)	-0.09 (-1.79, 1.61)	-0.09 (-2.05, 1.86)					0.47 (-0.96, 1.91)	0.29 (-0.8, 1.37)	-0.51 (-2.14, 1.13)	1.81 (-0.73, 4.35)
Neg X PL Transition					0.19 (-1.34, 1.72)	-0.84 (-2.09, 0.4)	-0.64 (-2.69, 1.41)	1.04 (-0.62, 2.69)	0.35 (-1.25, 1.95)	-0.72 (-2.02, 0.59)	-0.74 (-2.81, 1.34)	1.93 (-0.23, 4.09)
(cons)	4.55	5.69	4.71	6.94	2.08	1.48	1.15	3.03	2.88	2.65	0.29	4.71

Source: Health and Retirement Study, 2010-2012.

Note: Coefficients with 95 percent confidence intervals in parentheses.

Table 2.12 Linear Probability Models: Life Transitions on Clinical Depression (4+ CES-D Depressive Symptoms), 2012

	Model 1a				Model 1b				Model 1c			
	White		Black		White		Black		White		Black	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Age (/100)	-0.85 (-4.28, 2.58)	-4.21 (-6.23, -2.19)	-1.69 (-12.08, 8.7)	-3.11 (-7.46, 1.24)	-0.95 (-4.36, 2.46)	-4.52 (-6.54, -2.5)	-1.84 (-13.03, 9.35)	-3.09 (-7.44, 1.26)	-1.25 (-4.7, 2.2)	-4.62 (-6.66, -2.58)	-2.69 (-13.51, 8.13)	-3.08 (-7.45, 1.29)
Wealth (Log)	0 (-0.04, 0.04)	-0.02 (-0.04, 0)	0.04 (-0.04, 0.12)	-0.03 (-0.05, -0.01)	0 (-0.04, 0.04)	-0.02 (-0.04, 0)	0.04 (-0.04, 0.12)	-0.03 (-0.05, -0.01)	0 (-0.04, 0.04)	-0.02 (-0.04, 0)	0.04 (-0.04, 0.12)	-0.03 (-0.05, -0.01)
Income (Log)	-0.11 (-0.19, -0.03)	-0.01 (-0.07, 0.05)	-0.1 (-0.22, 0.02)	-0.03 (-0.11, 0.05)	-0.12 (-0.2, -0.04)	-0.01 (-0.07, 0.05)	-0.1 (-0.24, 0.04)	-0.02 (-0.1, 0.06)	-0.11 (-0.19, -0.03)	-0.01 (-0.07, 0.05)	-0.1 (-0.22, 0.02)	-0.02 (-0.1, 0.06)
Education	-0.09 (-0.15, -0.03)	-0.05 (-0.09, -0.01)	-0.08 (-0.22, 0.06)	-0.05 (-0.15, 0.05)	-0.09 (-0.15, -0.03)	-0.05 (-0.09, -0.01)	-0.1 (-0.26, 0.06)	-0.05 (-0.15, 0.05)	-0.09 (-0.15, -0.03)	-0.05 (-0.09, -0.01)	-0.09 (-0.25, 0.07)	-0.05 (-0.15, 0.05)
Caregiving Transition					0.53 (0.04, 1.02)	0.52 (0.25, 0.79)	0.67 (-0.64, 1.98)	0.15 (-0.44, 0.74)	0.54 (0.05, 1.03)	0.53 (0.26, 0.8)	0.72 (-0.53, 1.97)	0.15 (-0.44, 0.74)
Paid Labor Transition	-0.99 (-3.01, 1.03)	-0.6 (-1.46, 0.26)	-15.75 (-2867.33, 2835.83)	0.05 (-1.2, 1.3)					-1.06 (-3.08, 0.96)	-0.65 (-1.51, 0.21)	-15.81 (-2936.15, 2904.53)	0.05 (-1.2, 1.3)
(cons)	0.59	2.39	0.44	1.35	0.48	2.33	0.31	1.21	0.73	2.44	0.99	1.21
Resid. Dev. (DF)	372.48 (940)	968.52 (1922)	37.691 (155)	151.93 (436)	370.15 (940)	38.134 (155)	960.71 (1922)	151.82 (436)	369.10 (939)	958.86 (1921)	37.073 (154)	151.81 (435)

Source: Health and Retirement Study, 2010-2012. *Note:* Coefficients with 95 percent confidence intervals in parentheses.

Table 2.13 Linear Probability Models: Social Support on Clinical Depression (4+ CES-D Depressive Symptoms), 2012

	Model 2a				Model 2b				Model 2c			
	White		Black		White		Black		White		Black	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Age (/100)	0.18 (-3.13, 3.49)	-3.5 (-5.48, -1.52)	-1.64 (-12.28, 9)	-2.73 (-7.06, 1.6)	0.54 (-2.81, 3.89)	-2.88 (-4.9, -0.86)	-1.39 (-11.78, 9)	-2.21 (-6.62, 2.2)	0.75 (-2.62, 4.12)	-2.69 (-4.71, -0.67)	-0.75 (-11.55, 10.05)	-2.1 (-6.51, 2.31)
Wealth (Log)	0 (-0.04, 0.04)	-0.02 (-0.04, 0)	0.01 (-0.05, 0.07)	-0.03 (-0.05, -0.01)	0 (-0.04, 0.04)	-0.02 (-0.04, 0)	0 (-0.06, 0.06)	-0.03 (-0.05, -0.01)	0 (-0.04, 0.04)	-0.02 (-0.04, 0)	0 (-0.06, 0.06)	-0.03 (-0.05, -0.01)
Income (Log)	-0.11 (-0.19, -0.03)	-0.01 (-0.07, 0.05)	-0.12 (-0.26, 0.02)	-0.03 (-0.11, 0.05)	-0.12 (-0.2, -0.04)	-0.01 (-0.07, 0.05)	-0.13 (-0.27, 0.01)	-0.04 (-0.12, 0.04)	-0.12 (-0.2, -0.04)	-0.01 (-0.07, 0.05)	-0.13 (-0.27, 0.01)	-0.04 (-0.12, 0.04)
Education	-0.07 (-0.13, -0.01)	-0.04 (-0.08, 0)	-0.03 (-0.19, 0.13)	-0.06 (-0.16, 0.04)	-0.07 (-0.13, -0.01)	-0.05 (-0.09, -0.01)	-0.05 (-0.19, 0.09)	-0.06 (-0.16, 0.04)	-0.07 (-0.13, -0.01)	-0.05 (-0.09, -0.01)	-0.04 (-0.2, 0.12)	-0.06 (-0.16, 0.04)
Pos Soc Support	-0.53 (-1.06, 0)	-0.79 (-1.08, -0.5)	-0.85 (-1.91, 0.21)	-0.58 (-1.23, 0.07)					-0.36 (-0.93, 0.21)	-0.44 (-0.75, -0.13)	-0.54 (-1.66, 0.58)	-0.24 (-0.97, 0.49)
Neg Soc Support					0.82 (0.21, 1.43)	1.25 (0.92, 1.58)	1.78 (0.27, 3.29)	1.18 (0.53, 1.83)	0.69 (0.04, 1.34)	1.07 (0.72, 1.42)	1.55 (-0.1, 3.2)	1.1 (0.41, 1.79)
(cons)	1.23	4.28	3.11	3.03	-1.77	-0.53	-2.26	-1.09	-0.68	0.99	-0.79	-0.25

Source: Health and Retirement Study, 2010-2012. *Note:* Coefficients with 95 percent confidence intervals in parentheses.

Table 2.14 Linear Probability Models: Caregiving and Paid Labor Status, Life Transitions, Social Support on Clinical Depression (4+ CES-D Depressive Symptoms), 2012

	Model 3a				Model 3b				Model 3c			
	White		Black		White		Black		White		Black	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Age (/100)	-0.87 (-4.3, 2.56)	-4.47 (-6.51, -2.43)	-1.37 (-11.93, 9.19)	-3.09 (-7.46, 1.28)	-1.08 (-4.49, 2.33)	-4.77 (-6.81, -2.73)	-1.75 (-13.39, 9.89)	-3.61 (-7.96, 0.74)	-1.39 (-4.84, 2.06)	-5.15 (-7.23, -3.07)	-2.37 (-13.91, 9.17)	-3.64 (-8.03, 0.75)
Wealth (Log)	0 (-0.04, 0.04)	-0.03 (-0.05, -0.01)	0.03 (-0.05, 0.11)	-0.03 (-0.05, -0.01)	0 (-0.04, 0.04)	-0.03 (-0.05, -0.01)	0.04 (-0.04, 0.12)	-0.03 (-0.05, -0.01)	0 (-0.04, 0.04)	-0.03 (-0.05, -0.01)	0.03 (-0.05, 0.11)	-0.03 (-0.05, -0.01)
Income (Log)	-0.11 (-0.19, -0.03)	0 (-0.06, 0.06)	-0.1 (-0.22, 0.02)	-0.03 (-0.11, 0.05)	-0.11 (-0.19, -0.03)	-0.01 (-0.07, 0.05)	-0.11 (-0.25, 0.03)	-0.04 (-0.12, 0.04)	-0.11 (-0.19, -0.03)	0 (-0.06, 0.06)	-0.11 (-0.25, 0.03)	-0.04 (-0.12, 0.04)
Education	-0.09 (-0.15, -0.03)	-0.05 (-0.09, -0.01)	-0.08 (-0.22, 0.06)	-0.05 (-0.15, 0.05)	-0.09 (-0.15, -0.03)	-0.06 (-0.1, -0.02)	-0.1 (-0.26, 0.06)	-0.06 (-0.16, 0.04)	-0.09 (-0.15, -0.03)	-0.05 (-0.09, -0.01)	-0.09 (-0.25, 0.07)	-0.06 (-0.16, 0.04)
Caregiver					0.29 (-0.24, 0.82)	0.87 (0.58, 1.16)	-0.24 (-1.81, 1.33)	0.8 (0.19, 1.41)	0.28 (-0.25, 0.81)	0.88 (0.59, 1.17)	-0.28 (-1.83, 1.27)	0.81 (0.2, 1.42)
Retired	0.19 (-1.38, 1.76)	1.08 (-0.02, 2.18)	-0.81 (-3.53, 1.91)	-0.1 (-1.47, 1.27)					0.12 (-1.43, 1.67)	1.14 (0.04, 2.24)	-0.74 (-3.68, 2.2)	0.09 (-1.34, 1.52)
Caregiving Transition					0.43 (-0.1, 0.96)	0.25 (-0.04, 0.54)	0.71 (-0.64, 2.06)	-0.03 (-0.64, 0.58)	0.44 (-0.09, 0.97)	0.25 (-0.04, 0.54)	0.76 (-0.57, 2.09)	-0.03 (-0.64, 0.58)
Paid Labor Transition	-0.93 (-2.99, 1.13)	-0.3 (-1.18, 0.58)	-15.96 (-2871.76, 2839.84)	0.01 (-1.36, 1.38)					-1.02 (-3.08, 1.04)	-0.31 (-1.21, 0.59)	-15.99 (-3027.94, 2995.96)	0.02 (-1.37, 1.41)
(cons)	0.42	1.49	0.99	1.43	0.47	2.33	0.28	1.56	0.63	1.5	1.54	1.49

Source: Health and Retirement Study, 2010-2012.

Note: Coefficients with 95 percent confidence intervals in parentheses.

Table 2.15 Linear Probability Models: Paid Labor Transitions and Social Support on Clinical Depression (4+ CES-D Depressive Symptoms), 2012

	Model 4a				Model 4b				Model 4c			
	White		Black		White		Black		White		Black	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Age (/100)	-0.28 (-3.73, 3.17)	-3.5 (-5.54, -1.46)	-1.21 (-11.99, 9.57)	-2.67 (-7.02, 1.68)	0.06 (-3.47, 3.59)	-2.83 (-4.91, -0.75)	1.82 (-8.49, 12.13)	-2.18 (-6.59, 2.23)	0.32 (-3.21, 3.85)	-2.63 (-4.71, -0.55)	1.49 (-8.74, 11.72)	-2.13 (-6.54, 2.28)
Wealth (Log)	0 (-0.04, 0.04)	-0.02 (-0.04, 0)	0.04 (-0.04, 0.12)	-0.03 (-0.05, -0.01)	-0.01 (-0.05, 0.03)	-0.02 (-0.04, 0)	0.03 (-0.03, 0.09)	-0.03 (-0.05, -0.01)	-0.01 (-0.05, 0.03)	-0.02 (-0.04, 0)	0.03 (-0.03, 0.09)	-0.03 (-0.05, -0.01)
Income (Log)	-0.11 (-0.19, -0.03)	-0.01 (-0.07, 0.05)	-0.1 (-0.22, 0.02)	-0.03 (-0.11, 0.05)	-0.12 (-0.2, -0.04)	-0.01 (-0.07, 0.05)	-0.11 (-0.23, 0.01)	-0.03 (-0.11, 0.05)	-0.11 (-0.19, -0.03)	-0.01 (-0.07, 0.05)	-0.12 (-0.24, 0)	-0.03 (-0.11, 0.05)
Education	-0.09 (-0.15, -0.03)	-0.05 (-0.09, -0.01)	-0.08 (-0.22, 0.06)	-0.05 (-0.15, 0.05)	-0.09 (-0.15, -0.03)	-0.05 (-0.09, -0.01)	-0.08 (-0.22, 0.06)	-0.05 (-0.15, 0.05)	-0.09 (-0.15, -0.03)	-0.05 (-0.09, -0.01)	-0.09 (-0.23, 0.05)	-0.04 (-0.14, 0.06)
Paid Labor Transition	5.4 (-7.83, 18.63)	-2.94 (-11.07, 5.19)	-17.25 (-18129, 18094.5)	3.29 (-8.37, 14.95)	-2.23 (-10.38, 5.92)	-0.22 (-3.3, 2.86)	-12.09 (-11863.62, 11839.44)	-3.52 (-9.67, 2.63)	4.62 (-14.43, 23.67)	-3.25 (-13.58, 7.08)	-10.51 (-18998.34, 18977.32)	-11.38 (-33.39, 10.63)
Pos Soc Support	-0.59 (-1.14, -0.04)	-0.78 (-1.07, -0.49)	-0.3 (-1.63, 1.03)	-0.57 (-1.24, 0.1)					-0.41 (-1, 0.18)	-0.43 (-0.76, -0.1)	0.56 (-0.75, 1.87)	-0.29 (-1.02, 0.44)
Neg Soc Support					0.83 (0.18, 1.48)	1.26 (0.93, 1.59)	2.42 (0.91, 3.93)	1.08 (0.39, 1.77)	0.69 (0.02, 1.36)	1.08 (0.71, 1.45)	2.72 (1.07, 4.37)	0.99 (0.28, 1.7)
Pos X PL Transition	-2.13 (-6.78, 2.52)	0.72 (-1.71, 3.15)	0.46 (-5457.61, 5458.53)	-0.91 (-4.34, 2.52)					-2.04 (-6.94, 2.86)	0.79 (-1.76, 3.34)	-0.34 (-4689.56, 4688.88)	1.82 (-2.83, 6.47)
Neg X PL Transition					0.84 (-4.18, 5.86)	-0.17 (-2.37, 2.03)	-2.23 (-7663.83, 7659.37)	2.07 (-1.38, 5.52)	0.36 (-5.99, 6.71)	0.15 (-2.26, 2.56)	-2.53 (-7316.82, 7311.76)	3.09 (-1.91, 8.09)
(cons)	1.94	4.3	0.98	2.9	-1.27	-0.53	-5.97	-1.03	0	0.93	-7.94	0.01

Source: Health and Retirement Study, 2010-2012.

Note: Coefficients with 95 percent confidence intervals in parentheses.

Table 2.16 Linear Probability Models: Caregiving Transitions and Social Support on Clinical Depression (4+ CES-D Depressive Symptoms), 2012

	Model 4d				Model 4e				Model 4f			
	White		Black		White		Black		White		Black	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Age (/100)	-0.36 (-3.83, 3.11)	-3.85 (-5.89, -1.81)	-0.51 (-12.66, 11.64)	-2.57 (-6.98, 1.84)	-0.03 (-3.58, 3.52)	-3.14 (-5.22, -1.06)	1.94 (-9.27, 13.15)	-2.05 (-6.5, 2.4)	0.2 (-3.35, 3.75)	-2.98 (-5.06, -0.9)	2.83 (-8.05, 13.71)	-1.92 (-6.43, 2.59)
Wealth (Log)	-0.01 (-0.05, 0.03)	-0.02 (-0.04, 0)	0.04 (-0.04, 0.12)	-0.03 (-0.05, -0.01)	-0.01 (-0.05, 0.03)	-0.02 (-0.04, 0)	0.03 (-0.05, 0.11)	-0.03 (-0.05, -0.01)	-0.01 (-0.05, 0.03)	-0.02 (-0.04, 0)	0.04 (-0.02, 0.1)	-0.03 (-0.05, -0.01)
Income (Log)	-0.11 (-0.19, -0.03)	-0.01 (-0.07, 0.05)	-0.14 (-0.28, 0)	-0.03 (-0.11, 0.05)	-0.12 (-0.2, -0.04)	-0.01 (-0.07, 0.05)	-0.11 (-0.23, 0.01)	-0.03 (-0.11, 0.05)	-0.12 (-0.2, -0.04)	-0.01 (-0.07, 0.05)	-0.17 (-0.31, -0.03)	-0.04 (-0.12, 0.04)
Education	-0.09 (-0.15, -0.03)	-0.05 (-0.09, -0.01)	-0.08 (-0.24, 0.08)	-0.05 (-0.15, 0.05)	-0.09 (-0.15, -0.03)	-0.05 (-0.09, -0.01)	-0.1 (-0.26, 0.06)	-0.05 (-0.15, 0.05)	-0.08 (-0.14, -0.02)	-0.05 (-0.09, -0.01)	-0.1 (-0.24, 0.04)	-0.05 (-0.15, 0.05)
Caregiving Transition	-0.56 (-4.19, 3.07)	1.3 (-0.62, 3.22)	8.59 (-2.44, 19.62)	1.7 (-2.65, 6.05)	1.22 (-0.64, 3.08)	0.44 (-0.56, 1.44)	0.62 (-4.85, 6.09)	-0.32 (-2.55, 1.91)	0.42 (-4.32, 5.16)	1.18 (-1.52, 3.88)	14.66 (2.23, 27.09)	1.45 (-4.55, 7.45)
Pos Soc Support	-0.78 (-1.49, -0.07)	-0.66 (-1.09, -0.23)	1.34 (-1.38, 4.06)	-0.35 (-1.33, 0.63)					-0.54 (-1.3, 0.22)	-0.33 (-0.8, 0.14)	2.65 (0.34, 4.96)	-0.02 (-1.14, 1.1)
Neg Soc Support					1.05 (0.23, 1.87)	1.23 (0.74, 1.72)	2.4 (0.17, 4.63)	1.04 (0.02, 2.06)	0.81 (-0.09, 1.71)	1.1 (0.57, 1.63)	3.98 (1.35, 6.61)	1.04 (-0.06, 2.14)
Pos X Care Transition	0.35 (-0.79, 1.49)	-0.24 (-0.83, 0.35)	-2.44 (-5.75, 0.87)	-0.47 (-1.8, 0.86)					0.19 (-1.01, 1.39)	-0.19 (-0.84, 0.46)	-3.53 (-6.35, -0.71)	-0.48 (-1.95, 0.99)
Neg X Care Transition					-0.5 (-1.77, 0.77)	0.05 (-0.62, 0.72)	-0.03 (-3.19, 3.13)	0.27 (-1.06, 1.6)	-0.35 (-1.68, 0.98)	-0.03 (-0.76, 0.7)	-1.57 (-4.9, 1.76)	0.14 (-1.29, 1.57)
(cons)	2.41	3.88	-4.97	2	-1.69	-0.53	-6.23	-1.14	0.11	0.57	-17.74	-1.14

Source: Health and Retirement Study, 2010-2012.

Note: Coefficients with 95 percent confidence intervals in parentheses.

Chapter 3 Caregiving Transitions, Coping Behaviors, and CES-D Depressive Symptoms in Late-Life

Introduction

Recent research finds that while Whites have better physical health outcomes than do Blacks, Whites have similar or worse mental health outcomes (Jackson and Knight 2006; Jackson, Knight, and Rafferty 2010; Williams 2001). Referred to as the "minority paradox" by some mental health researchers, many racial/ethnic minority groups – including non-Hispanic Blacks and Hispanics – report lower rates of depression and depressive symptoms relative to Whites, despite experiencing worse physical health outcomes (Williams 2001). Indeed, racial/ethnic trends observed for mental health differ from what is observed for physical health.

Studies among adolescent and midlife adults have found stable and comparable levels of CES-D depressive symptoms between Blacks and Whites. These studies often attribute increased use of coping behaviors – such as alcohol, tobacco and substance use, and overeating – as mediators of the relationship for social stress and CES-D depressive symptoms for Blacks, but not for Whites (Jackson et al. 2010). However, the role of coping behaviors as potential mediators between social stress and CES-D depressive symptoms has not been examined in the late-life period, when engagement in these types of behaviors have been found to differ from earlier ages (Blazer 2003; Moos et al. 2009).

Mental Health

Depression among late-life adults is a major public health problem. The prevalence of depression among late-life adults is often reported to be lower than the prevalence of depression among adolescents and younger adults (Fiske, Wetherell, and Gatz 2009). Yet, the problem of depression among late-life adults may be understated. Particularly, researchers

report that 70-90 percent of depression among late-life adults goes undiagnosed (Koenig 1999). Symptoms of late-life depression are often not recognized by patients (Mills and Henretta 2001). More than half of individuals experiencing late-life major depression are reported to have never been afflicted with depression previously (Fiske et al. 2009). This "late onset depression", compared to "early onset depression" experienced by individuals before reaching old age, is not only difficult to recognize by patients, but by medical professionals as well (Fiske et al. 2009). Often in late-life, depressive symptoms are ascribed to other medical problems (Koenig 1999).

There are negative consequences associated with late-life depression (Fiske et al. 2009), which can compound when depression goes undiagnosed and untreated. Depression in late-life is associated with disability, major health conditions such as diabetes, and even death (Hicken et al. 2013; Barry et al. 2008). This is particularly true for racial/ethnic minorities (Hicken et al. 2014; Mills and Henretta 2001). Research on racial/ethnic variation in mental health outcomes for late-life adults will be particularly important as the older population grows. Racial/ethnic minorities aged 65 and older are projected to increase by 123% between 2013 and 2030, substantially larger than the projected 50% growth for white adults 65 and older (Administration on Aging 2014).

Stress and Unhealthy Coping Behaviors

Research finds that unhealthy coping behaviors, including alcohol use, tobacco use and overeating, are utilized to buffer the negative mental health effects associated with stress exposure (Collins 2001; Jackson et al. 2010; Mezuk et al. 2010; Schwartz and Meyer 2010; Williams 2001). Yet, how these coping behaviors operate as mediators in the late-life period is yet to be fully understood. For alcohol use, studies of older adults indicate alcohol consumption tends to decline with age (Merrick et al. 2008; Moore, Endo, and Carter 2003; Moos et al.

2009). Nutritional guidelines from the American Geriatrics Society (AGS) define heavy drinking behavior for adults 65 years and older as averaging more than 7 drinks per week, more than 1 drink per day, or more than 3 drinks in one setting (AGS 2008). However, many adults continue to engage in heavy drinking behavior, in excess of the AGS recommendations, throughout the late-life period (Kirchner et al. 2007; Merrick et al. 2008; Moore et al. 2003; Moos et al. 2009).

This trend is problematic as heavy drinking behavior is positively associated with morbidity and mortality in the late-life period (SAMHSA 2005). Older adults experience more alcohol sensitivity and elevated blood alcohol content from the same amount of alcohol as midlife adults, due to older adults' lower average body mass (Vogel-Sprott and Barrett 1984). Thus, excessive alcohol consumption can hold significant physical concerns for older adults (Deb et al. 2011).

Stress has been shown to impact health outcomes indirectly through negative health behaviors. Individuals attempt to mitigate the unpleasant experience of stress by managing psychological and physiological symptoms through coping behaviors (Aneshensel 1992; Mezuk et al. 2013; Pearlin 1989; Thoits 1995). While largely dependent upon the norms and options afforded by one's social context (Pearlin 1989), coping behaviors may take many forms, including physical exercise, calling on social support, drinking alcohol or smoking cigarettes (Diez Roux and Mair 2010; Williams and Collins 2001).

Alcohol consumption and tobacco use are strategies commonly utilized to cope with the deleterious mental health consequences associated with social stress (Collins 2001; Keyes, Hatzenbuehler, and Hasin 2011). Alcohol consumption has been found to reduce anxiety and enhance mood (Jackson et al. 2010; Peele and Brodsky 2000), and nicotine ingestion through cigarette smoking can create a sense of mild euphoria and reduce stress-induced anxiety (Benowitz 1996; Jackson et al. 2010). In this way, alcohol and tobacco use may buffer some of

the negative mental consequences of stress exposure, while at the same time being deleterious to physical health (Collins 2001).

The methods used to manage stress are influenced by an individual's (1) social context, including race/ethnicity, gender and age, (2) cultural and social norms influencing or promoting specific behaviors, and (3) environmental context, including access to information and resources (Mezuk et al. 2013). Indeed, coping behaviors are socially patterned (Meyer, Schwartz, and Frost 2008). For instance, an individual's physical or neighborhood context can influence negative health coping behaviors, such as through widespread availability of alcohol or tobacco products. Thus, in addition to the negative physiological impacts of the body's stress-response system itself, negative health behaviors used to cope with stress, such as alcohol and tobacco use, further drive the relationship between stress and health outcomes (Collins 2001).

Stress and Coping: Racial Differences

Due to consistent evidence highlighting an association between stress, particularly chronic stress, and limited resources on poor mental health outcomes, we may expect to find elevated rates of depressive symptoms among racial/ethnic minority groups due to their relative social status. Yet, studies among younger age groups have found stable and comparable levels of depression and depressive symptoms between Blacks and Whites (Somervell et al. 1989). Often using the Centers for Epidemiologic Study of Depression (CES-D) scale, these studies attribute increased use of coping behaviors – such as alcohol, tobacco and substance use and overeating – as mediators of the relationship for social stress and CES-D depressive symptoms for Blacks, but not for Whites (Hicken et al. 2013; Jackson et al. 2010).

Thus, recent research has addressed a "conundrum" in the social stress literature which finds that while Whites have better physical health outcomes than do Blacks, Whites have similar or worse mental health outcomes (Jackson and Knight 2006; Jackson et al. 2010; Williams 2001). Referred to as the "minority paradox" by some mental health researchers, many racial/ethnic minority groups – including non-Hispanic Blacks and Hispanics – report lower rates of depression and depressive symptoms relative to Whites, despite experiencing worse physical health outcomes (Williams 2001). For example, a study by Jackson and colleagues (2010) found Black respondents were more likely than White respondents to report a chronic health condition (46.6% and 36.4%, respectively), yet they found no difference in prevalence of clinical depression between Black and White respondents (13.0% and 12.5%, respectively) (Jackson et al. 2010). This pattern remains even when controlling for features of socioeconomic status (Kessler et al. 2005; Mezuk et al. 2010).

Various models aimed at explaining these observed social patterning of physical health and mental health outcomes across racial/ethnic groups have been proposed (Mezuk et al. 2010). A model proposed by Jackson and Knight (2006) rests on three foundational premises (Jackson and Knight 2006). First, stress exposure is negatively associated with physical and mental health. Second, engagement in coping behaviors is positively associated with stress exposure. Third, the types of coping behaviors in which individuals engage is dependent upon social structure and environmental conditions (see Figure 3.1) (Jackson and Knight 2006). Jackson and Knight posit individuals in disadvantaged positions are more likely to be exposed to stressors, and are also more likely to engage in unhealthy coping behaviors – such as alcohol use, tobacco use, and overeating behaviors – than more advantaged individuals (Jackson and Knight 2006).

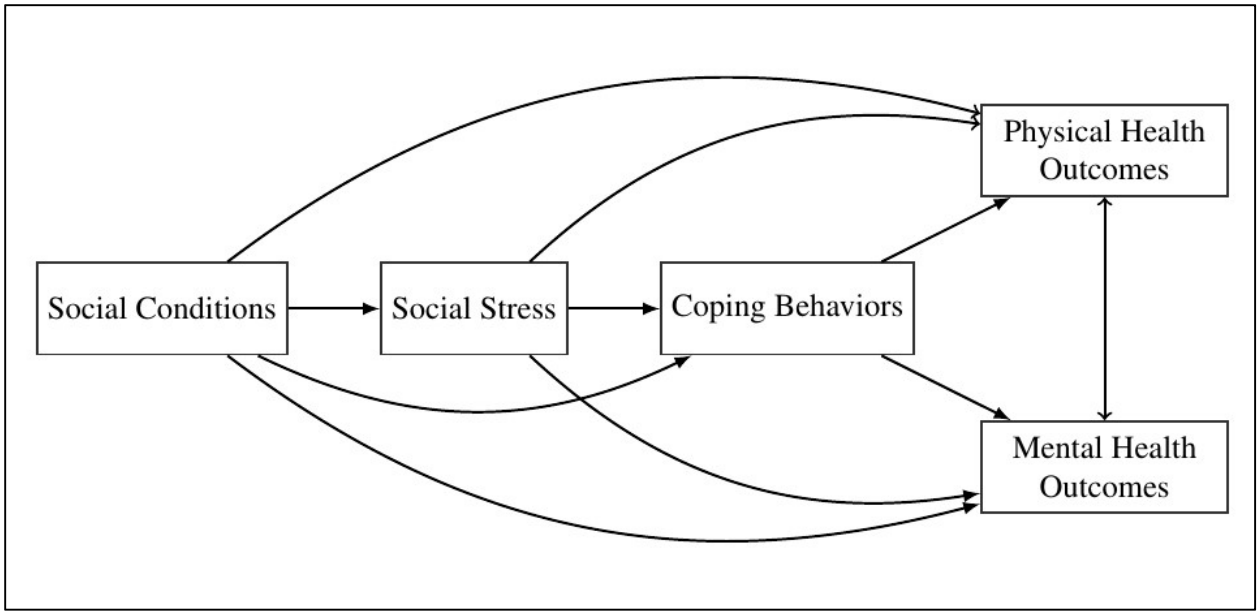

Figure 3.1 Hypothesized relationship between social conditions, social stress, coping behaviors, physical health outcomes and mental health outcomes.

Socioeconomically disadvantaged communities often lack resources and services fundamental to good health. Community-level resources necessary for health-promotion include infrastructures such as safe neighborhoods and areas for physical activity, educational and occupational opportunities, and social welfare and healthcare systems (Boardman et al. 2005). In this way, structural-level discrimination negatively impacts the health of racial/ethnic minority groups through the lack of health-promoting services and opportunities for healthful coping in disadvantaged and segregated communities (Boardman et al. 2005; Jackson and Knight 2006; Jackson et al. 2010).

Further, research indicates more disadvantaged individuals tend to use less effective coping strategies in deterring distress than do their more advantaged counterparts (Aneshensel 1992; Pearlin and Schooler 1978). For example, Black populations experience higher rates of obesity relative to other racial/ethnic groups, particularly for Black women (Jackson et al. 2010). The overeating of comfort foods may be a well-learned, socially normative response to chronic stressors (Jackson et al. 2010). Blacks are reported to prefer larger body sizes than other

racial/ethnic groups, which can shape expectations, preferences, and behavior surrounding eating habits (Boardman et al. 2005; Flynn and Fitzgibbon 1998; Kumanyika 1993). Disparities associated with the elevated rates of obesity relative to other groups for Black women are shown to only widen throughout the life course (Jackson et al. 2010). Thus, the unhealthy stress-coping behaviors that are more prevalent among disadvantaged populations are posited to contribute to racial/ethnic minorities experiencing worse physical health outcomes, compared to Whites, throughout the life course (Jackson et al. 2010). However, how these unhealthy stress-coping behaviors contribute to mental health across racial/ethnic groups is less well known.

Stress and Coping: Sex Differences

Compared to men, women experience greater levels of depression (Aneshensel, Rutter, and Lachenbruch 1991; Barry et al. 2008; Lorber and Moore 2008; Umberson, Chen, and House 1996). There are many factors commonly utilized to explain disparities in prevalence of depression and depressive symptoms between men and women. Research assessing differential vulnerability to stress between women and men using depression as an outcome inferred that women are more vulnerable to the stressors they experience relative to men experiencing the same stressors. However, theory and research indicate that men may not necessarily be less vulnerable to stress, but their distress may manifest differentially (Aneshensel et al. 1991; Pearlin 1989; Umberson et al. 1996). For women, stress exposure is more strongly associated with a direct effect on depression and depressive symptoms. For men, however, stress exposure is more strongly associated with alcohol or substance use, and thus has an indirect effect on depressive and depression symptoms through these behaviors (Pearlin 1989; Umberson et al. 1996).

Stressors and stressful life events have been shown to be more strongly associated with alcohol use for men than for women (Dawson, Grant, and Ruan 2005; Keyes et al. 2011; Umberson et al. 1996). Dawson and colleagues (2005) found the number of stressors experienced by individuals within the past 12 months was associated with the drinking and binge drinking behavior for both men and women, but the magnitude of the relationship was stronger for men (Dawson et al. 2005). Researchers assessing the causes and consequences of stress and coping behaviors find men report utilizing alcohol consumption as a mechanism to cope with stress more frequently than do women (Armeli et al. 2000; Nolen-Hoeksema and Harrell 2002; Umberson et al. 1996). Researchers assessing sex differences in drinking behavior following specific stressful life events find men are more likely to increase drinking behavior following job loss than are women (Catalano et al. 1993; Crawford et al. 1987). Further, men tend to increase drinking behavior following divorce, whereas women tend to decrease drinking behavior following divorce (Wilsnack et al. 1991).

For mental health outcomes, it is posited men's utilization of alcohol and other substance use behaviors are effective coping strategies to avoid or ameliorate the risk of depression or the level of depressive symptoms (Kessler 1979). However, while women experience poorer mental health outcomes than do men, unhealthy alcohol and tobacco use behaviors associated with stress exposure negatively impact men's physical health. The negative health impacts of unhealthy behaviors for men compound as men are less likely than are women to see health care professionals and utilize treatment (Lorber and Moore 2008).

While depression rates decline overall, research continually finds women report higher levels of depressive symptoms and greater prevalence of clinical depression in late-life than do men (Fiori and Jager 2011). The greater prevalence of depression among women in late-life has been posited to result from a combination of three factors (Barry et al. 2008). First, women

appear to be more susceptible to the onset of depression. Second, depressive symptoms are more persistent, with longer durations, for women than for men. Paired with women's greater longevity relative to men's, the overall prevalence of depression is higher among older women than older men (Barry et al. 2008). Interestingly, however, the gap in depression prevalence between women and men has been found to narrow with age, with the smallest sex gap existing among the oldest-old (Barry et al. 2008). Thus, it is unclear if manifestations of distress or coping behaviors utilized to ameliorate the negative mental health consequences of stress change throughout the late-life period in order to explain the narrowing of the depression sex gap.

Stress Coping Behaviors in Late-Life

Previous research indicates 20-25% of adults 75 years and older engage in heavy drinking behavior (Adams, Barry, and Fleming 1996; Moos et al. 2009; Zhang et al. 2008). Older men are more likely than older women to engage in heavy drinking behavior (Kirchner et al. 2007; Merrick et al. 2008; Moore et al. 2003; Moos et al. 2009). Particularly, older men are more likely to engage in heavy episodic drinking behavior, with men drinking in excess of 3 or more drinks in one setting more commonly than do older women (Moos et al. 2009). A study by Moos and colleagues (2009) found drinking behavior to slowly and consistently decline with age throughout the late-life period for both men and women (Moos et al. 2009).

For overeating behaviors – for which body mass index (BMI) and obesity may be used as proxies (Hicken et al. 2014; Jackson et al. 2010) – research among older adults indicates obesity and depression are comorbid in late-life (Blazer et al. 2002). Obesity is strongly associated with chronic health conditions and functional limitations (Deb et al. 2011), which are also known to be associated with depression and depressive symptoms (Blazer 2003). As such, it may be

expected for an association between obesity and depression to be particularly strong in late-life, when chronic health conditions and functional limitations are more prominent.

However, appetite loss is a common cause of weight loss among depressed late-life adults (Blazer 2003; Fiske et al. 2009; Tiemeier 2003). Women commonly experience appetite disturbances in conjunction with depressed mental state in late-life (Fiske et al. 2009). However, the association between depression and weight loss is less common for men, who are more prone to experience agitation in conjunction with depressed mood in late-life (Fiske et al. 2009). In elderly populations, appetite disturbance and weight loss can lead to compromised nutritional status, frailty, and failure to thrive (Blazer 2003; Fiske et al. 2009). Thus, the relationship between obesity and depression observed in midlife may not hold for late-life adults.

Research Motivations

Prior research calls for assessment of whether social stress and coping behaviors operate along the causal pathway between sociodemographic characteristics and mental health outcomes (Aneshensel et al. 1991; Meyer et al. 2008). The role of coping behaviors as potential mediators between social stress and CES-D depressive symptoms has not been examined in the late-life period, when engagement in these types of behaviors have been found to differ from earlier ages (Moos et al. 2009). Previous studies find no significant or consistent differences in prevalence of CES-D depressive symptoms across racial/ethnic groups in late-life, even when substance use behaviors change during this period relative to earlier life, and when the association between obesity and depression is not yet clear. This is particularly important to address due to the "minority paradox", wherein many Blacks report lower rates of depression and depressive symptoms relative to Whites, despite experiencing worse physical health outcomes (Williams 2001). The racial/ethnic trends observed for mental health differ from what is observed for physical health and thus require further examination.

To be successful in this assessment, research must test (1) whether sociodemographic characteristics – including race/ethnicity and sex – affect engagement in coping behaviors, and (2) whether coping behaviors act as a buffer against the negative mental health consequences of social stress (Aneshensel et al. 1991; Meyer et al. 2008). This article serves to answer those two questions. Figure 3.2 presents the overall framework for hypothesizing the pathway through which care transitions, negative social support, wealth, education, and age are associated with CES-D depressive symptoms, both directly and indirectly through coping behaviors. In this way, this article builds upon burgeoning research identifying different factors and pathways leading to mental health disparities between sex and race groups in late-life (Morris 2017).

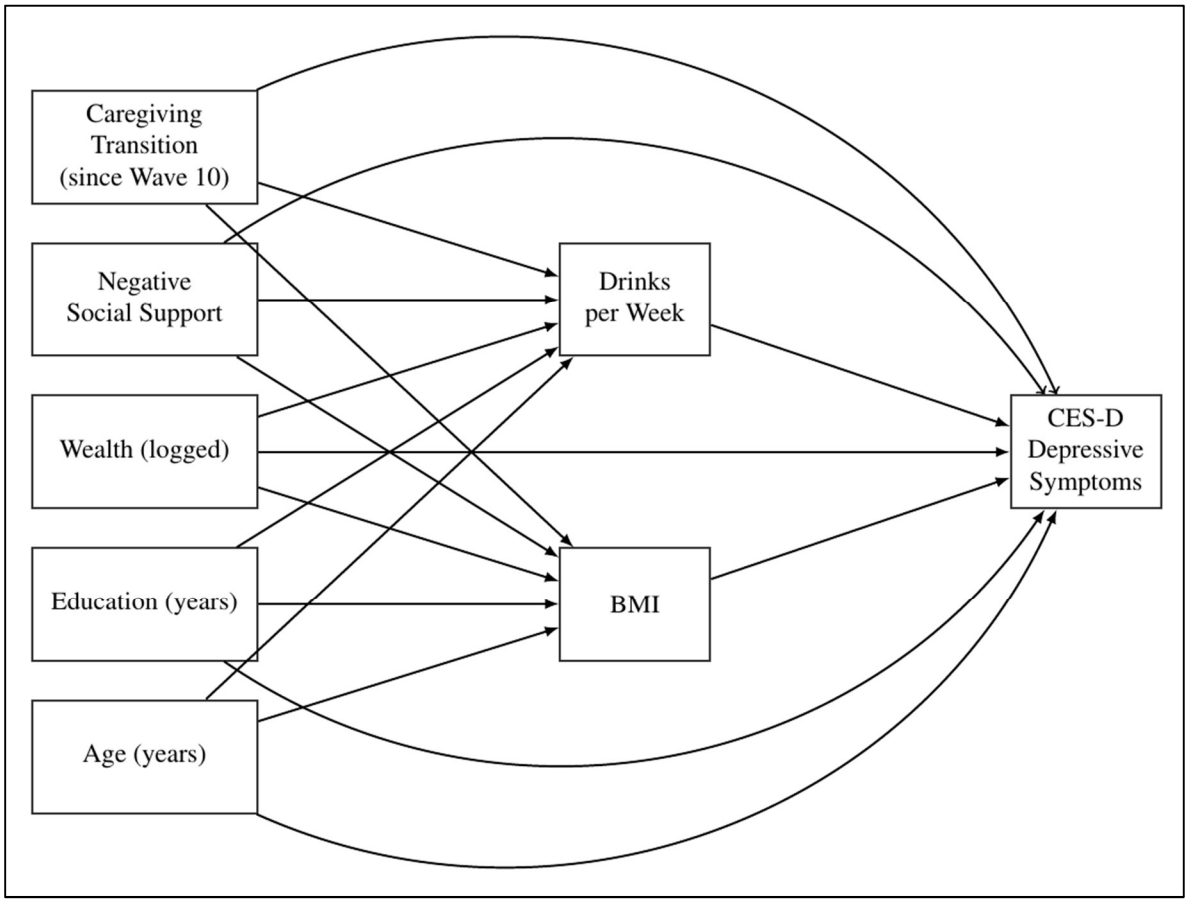

Figure 3.2 Hypothesized relationship between negative social support, care transition, sociodemographic indicators, drinks per week and BMI as coping behaviors, and CES-D depressive symptoms.

Data and Methods

Using path analysis, this chapter will analyze the role of alcohol use and overeating behaviors as potential mediators in the pathway between caregiving transitions, negative social support, and sociodemographic indicators on CES-D depressive symptoms by race/ethnicity and sex across two waves of the Health and Retirement Study (2010 to 2012). This study focuses on caregiving transitions as an indicator of a life transition in which to study the potential sex or race differences in coping behaviors utilized to buffer the mental health consequences of life transitions. Specifically, this chapter aims to test the use of alcohol and overeating behaviors as coping mechanisms, serving as mediators, between caregiving transitions and CES-D depressive symptoms across groups in late-life by assessing the direct and indirect effects of stressors on CES-D scores in the path models (see Figure 3.2). Negative social support – an indicator of network strain – is used as the primary indicator for social support in this analysis (Morris 2017). Models are split by sex and race to assess if the associations and mechanisms linking caregiving transitions, negative social support, sociodemographic indicators, coping behaviors and CES-D depressive symptoms differ across groups.

Health and Retirement Study

This study utilizes data from the 2010 to 2012 waves of the Health and Retirement Study (HRS). The HRS is a nationally representative and longitudinal survey of U.S. adults over 50 years of age, with surveys conducted every two years. The HRS began in 1992 and consists of five birth cohorts, entering the study in different calendar years. This study utilizes data from the HRS sample (1931-1941 birth cohorts), aged 51 to 61 at the beginning of the HRS study, the Aging and Health in America (AHEAD) sample (born 1923 or earlier) and the Children of Depression (CODA) sample (1924-1930 birth cohorts) (Ofstedal et al. 2011).

Beginning in 2004, the HRS added an additional psychosocial "*leave-behind*" questionnaire to obtain additional information from respondents not included in the Core questionnaire. A random subsample of HRS respondents are selected and receive the questionnaire following the in-person Core interview. The questionnaire is self-administered, and has a response rate of about 90%, for those given the questionnaire. This analysis utilizes measures exclusive to the psychosocial leave-behind questionnaire, so restricts the HRS sample to only those receiving and answering the questionnaire (Clarke et al. 2008).

In this analysis, only primary respondents are included in the sample. This analysis will focus on non-Hispanic Black and White differences only. The sample utilized in this analysis included 1,645 individuals from the HRS cohort, 1,106 individuals from the AHEAD cohort and 1,601 individuals from the CODA cohort. In sum, the analysis includes 4,352 individuals.

Statistical Analyses

Data management, sample weighting and statistical analyses were conducted in R, version 3.3.1. Sample weights were applied using utilizing HRS guidelines, and provide adjustments for birth cohort, sex, race/ethnicity, attrition, and mortality (HRS n.d.). Multiple imputation (5 imputations) was conducted utilizing R's Amelia package to impute missing values on other covariates. A linear time effect was assumed for the imputation models. Multiple imputation allows for complete cases to be utilized, limiting omitted variable bias (Rubin 1996). To calculate model coefficients and results independently by sex and race, separate sex- and race-split datasets were then created for modeling.

This chapter creates path diagrams modeling direct caregiving transitions (occurring between the 2010 and 2012 waves of HRS data collection), negative social support, wealth (in logged dollars), education (in years), and age (in years) on CES-D depressive symptoms, with alcohol consumption – measured as reported drinks per week – and BMI (see Figure 3.2). In the

first set of path models – the mediated models – the indirect effects of caregiving transitions, negative social support, wealth, education, and age on CES-D depressive symptoms through drinks per week and BMI are calculated to assess if drinks per week and/or BMI mediate the effects of a care transition, negative social support, or these sociodemographic indicators on mental health outcomes (see Table 3.2 and Figure 3.3). In the second set of path models – the full saturation models – the direct effects of caregiving transitions, negative social support, wealth, education, age, drinks per week, and BMI on CES-D depressive symptoms are assessed (see Figure 3.4). The mediated models and full saturation models are then compared to assess which path diagrams best fit the data.

Within each sex and race split dataset, direct effects for path analysis models were calculated by utilizing weighted negative binomial and Gaussian regression models. Bootstrapped samples (N=100, with replacement) allowed for the indirect effects of drinks per week on CES-D depressive symptoms and BMI on CES-D depressive symptoms to be calculated. First, within each bootstrapped sample, the direct path coefficients and standard errors of (a) care transitions, negative social support, and sociodemographic indicators to drinks per week were calculated using negative binomial regression models, and (b) drinks per week to CES-D were calculated using negative binomial regression models. Then, the product of the direct path coefficients and standard errors (a*b) were calculated to estimate the indirect effect of care transitions, negative social support, and sociodemographic indicators on CES-D depressive symptoms via drinks per week. Second, within each bootstrapped sample, the direct path coefficients of (a) care transitions, negative social support, and sociodemographic indicators to BMI were calculated using Gaussian regression models, and (c) BMI to CES-D were calculated using negative binomial regression models. Then, the product of the direct path coefficients and standard errors (a*c) were calculated to estimate the indirect effect of care transitions,

negative social support, and sociodemographic indicators on CES-D depressive symptoms via BMI.

Measures

CES-D Depressive Symptoms

The primary outcome measure of this study of depressive symptom score was measured utilizing the Centers for Epidemiologic Study of Depression (CES-D) scale. The 8-item version of the CES-D included in the HRS asks respondents yes or no questions relating to feelings experienced "much of the time during the past week". The feelings included in the scale are: "felt depressed", "everything was an effort", "sleep was restless", "was happy" (reverse coded), "felt lonely", "enjoyed life" (reverse coded), "felt sad", and "could not get going". Loneliness is posited to operate differently and independently from other measures of depressive symptoms among older populations (Cacioppo, Hughes, and Waite 2006). As such, this analysis utilizes a shortened measure of the CES-D scale outcome in which loneliness is excluded. "Yes" CES-D symptom responses from the remaining indicators were summed to create a CES-D score, with higher scores representing elevating levels of depressive symptoms, with a maximum score of depressive symptoms of 7.

Demographic Information

Age is measured in years. This analysis focuses on differences between non-Hispanic Black and non-Hispanic White respondents. As such, Race is measured as non-Hispanic Black and non-Hispanic White.

Socioeconomic Status

Education is measured as years of education. Income is measured as total household income. Due to a positively skewed distribution of income among the HRS sample, income is logged in this analysis. Wealth is measured using a RAND HRS wealth extract, which combines total wealth holdings (including real estate, transportation, business, and investments holdings), net of mortgage loans and other debts. Due to a positively skewed distribution of wealth among the sample, positive wealth is logged in this analysis. Negative wealth values (debt) are converted to near-zero values (0.0000001) before logging (Smith and Cicchetti 1974).

Alcohol Consumption and Overeating Behaviors

Alcohol consumption behavior is assessed as the number of drinks respondents report consuming per week. Respondents who report any drinking behavior are asked to report the number of days during the week in which they drink alcohol, and the number of alcoholic beverages they consume on the days they drink. A weekly alcohol consumption measure is constructed by multiplying the two indicators. Respondents who do not report ever drinking are coded as "0" for number of daily drinks. BMI is assessed as a continuous measure, and is utilized as a proxy for overeating behaviors, consistent with Jackson and colleagues (2010) (Jackson et al. 2010). Most late-life males and females tend to fall in the "normal" and "overweight" categorizations of BMI, with an average BMI of 26.8 and 25.4, respectively (Bahat et al. 2012). A BMI of 18.5-24.9 is classified as "normal", and a BMI of 25-29 is classified as "overweight" (Bahat et al. 2012).

Social Support

Chapter 2 highlighted the important role of negative social support when assessing mental health outcomes in late-life. The ability of individuals in the late-life period – regardless

of sex or race – to withstand excess demand from their social networks may diminish during the late-life period, making the role of negative social support more meaningful for their mental health status than positive social support in their later years. As such, future research assessing correlates and trajectories of mental health status in late-life should incorporate this measure.

Respondents were asked a series of questions for negative social support from spouses, children, family, and friends. Negative social support is assessed using the HRS questions asking respondents how much they agree (not at all, a little, some, or a lot) with the statements about their social network branch, including if the respondent feels their social network "makes too many demands on them", "criticizes them", "lets them down when counting on them" and "gets on nerves". Indicator scores from each social network branch (spouses, children, family, and friends) are averaged to create a summary measure of social support, with higher scores representing more positive social support.

Caregiving Transition

Caregiving transitions are indicated by being a caregiver in 2012 for a spouse, parent, or grandchild, when the respondent did not report being a caregiver for that care group in 2010.

Results

The weighted characteristics of the HRS 2012 data are reported in Table 3.1. The weighted HRS sample includes 1,213 White males (27.9%), 2,382 White females (54.7%), 208 Black males (4.8%) and 549 Black females (12.6%). Among White males, the average age is 82.33 years and the distribution of cohort membership is 25.2% AHEAD, 39.6% CODA, and 35.2% HRS. The socioeconomic status indicators include average completed education of 12.68 years, an income of $59,503.77 and wealth equal to $637,648.66. The average BMI is 26.67, and the average number of reported drinks per week is 2.61. Since the prior wave of data

collection (2010), 33.9% of White males experienced a caregiving transition. The average score for negative social support is 1.33. The average number of reported CES-D depressive symptoms was 1.03.

Among White females, the average age is 83.02 years and the distribution of cohort membership is 27.8% AHEAD, 40.8% CODA, and 31.4% HRS. The socioeconomic status indicators include average completed education of 12.14 years, an income of $32,453.28 and wealth equal to $346,556.24. The average BMI is 26.06, and the average number of reported drinks per week is 1.08. Since the prior wave of data collection (2010), 47.2% of White females experienced a caregiving transition. The average score for negative social support is 1.32. The average number of reported CES-D depressive symptoms was 1.23.

Among Black males, the average age is 78.63 years and the distribution of cohort membership is 13.0% AHEAD, 22.1% CODA, and 64.9% HRS. The socioeconomic status indicators include average completed education of 10.03 years, an income of $35,211.63 and wealth equal to $145,811.48. The average BMI is 26.89, and the average number of reported drinks per week is 2.10. Since the prior wave of data collection (2010), 39.8% of Black males experienced a caregiving transition. The average score for negative social support is 1.46. The average number of reported CES-D depressive symptoms was 1.15.

Among Black females, the average age is 79.58 years and the distribution of cohort membership is 20.0% AHEAD, 18.8% CODA, and 61.2% HRS. The socioeconomic status indicators include average completed education of 11.21 years, an income of $22,317.15 and wealth equal to $76,154.11. The average BMI is 27.94, and the average number of reported

drinks per week is 0.37. Since the prior wave of data collection (2010), 52.5% of Black females experienced a caregiving transition. The average score for negative social support is 1.49. The average number of reported CES-D depressive symptoms was 1.30.

The highest average amount of wealth is observed among White males, followed by White females, Black males, and Black females. Highest average years of education are observed among White males, followed by White females, Black females, and Black males. Highest average levels of income are observed among White males, followed by Black males, White females, and Black females. The differences in these three indicators across group are statistically significant (p<0.001).

Additionally, there are statistically significant differences in BMI, with Black females having the highest BMI (27.94), followed by Black males (26.89), White males (26.67), and White females (26.06) (p<0.001). There are statistically significant differences in average number of reported drinks per week, with White males (2.61) reporting the most drinks per week, followed by Black males (2.10), White females (1.08), and Black females (0.37) (p<0.001). There are statistically significant differences in average number of reported CES-D depressive symptoms, with Black females (1.30) reporting the highest CES-D score, followed by White females (1.23), Black males (1.15), and White males (1.03) (p=0.009).

Table 3.1 Descriptive Characteristics by Sex and Race: Health and Retirement Study, 2012

	White		Black		
	Male	**Female**	**Male**	**Female**	
N (4352)	1213	2382	208	549	
	Mean (SD) or N (%)	Mean (SD) or N (%)	Mean (SD) or N (%)	Mean (SD) or N (%)	p-value
Age	82.33 (6.88)	83.02 (6.92)	78.63 (6.20)	79.58 (7.38)	<0.001
Cohort					<0.001
AHEAD	306 (25.2)	663 (27.8)	27 (13.0)	110 (20.0)	
CODA	480 (39.6)	972 (40.8)	46 (22.1)	103 (18.8)	
HRS	427 (35.2)	747 (31.4)	135 (64.9)	336 (61.2)	
Socioeconomic Status					
Education (Years)	12.68 (3.48)	12.14 (3.06)	10.30 (3.94)	11.21 (3.28)	<0.001
Income	59,503.77 (164,460.97)	32,453.28 (38,957.55)	35,211.63 (43,163.19)	22,317.15 (43,107.03)	<0.001
Wealth	637,648.66 (1,979,638.12)	346,556.24 (939,024.17)	145,811.48 (358,146.27)	76,154.11 (146,951.90)	<0.001
Health Behaviors					
BMI	26.67 (4.55)	26.06 (5.62)	26.89 (5.21)	27.94 (6.29)	<0.001
Drinks per week	2.61 (6.26)	1.08 (3.02)	2.10 (6.14)	0.37 (1.42)	<0.001
Caregiving Transition	321 (33.9)	910 (47.2)	64 (39.8)	232 (52.5)	<0.001
Negative Social Support	1.33 (0.33)	1.32 (0.35)	1.46 (0.32)	1.49 (0.37)	<0.001
CES-D Symptoms	1.03 (1.53)	1.23 (1.72)	1.15 (1.54)	1.30 (1.71)	0.009

Path analysis was used to assess the effect of caregiving transitions, negative social support, and sociodemographic indicators on CES-D depressive symptoms. Alcohol use and overeating behaviors were tested independently as potential mediators of caregiving transitions. Given these mediators – viewed in this analysis as measures for coping behaviors – may operate differently by sex and race, models are stratified by sex and race group.

Figure 3.3 presents the results for Models 1a-1d, the mediated models for caregiving transitions, negative social support, and the sociodemographic indicators of wealth, education and age on CES-D depressive symptoms through drinks per week and BMI. Caregiving transitions were only shown to increase the number of drinks consumed per week for Black females. Caregiving transitions significantly predicted a greater number of drinks per week for Black females (β=0.79, p=0.03), but had no significant effect on drinks per week for White

males (*β*=-0.05, *p*=0.73), White females (*β*=-0.07, *p*=0.58) or Black males (*β*=0.02, *p*=0.95), when controlling for negative social support and the sociodemographic indicators. Caregiving transitions had no significant effects on BMI for any sex and race group (White males *β*=0.18, *p*=0.55; White females *β*=0.38, *p*=0.13; Black males *β*=0.10, *p*=0.90; Black females *β*=0.00, *p*=0.99), when controlling for negative social support and the sociodemographic indicators.

Negative social support was shown to increase the number of drinks consumed per week for White females and Black males. Negative social support significantly predicted a greater number of drinks per week for White females (*β*=0.50, *p*=0.005) and Black males (*β*=1.47, *p*=0.008), but had no significant effect on drinks per week for White males (*β*=0.27, *p*=0.19) or Black females (*β*=0.44, *p*=0.29), when controlling for caregiving transitions and the sociodemographic indicators. Negative social support was shown to increase BMI for White females, but no other sex or race group. Negative social support significantly predicted greater BMI for White females (*β*=0.87, *p*=0.02), but had no significant effect on BMI for White males (*β*=47, *p*=0.28), Black males (*β*=-0.07, *p*=0.96) or Black females (*β*=1.25, *p*=0.11), when controlling for caregiving transitions and the sociodemographic indicators.

Wealth was shown to impact the drinks consumed per week for all sex and race groups except for Black females, but the direction of the effect differed by race. Wealth (logged) predicted significantly different number of drinks per week for White males (*β*=0.04, *p*=0.003), White females (*β*=0.04, *p*<0.001), and Black males (*β*=-0.04, *p*=0.046), but had no significant effect on drinks per week for Black females (*β*=-0.01, *p*=0.65), when controlling for caregiving transitions, negative social support, education, and age. Wealth was shown to impact BMI only for White females. Wealth predicted significantly different BMI for White females (*β*=-0.06, *p*<0.001), but had no significant effect on BMI for White males (*β*=0.02, *p*=0.45), Black males

(*β*=0.07, *p*=0.07), and Black females (*β*=-0.01, *p*=0.76), when controlling for caregiving transitions, negative social support, education, and age.

Education (in years) predicted significantly different number of drinks per week for all sex and race group (White males *β*=0.07, *p*=0.001; White females *β*=0.18, *p*<0.001; Black males *β*=0.21, *p*=0.002; Black females *β*=0.23, *p*<0.001), when controlling for caregiving transitions, negative social support, wealth, and age. Education was shown to decrease BMI for Whites, but did not impact BMI for Blacks. Education predicted significantly different BMI for White males (*β*=-0.10, *p*=0.03) and White females (*β*=-0.13, *p*=0.004), but had no significant effect on BMI for Black males (*β*=0.15, *p*=0.16) or Black females (*β*=-0.02, *p*=0.87), when controlling for caregiving transitions, negative social support, wealth, and age.

Age (in years) significantly predicted fewer drinks per week for all sex and race group (White males *β*=-0.04, *p*<0.001; White females *β*=-0.03, *p*=0.006; Black males *β*=-0.11, *p*=0.005; Black females *β*=-0.06, *p*=0.04), when controlling for caregiving transitions, negative social support, wealth, and education. Age was shown to decrease BMI for all sex and race groups except for Black males. Age significantly predicted lower BMI for White males (*β*=-0.17, *p*<0.001), White females (*β*=-0.24, *p*<0.001), and Black females (*β*=-0.26, p<0.001), but had no significant effect on BMI for Black males (*β*=-0.07, *p*=0.34), when controlling for caregiving transitions, negative social support, wealth, and education.

In sum, caregiving transitions, negative social support, and sociodemographic indicators are differentially associated with drinks per week and BMI according to sex and race group. Looking at the indirect effects of these indicators through coping behaviors in the mediated models, results show drinks per week had no significant effect on CES-D depressive symptoms for any sex and race group (White males *β*=-0.002, *p*=0.82; White females *β*=-0.02, p=0.16; Black males *β*=0.001, *p*=0.96; Black females *β*=0.06, *p*=0.18), when controlling for BMI. In the

mediated models, BMI was shown to be associated with elevated CES-D depressive symptoms for females, but not for males. BMI predicted significantly more CES-D depressive symptoms for White females (β=0.02, p<0.001) and Black females (β=0.02, p=0.02), but had no significantly effect on CES-D depressive symptoms for White males (β=-0.004, p=0.72) or Black males (β=0.002, p=0.92), when controlling for drinks per week.

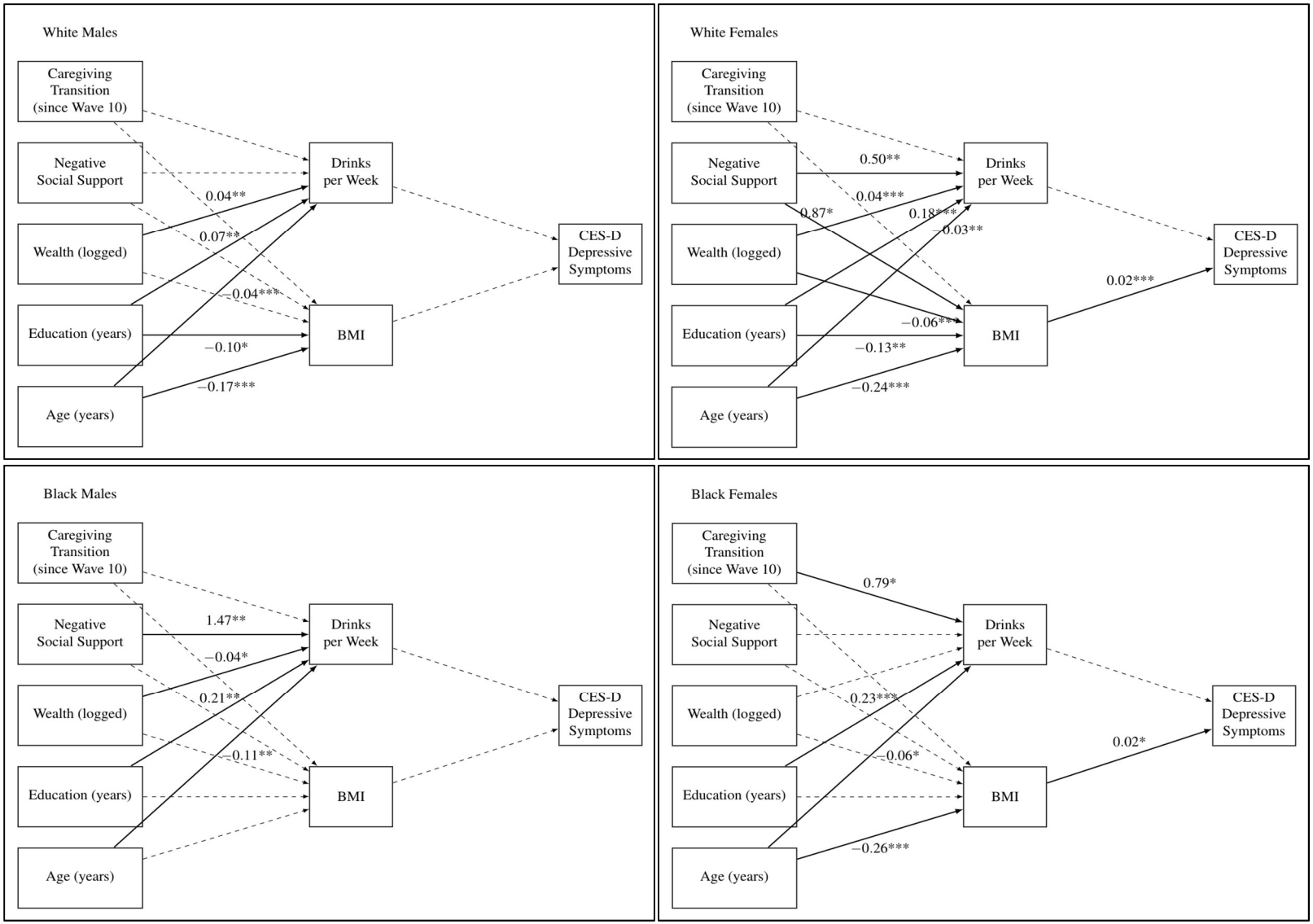

Figure 3.3 Models 1a-1d; Caregiving Transitions, Negative Social Support, Sociodemographic Indicators, Drinks per Week, BMI, and CES-D Score. Upper: White Males (AIC=2034) and White Females (AIC=4387). Lower: Black Males (AIC=255) and Black Females (AIC=703).

Figure 3.4 presents the results for Models 2a-2d, the full saturation models for caregiving transitions, negative social support, wealth, education, age, drinks per week, and BMI on CES-D depressive symptoms. In these models, caregiving transitions, negative social support, wealth, education, and age are shown to have both direct and indirect – via drinks per week and BMI – on CES-D depressive symptoms.

Caregiving transitions were shown to directly increase CES-D depressive symptoms for White females, but no other sex and race group. Caregiving transitions significantly predicated a greater number of CES-D depressive symptoms for White females (β=0.23, p<0.001), but had no significant effect on CES-D depressive symptoms for White males (β=0.20, p=0.05), Black males (β=0.20, p=0.35) or Black females (β=0.09, p=0.47), when controlling for negative social support and the sociodemographic indicators. Negative social support significantly predicated a greater number of CES-D depressive symptoms for all sex and race groups (White males β=0.62, p<0.001; White females β=0.81, p<0.001; Black males β=1.2, p<0.001; Black females β=0.60, p<0.001), when controlling for caregiving transitions, and the sociodemographic indicators.

Wealth was shown to directly decrease CES-D depressive symptoms for Black females, but no other sex and race group. Wealth (logged) predicted significantly fewer CES-D depressive symptoms for Black females (β=-0.01, p=0.004), but had no significant effect on CES-D depressive symptoms for White males (β=001, p=0.87), White females (β=-0.006, p=0.11) or Black males (β=-0.001, p=0.91), when controlling for caregiving transitions, negative social support, education, and age. Education (in years) significantly predicated fewer CES-D depressive symptoms for all sex and race groups (White males β=-0.05, p=0.002; White females β=-0.02, p=0.045; Black males β=-0.07, p=0.006; Black females β=-0.04, p=0.04), when controlling for caregiving transitions, negative social support, wealth, and age. Age was shown to directly decrease CES-D depressive symptoms for females, but not for males. Age (in years)

predicted significantly fewer CES-D depressive symptoms for White females (*β*=-0.01, *p*=0.02) and Black females (*β*=-0.02, *p*=0.047), but had no significant effect on CES-D depressive symptoms for White males (*β*=-0.01, *p*=0.41) or Black males (*β*=-0.02, *p*=0.34), when controlling for caregiving transitions, negative social support, education, and wealth.

Looking at the direct effects in the full saturation models, drinks per week had no significant effect on CES-D depressive symptoms for any sex and race group (White males *β*=0.002, *p*=0.86; White females *β*=-0.02, *p*=0.005; Black males *β*=-0.009, *p*=0.0.62; Black females *β*=0.04, *p*=0.39), when controlling for caregiving transitions, negative social support, the sociodemographic variables, and BMI. Looking at the direct effects in the full saturation models, BMI was shown to increase CES-D depressive symptoms for White females, but no other sex and race group. BMI predicted significantly more CES-D depressive symptoms for White females (*β*=0.02, *p*=0.004), but had no significant effect on CES-D depressive symptoms for White males (*β*=-0.007, *p*=0.52), Black males (*β*=0.006, *p*=0.75), or Black females (*β*=0.02, *p*=0.11), when controlling for caregiving transitions, negative social support, the sociodemographic variables, and drinks per week.

Models were split by sex and race as differences in the pathways linking caregiving transitions, social support, and sociodemographic characteristics through drinks per week and BMI were assumed. However, the full saturation models were tested with pair-wise interactions between sex and race indicators. First, the full HRS dataset was split by sex, and interactions of the indicators with race were tested for males and females. Results indicate none of the indicators' effects on CES-D depressive symptoms vary by race for either sex group. Second, the full HRS dataset was split by race, and interactions of the indicators with sex were tested for Whites and Blacks. Results indicate none of the indicators' effects on CES-D depressive symptoms vary by sex for either race group.

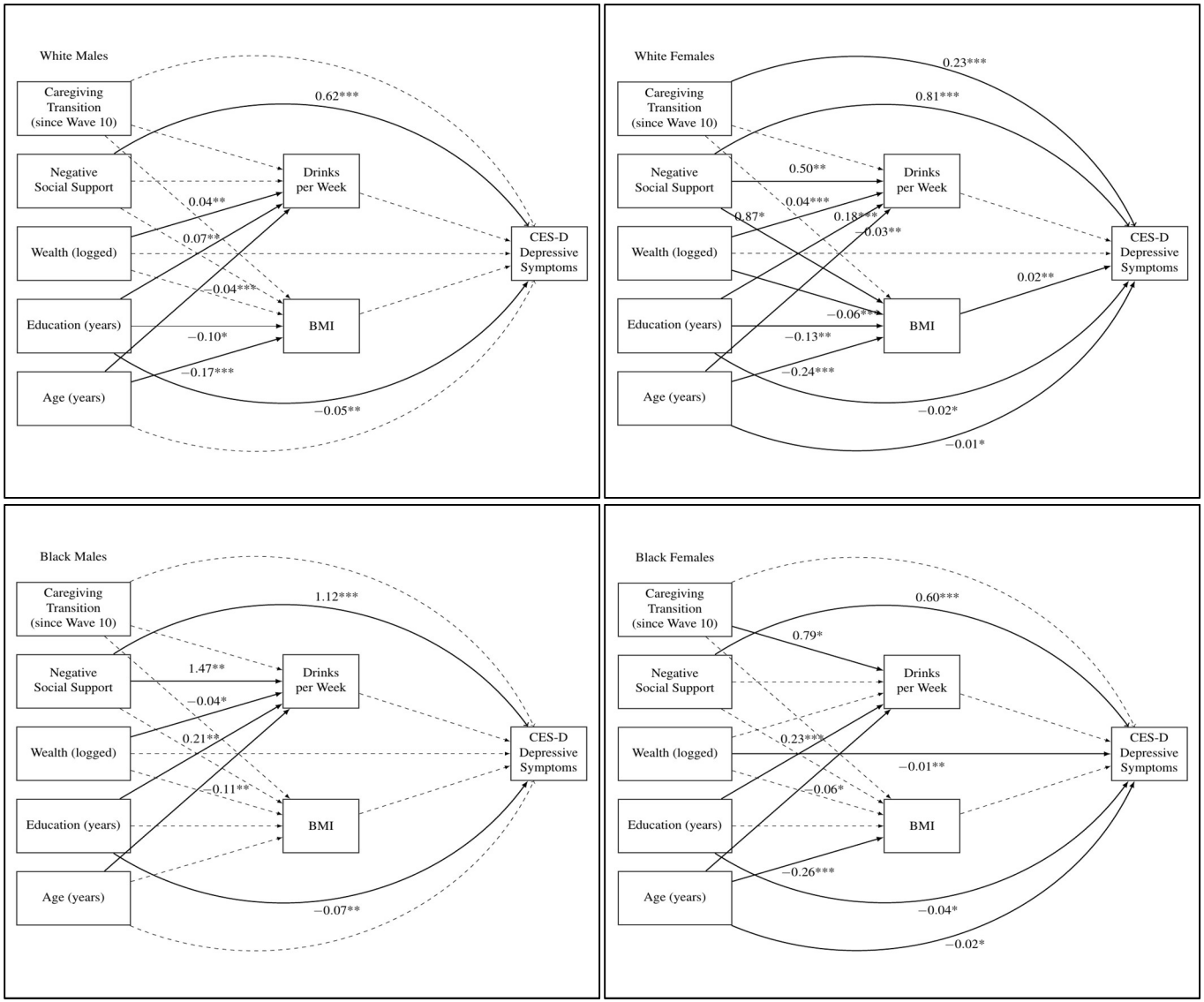

Figure 3.4 Models 2a-2d; Caregiving Transitions, Negative Social Support, Sociodemographic Indicators, Drinks per Week, BMI, and CES-D Score. Upper: White Males (AIC=1931) and White Females (AIC=4153). Lower: Black Males (AIC=235) and Black Females (AIC=685).

Table 3.2 presents the indirect effects of caregiving transitions, negative social support, and the sociodemographic indicators of wealth, education, and age on CES-D depressive symptoms through drinks per week and BMI. In Models 1a-1d, the mediated models, the combination of indicators had no significant effect on CES-D depressive symptoms through drinks per week for any sex and race group (White males β=0.001, p=0.52; White females β=0.002, p=0.19; Black males β=0.011, p=0.41; Black females β=0.007, p=0.85). The combination of indicators also had no significant effect on CES-D depressive symptoms through BMI for any sex and race group (White males β=0.000, p=0.99; White females β=-0.006, p=0.19; Black males β=-0.003, p=0.91; Black females β=0.004, p=0.83).

In Models 2a-2d, the full saturation models, the combination of indicators had no significant effect on CES-D depressive symptoms through drinks per week for any sex and race group (White males β=0.000, p=0.99; White females β=0.000, p=0.99; Black males β=0.000, p=0.99; Black females β=0.024, p=0.27). The combination of indicators also had no significant effect on CES-D depressive symptoms through BMI for any sex and race group (White males β=0.000, p=0.99; White females β=-0.004, p=0.44; Black males β=0.000, p=0.99; Black females β=-0.005, p=0.87). AIC values indicate preference for the full saturation models over the mediated models for all sex and race groups (White males AIC_m=2034, AIC_{fs}=1931; White females AIC_m=4387, AIC_{fs}=4153; Black males AIC_m=255, AIC_{fs}=235; Black females AIC_m=703, AIC_{fs}=685). This finding further indicates drinks per week and BMI are not serving as mediators between caregiving transitions, negative social support, and sociodemographic indicators on CES-D depressive symptoms via indirect effects.

Table 3.2 Indirect Effects of Caregiving Transitions, Negative Social Support, and Sociodemographic Indicators on CES-D Score via Drinks per Week (upper) and BMI (lower).

	CES-D Score			
	White		Black	
Models 1a-1d: Mediated Models	**Male**	**Female**	**Male**	**Female**
Drinks per Week	0.001 (-0.002, 0.004)	0.002 (0.000, 0.005)	0.011 (-0.004, 0.048)	0.007 (-0.031, 0.105)
BMI	0.000 (-0.003, 0.003)	-0.006 (-0.015, 0.003)	-0.003 (-0.068, 0.033)	0.004 (-0.037, 0.032)
Models 2a-2d: Full Saturation Models				
Drinks per Week	0.000 (-0.001, 0.004)	0.000 (-0.003, 0.005)	0.000 (-0.003, 0.012)	0.024 (-0.007, 0.078)
BMI	0.000 (-0.003, 0.001)	-0.004 (-0.020, 0.000)	0.000 (-0.013, 0.027)	-0.005 (-0.037, 0.072)

Source: Health and Retirement Study, 2010-2012.
Note: Coefficients with 95 percent confidence intervals in parentheses.

Discussion and Conclusions

Discussion

Results of this study show the association between caregiving transitions, negative social support, and sociodemographic indicators with purported coping behaviors do, indeed, differ by sex and race group. Caregiving transitions were shown to increase the number of drinks consumed per week for Black females, and no other sex or race group. This finding is inconsistent with literature indicating males are more likely than females to utilize alcohol as both a deterrent of, and response to, stressors and symptoms of distress. Stress exposure for men is shown to be more strongly associated with alcohol or substance use than for women (Umberson et al. 1996). However, consistent with prior research, one additional interpretation of this finding is disadvantaged individuals are more likely to engage in unhealthy coping behaviors than their more advantaged peers, and Black females face a double burden resulting from their race and sex.

Caregiving transitions were not found to be associated with BMI for any of the sex or race groups. This finding does not lend support to theories and prior research suggesting females, particularly Black females, engage in overeating behaviors – measured as BMI – to

cope with stressors and stressful life transitions. However, BMI was found to be associated with CES-D depressive symptoms for Black females. This finding lends support to theories and prior research suggesting females, particularly Black females, engage in overeating behaviors to cope with social stress. However, results of this study indicate drinks per week is not associated with CES-D depressive symptoms for any of the sex or race groups. This finding does not lend support to theories and prior research indicating alcohol consumption is associated with depression and depressive symptoms.

Results of this study show direct effects of caregiving transitions on CES-D depressive symptoms for White females, but not for White males, Black males, or Black females. Yet, findings from this study do not lend support to the general framework that the lack of direct effects of caregiving transitions on CES-D depressive symptoms for White males, Black males, and Black females is due to coping behaviors mediating the potential association between these two indicators. Results do show direct effects of negative social support on CES-D depressive symptoms for all sex and race groups.

Overall, this study does not find evidence for mediated pathways from caregiving transitions, negative social support, wealth, education, and age on CES-D depressive symptoms through drinks per week or BMI in late-life for any of the sex and race groups, although such mediated pathways have been observed for Blacks during earlier life stages (Jackson et al. 2010). This study aimed to test the use of alcohol and overeating behaviors as coping mechanisms, serving as mediators, between caregiving transitions and CES-D depressive symptoms, and results indicate these coping behaviors are not serving as mediators in the late-life period for these groups.

Conclusions

In this paper, I argue coping behaviors may be used as mediators between stressful life transitions, negative social support, sociodemographic indicators, and the outcome of CES-D depressive symptoms. Specifically, I argue alcohol use and overeating behaviors may be used as mediators differentially by sex and race group. The results of this study do not indicate indirect effects of stressors, negative social support, and sociodemographic indicators exist through alcohol consumption and overeating behaviors in the late-life period.

A possible explanation for this lack of indirect effects could be due to the inclusion of an indicator of social support – negative social support – in the analyses. Previous research, notably a study by Russell and Cutrona (1991), found social support has both direct impacts, and indirect impacts through an indicator of social stress – daily hassles – on change in depression over time for older adults. This study highlights two key points. First, the authors provide evidence that social support is independently and directly meaningful for mental health status in the late-life period. Second, the authors posit that the indirect effects of social support on mental health through daily hassles indicate social support is a deterrent for experiencing social stress for older adults (Russell and Cutrona 1991; Wheaton 1985, 1996). As the authors show experiencing daily hassles is detrimental to mental health, the ability of social support to deter daily hassles is an important mechanism through which social support deters depression or ameliorates depressive symptoms in late-life (Russell and Cutrona 1991). Thus, future work could delve further into the mechanisms linking social stress, social support, and coping behaviors with mental health outcomes. Such work would further elucidate the complex and multifaceted pathways explored in this article in relation to mental health.

Social networks serve to support healthy behavior through releasing necessary or beneficial information, providing encouragement and functional resources, express disapproval

of unhealthy behaviors (Pampel, Krueger, and Denney 2010). For older individuals, information from social support networks can be vital in deterring stressors and distress. As individuals move into late-life, the need to apply for government assistance, Social Security, and/or Medicare is often unchartered territory. Having social support to provide either specific information or assistance, or referrals to assistance agencies, can be paramount for aiding the success and limiting the distress associated with transition onto these services (Russell and Cutrona 1991; Thoits 1982).

The mechanisms through which social support is posited to promote healthy behaviors is strongly linked to theories of social capital. Individuals with greater social capital and associated resources – including family and friends, income and wealth, and job status – tend to utilize more effective and healthier coping strategies than individuals lacking these key resources (Taylor and Aspinwall 1996). It is important to remember that social capital resources are largely influenced by social status and structural or environmental resources, above and beyond individual personality and characteristics (Aneshensel 1992, 1996; Pearlin 1989). Socioeconomic status is associated with alcohol consumption, tobacco use, and poor physical activity (Mezuk et al. 2010). Interventions targeting these health behaviors understood to be associated with socioeconomic status are shown to reduce physical health risk associated with chronic conditions (Govil et al. 2009; Hawkley et al. 2011). As such, by controlling for an indicator of social support in the analysis, the impact of stressful life transitions – such as caregiving transitions – on alcohol consumption, overeating behaviors, and/or CES-D depressive symptoms may fail to exist above-and-beyond the role of social support.

Another possible explanation for this lack of indirect effects could be due to the uniqueness of the late-life period. Results of this study highlight age is associated with significantly reduced alcohol consumption for all sex and race groups, and with reduced overeating behaviors for White males, White females, and Black males. Thus, the observed

utilization of these coping behaviors and mediators between stressors and mental health outcomes observed in adolescence and midlife may not hold in the late-life period, when a reduction in these is shown for most individuals.

In this way, the late-life period provides a unique lens to understand if and how disparities observed during earlier periods of the life course play out in old age (Abramson 2015). Particularly, during late-life, deviations from that expectation may provide valuable insight into the mechanisms driving continued stratification, should stratification continue to be observed. However, as more individuals survive to old age than at any other point in history, vast inequality remains in the trajectories of health and quality of life within the aging process (Abramson 2015), sparking questions and research into the aging experience (Ailshire and Crimmins 2011).

Limitations

In this study, I utilize CES-D depressive symptoms as a marker of distress and poor mental health status theorized to result from stressful life transitions. However, a limitation implicit in all social stress and mental health research is specification of the outcome. Prior research indicates individuals of different sociodemographic backgrounds – such as race/ethnicity, sex, and socioeconomic status – manifest distress differently (Aneshensel 1992; Aneshensel et al. 1991; Umberson et al. 1996). Thus, utilizing CES-D depressive symptoms as the sole outcome in this study may not fully capture the universe of mental health outcomes associated with social stress.

Theorists highlight the need for research to assess multiple outcomes relevant to distress in order to truly understand how social stress impacts mental health (Thoits 1995). Specifically, utilizing multiple measures for mental health outcomes may provide additional

benefit for assessing whether individuals differ in their vulnerability to stressful life transitions based upon sex and race group (Umberson et al. 1996). Despite these limitations, I use prior research as a guide to select the mental health outcome and coping behaviors for this analytic framework, and am thus aware of the possibility of model misspecification in this analysis.

Additionally, the measure of BMI utilized in this study is only a proxy for overeating behaviors. Changes in BMI – up or down – can be a long process. Thus, assessing an individual's BMI in association with a specific caregiving transition or other indicators may not accurately capture engagement in overeating as a coping behavior. However, due to data limitations, BMI is the closest available measure for overeating afforded by the HRS data.

Further, issues of endogeneity between CES-D depressive symptoms and coping behaviors may exist. Appetite loss is a common cause of weight loss among depressed late-life adults (Blazer 2003; Fiske et al. 2009; Tiemeier 2003). Women commonly experience appetite disturbances in conjunction with depressed mental state in late-life (Fiske et al. 2009). However, the association between depression and weight loss is less common for men, who are more prone to experience agitation in conjunction with depressed mood in late-life (Fiske et al. 2009). In elderly populations, appetite disturbance and weight loss can lead to compromised nutritional status, frailty, and failure to thrive (Blazer 2003; Fiske et al. 2009). Thus, the relationship between obesity and depression observed in midlife may not hold for late-life adults. Similarly, alcohol use – particularly problem drinking behavior – may be a cause, and not a consequence, of depression or depressive symptoms. The common comorbidity between alcohol use and depression makes the causal direction of this relationship difficult to discern (Vaillant 1993). Thus, results of this study are limited based upon the choice of model specification – in terms of variables included in the analysis, measurement of those indicators, and assortment of causal pathways.

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Chapter 4 CES-D Trajectories and Aging-As-Leveler for Mental Health

Introduction

Due to declining mortality rates and other demographic transformations, individuals aged 65 and above make up a larger share of the population within the United States than ever before, yet vast inequality remains in the trajectories of health and quality of life within the aging process (Abramson 2015; Ailshire and Crimmins 2011). Research consistently links sex, race/ethnicity, and socioeconomic status to disparate rates of mortality and chronic health conditions such as diabetes, hypertension, and coronary heart disease (Kahng, Dunkle, and Jackson 2004). As recent explorations of these theories focus on physical health disparities in morbidity and mortality, less is known about how these theories can help to understand trajectories of mental health outcomes in late-life. A driver of mental and physical health inequities throughout the life course in U.S. is access to basic resources, such as a basic income and medical insurance (Cummings and Jackson 2008).

Social policies, such as Social Security and Medicare are designed to limit inequality through the provision of the basic resources of income and medical coverage (Adler and Newman 2002; Beckett 2000; Brown, O'Rand, and Adkins 2012). By providing basic resources previously unavailable to individuals at the lower end of the socioeconomic distributation, these redistributive policies provide a net increase in basic resources available to individuals at the lowest end of the socioeconomic hierarchy, and also, may act to decrease resource disparities between individuals in the lowest- and highest- socioeconomic strata (Adler and Newman 2002). Resource disparities important for physical health decrease in late-life (Adler and Newman 2002), and as such, redistributive policies becoming available to individuals in late-life may serve to reduce health disparities in this period (Adler and Newman 2002; Beckett 2000; Brown et al. 2012).

In addition to the redistribution of resources, biological features of aging may also act to narrow the health gap. Specifically, it is hypothesized mortality selection among the most disadvantaged individuals, and delayed onset of illness for the most advantaged individuals, result in the convergence of health statuses among late-life adults (Brown et al. 2012; Brown, Richardson, and Hargrove 2016). However, the role of policy and biological health on health disparities in late-life are yet to be fully understood. While some theoretical and empirical evidence suggest health gaps narrow in late-life (Brown et al. 2012, 2016; House, Lantz, and Herd 2005), the cumulative burden and stress proliferation experienced by disadvantaged groups throughout the life course are posited to continually widen health gaps as individuals age (Thoits 2010). As a result, a debate between competing theories about whether age serves to reduce, maintain, or widen health disparities has emerged.

Proponents of the "aging-as-leveler" hypothesis posit inequalities in health reduce across the lifespan due to reductions in resource inequality and mortality selection that occur with increasing age (Brown et al. 2012, 2016; House et al. 2005). Alternatively, proponents of the "cumulative disadvantage" hypothesis hold that inequality increases throughout the lifespan due to the ever-present and compounding impacts of stress, discrimination, and resource deprivation, resulting in increased morbidity and mortality among the most disadvantaged (DiPrete and Eirich 2006; Willson, Shuey, and Elder 2007). Centered in the middle of this debate are proponents of the "persistent inequality" hypothesis, in which health disparities are hypothesized to remain constant across the life course due to the competing effects of cumulative disadvantage with reductions in resource inequality in late-life (Cummings and Jackson 2008; Ferraro and Farmer 1996). Thus, according to this hypothesis, increasing age does not reduce or widen health disparities observed in the early and middle years of life (Ferraro and Farmer 1996).

Recent sociological scholarship explores these theories for physical health outcomes. Brown and colleagues (2016) find age serves to reduce health disparities, lending weight to the aging-as-leveler hypothesis. However, the authors additionally find evidence for the cumulative disadvantage and persistent inequality hypotheses when analyses focus on different physical health outcomes, racial/ethnic group comparisons, and lifespan of analysis (Brown et al. 2012). Similiarly, research by Ferraro and Farmer (1996) provides evidence for the persistent inequality hypothesis for Black-White disparities in mortality and for serious medical conditions such as heart failure and disabilities. Yet, the authors find additional evidence for all three theories, depending upon the physical health outcome being measured and the analytical methodology being utilized (Ferraro and Farmer 1996).

Trajectories of mental health outcomes, however, are less well understood in late-life. Prevalence of clinical depression and depressive symptoms in late-life are repeatedly found to be on-par with, or less than, the prevalence observed in midlife (Blazer 2003; Charles, Reynolds, and Gatz 2001), with an estimated 8%-16% of elderly adults experiencing depressive symptoms (Blazer, Swartz, and Woodbury 1988; Murrell, Himmelfarb, and Wright 1983) compared to 10%-18% across the life course (Hasin, Goodwin, and Stinson 2005; Williams et al. 2007). While the prevalence of depression is not shown to increase in late-life, the negative consequences of depression and depressive symptoms increase with age (Blazer 2003; Fiske, Wetherell, and Gatz 2009). Depression is shown to significantly hinder quality of life in elderly adults and is associated with functional limitations, reduced self-rated health, and limited pereptions of social support (Blazer 2003). As a result, the causes, consequences, and relationships of depression with the causes and consequences of physical health disparities in late-life warrant investigation (Fiske et al. 2009).

This study will utilize the aging-as-leveler, peristent inequality, and cumulative disadvantage perspectives to analyze trajectories of CES-D depressive symptoms using data

from eight waves of the Health and Retirement Study (1998 to 2012). Using growth curve models with person fixed-effects, I identify trajectories of CES-D depressive symptoms during the late-life period across sex and race, as well as assess if functional limitations alter the association between age and levels of CES-D depressive symptoms throughout the late-life period.

Physical Health Trajectories

Physical health tends to deteriorate with age. Individuals are more likely to experience functional disabilities and chronic health conditions, such as arthritis, heart disease and hypertension, as they move into late-life (Kahng, Dunkle, and Jackson 2004). While worsening physical health as one moves through the life course is relatively universal, the magnitude of physical health problems in old age varies across groups. Research indicates women and racial/ethnic minorities endure a greater number of chronic health conditions in old age than do men and Whites (Kahng et al. 2004). Socioeconomic and network statuses additionally contribute to this gap. Being unmarried, having a lower level of education and a lower income has been found to further increase one's odds of experiencing a chronic health condition during old age relative to individuals who are married or are of higher socioeconomic status (Kahng et al. 2004).

In addition to the magnitude of physical health problems in late-life, the speed and trajectory of physical health decline also varies by group membership. While men experience heightened mortality rates relative to women across the life course, women endure greater levels of chronic health conditions and functional limitations in late-life than do men (Brown et al. 2016). Overall, women are more likely to report poor or fair self-rated health, limitations stemming from functional disabilities, and note poor quality of life (Brown et al. 2016; Kahng et al. 2004).

Mental Health Trajectories

Even as depression rates decline throughout the late-life period, public health and social sciences researchers find depressive symptoms are positively associated with factors of aging and longevity (Blazer 2003). Particularly, heightened prevalence of depression and depressive symptoms are attributed to: higher levels of functional limitations, physical impairment and chronic health conditions; lower sex-ratio due to women's greater life expectancy; and, lower socioeconomic resources among the "oldest old" relative to those more recently retired or still working (Blazer 2003; Fiori and Jager 2011; Mills and Henretta 2001). The simultaneous reduction in depression rates as features associated with depression rise warrant investigation into the pathways linking social life and physical health and to mental health outcomes during the late-life period.

Older individuals are posited to be happier and less depressed in late-life relative to their younger years due to increased emotional intelligence developed throughout the life course (Baltes 2003; Carstensen, Fung, and Charles 2003; Stone et al. 2010). Increased emotional intelligence allows individuals to more easily regulate their behaviors, emotions, and assessment following a stressful experience (Carstensen et al. 2003; Stone et al. 2010). Thus, even when faced with the same or similar stressful experience, an older individual may be better emotionally equipped to moderate the negative psychological consequences associated with stress than is a younger individual (Stone et al. 2010).

Physical Health and Mental Health

Myriad functional disorders and chronic health conditions are consistently found to be co-morbid with mental health disorders among late-life populations (Blazer 2003; Carney and Freedland 2003; Fiske et al. 2009; Mills and Henretta 2001; Muramatsu, Yin, and Hedeker 2010). The functional restrictions, loss of identity, social connections and resources associated

with adjustment to, and management of, health limitations are theorized to increase symptoms of depression and depressed mood (Fiori and Jager 2011; Muramatsu et al. 2010). Risk factors for more negative views of aging include poor health status and greater physical and cognitive functional limitations, and social features including education level, income, social support, retirement status, and relationship status (Mills and Henretta 2001; Muramatsu et al. 2010; Perreira et al. 2005).

Functional decline is shown to be associated with elevated levels of depression and depressive symptoms (Lynch and George 2002; Muramatsu et al. 2010). Functional and cognitive limitations are posited to be particularly detrimental to mental health outcomes due to their impact on mobility, independence, and ability to socialize (Ailshire and Crimmins 2011; Muramatsu et al. 2010). Especially for individuals facing rapid functional decline, the ability for them to adopt assimilating or accommodative strategies is more limited than for individuals for whom functional decline occurs at a relatively slower pace (Muramatsu et al. 2010; Schulz, Heckhausen, and O'Brien 1994).

When individuals face functional limitations, they are more restricted in their ability to move and interact socially outside of their homes. This can lead to loneliness, isolation, and separation from people and activities from which individuals formerly found enjoyment and fulfillment (Ailshire and Crimmins 2011; Blazer 2003; Perreira et al. 2005). Research indicates emotional troubles such as feelings of helplessness occur more frequently and to greater degrees among adults experiencing rapid functional decline relative to other adults (Muramatsu et al. 2010; Schulz et al. 1994). Even for individuals still married and living with their partner, functional limitations remain a significant threat to emotional and mental health for both the individual and his or her spouse (Muramatsu et al. 2010).

Core Hypotheses

"Aging-As-Leveler" Hypothesis

Redistributive policies becoming available to individuals in late-life paired with the biological features of aging may serve to reduce health disparities in the late-life period (Adler and Newman 2002; Beckett 2000; Brown et al. 2012, 2016). Thus, age may serve to "level" health disparities observed in earlier life stages. Ferraro and Farmer (1996) found the slope of the trajectory for self-rated health for Black individuals declined with age during the young and middle ages, and declined more rapidly than for Whites during the same time period, lending support for the aging-as-level hypothesis (Ferraro and Farmer 1996). However, the slopes of self-reported health during late-life period were not found to differ by race/ethnicity for elder adults (Ferraro and Farmer 1996). Nevertheless, as Black individuals in the sample started the study period in worse self-reported health than their White counterparts, the narrowing of the health disadvantage experienced by Blacks in the late-life period lends support for the aging-as-leveler hypothesis. The authors note, however, that the purposed cause of this aging-as-level support stems from selective mortality, more so than shrinking resource disparities as a result of redistributive policies available in late-life (Ferraro and Farmer 1996). Scholars widely recognize that disadvantaged individuals have higher rates of morbidity and mortality throughout the life course, and as such, are much more likely to be sick or die before reaching old age than are their more advantaged peers (Abramson 2015; Brown et al. 2016).

Persistent Inequality Hypothesis

Cross-sectional and longitudinal studies find evidence for the persistent inequality hypothesis (Ferraro and Farmer 1996). Within the late-life period, socioeconomically disadvantaged individuals are shown to exhibit more persistent levels of depression and depressive symptoms relative to their more advantaged counterparts (Fiske et al. 2009;

Mojtabai and Olofson 2004). Reduction in financial security, income, or other socioeconomic resources are found to be some of the most common stressors reported by late-life adults (Fiske, Gatz, and Pedersen 2003; Fiske et al. 2009). In addition to the distress caused by financial strain, researchers and theorists understand the association between low socioeconomic status and elevated prevalence of depression in late-life is due to the chronic and multiplicative stressors associated with low income status, such as environmental stressors and limited social support (Fiske et al. 2009). Some studies indicate the Black-White disparities in health remain consistent throughout the life course (Ferraro 1987; Ferraro and Farmer 1996).

Cumulative Disadvantage Hypothesis

The additive nature of episodic stressful events, prolonged chronic stressors, and traumas experienced throughout the life course represent an individual's "cumulative stress burden" that weighs on their physical and mental health (Turner, Wheaton, and Lloyd 1995). This cumulative burden is heightened by the fact that vulnerable individuals and populations experiencing significant stressors are also more likely to experience stress in the future (Nurius, Uehara, and Zatzick 2013). Through the process of stress proliferation, stressors have the tendency to cause additional stressors (Pearlin et al. 2005). The cumulative nature of life stressors, in which stress begets stress, links prior stressors to current mental health status through their association to more recent stressors with immediate impacts on mental health outcomes (Turner and Lloyd 1995; Wheaton 1996). As such, poor mental health outcomes are not posited to level off with age, but instead, worsen for the most disadvantaged groups.

Further, theorists posit individuals holding multiple disadvantaged statuses will experience worse health problems in late-life relative to individuals experiencing fewer sources of disadvantage, as the effects of multiple sources of stress and deprivation will only compound throughout the life course (Ferraro and Farmer 1996). The double disadvantage hypothesis

posits members of more than one disadvantaged groups experience elevated negative effects as a result of their multiple status (Grollman 2014). Thus, health disparities are understood to widen throughout the life course and to be the widest in late-life, despite programs such as Social Security and Medicare becoming available (Ferraro and Farmer 1996). Indeed, disparities in self-rated health between highly educated White and Black individuals is shown to widen with age (Brown et al. 2016).

Research Motivations

Whether mental health disparities along sex and racial lines decrease, remain stable, or increase throughout the life course remains unclear (Brown et al. 2016). This study engages the aging-as-leveler, persistent inequality, and cumulative disadvantage hypotheses for CES-D depressive symptoms in late-life. While there is extensive evidence for the ways individual sociodemographic characteristics – including sex and race – impact physical health outcomes, little attention has been paid to the way these characteristics intersect to impact levels and trajectories of mental health outcomes in the late-life period (Brown et al. 2016).

Data and Methods

Harnessing the strength of the panel data structure of the Health and Retirement Survey, this chapter uses growth model analysis to explore the aging-as-leveler, persistent inequality, and cumulative disadvantage hypotheses for trajectories of CES-D depressive symptoms across sex and race in late-life across eight waves of the HRS (1998 to 2012). First, I model trajectories of CES-D depressive symptoms across the late-life period (1998-2012) by sex and race group. Second, I model trajectories of functional limitations across the late-life period (1998-2012) by sex and race group. Third, I calculate correlations between CES-D depressive symptoms trajectories and functional limitation trajectories by sex and race group.

The growth curve models of CES-D depressive symptom trajectories provide assessment of the aging-as-leveler, persistent inequality, versus cumulative disadvantage hypotheses for a mental health outcome. Further, the growth curve models of functional limitation trajectories provide assessment of reduction, maintenance, or widening of physical health disparities throughout the late-life period. The correlation between the slopes of CES-D depressive symptom and functional limitation trajectories allow for assessment of the purported relationship between functional limitations and CES-D depressive symptoms highlighted in the extant literature. Specifically, previous research indicates functional limitations increase across the late-life period and CES-D depressive symptoms decrease across the late-life period, yet deleterious physical health and mental health outcomes are consistently found to be positively associated in cross-sectional analyses (Blazer 2003; Carney and Freedland 2003; Fiske et al. 2009; Mills and Henretta 2001; Muramatsu et al. 2010).

Health and Retirement Study

This study utilizes data from the 1998 to 2012 waves of the Health and Retirement Study (HRS). The HRS is a nationally representative and longitudinal survey of U.S. adults over 50 years of age, with surveys conducted every two years. The HRS began in 1992 and consists of five birth cohorts, entering the study in different calendar years. This study utilizes data from the HRS sample (1931-1941 birth cohorts), aged 51 to 61 at the beginning of the HRS study, the Aging and Health in America (AHEAD) sample (born 1923 or earlier) and the Children of Depression (CODA) sample (1924-1930 birth cohorts) (Ofstedal et al. 2011). This analysis restricts the sample to individuals aged 95 or younger. In preliminary analyses (not shown), CES-D trajectories following age 95 are empirically very noisy due to small sample size, and thus, generalized trends in this period become difficult to discern[4]. In this analysis, only primary

[4] 62 otherwise-eligible respondents were removed from analysis due to this age restriction.

respondents are included in the sample. This analysis will focus on non-Hispanic Black and White differences only. The sample utilized in this analysis included 2,865 individuals from the HRS cohort, 7,387 individuals from the AHEAD cohort and 3,086 individuals from the CODA cohort. In sum, the analysis includes 13,338 individuals.

Statistical Analyses

Data management, sample weighting and statistical analyses were conducted in R, version 3.3.1. Sample weights were applied using utilizing HRS guidelines, and provide adjustments for birth cohort, sex, race/ethnicity, attrition, and mortality (HRS n.d.). Multiple imputation (5 imputations) was conducted utilizing R's Amelia package to impute missing values on other covariates. A linear time effect was assumed for the imputation models. Multiple imputation allows for complete cases to be utilized, limiting omitted variable bias and to obtain robust standard errors (Rubin 1996). To calculate model coefficients and results independently by sex and race, separate sex- and race-split datasets were then created for modeling.

First, growth curve model estimates of CES-D depressive symptom trajectories are modeled by survivorship and sex and race group (See Table 4.2). Second, functional limitation trajectories are modeled by survivorship and sex and race group (See Table 4.3). Third, correlations are calculated between CES-D depressive symptoms trajectories and functional limitation trajectories by survivorship and sex and race group (See Tables 4.4).

Measures

CES-D Depressive Symptoms

The primary outcome measure of this study of depressive symptom score was measured utilizing the Centers for Epidemiologic Study of Depression (CES-D) scale. The 8-item version of

the CES-D included in the HRS asks respondents yes or no questions relating to feelings experienced "much of the time during the past week". The feelings included in the scale are: "felt depressed", "everything was an effort", "sleep was restless", "was happy" (reverse coded), "felt lonely", "enjoyed life" (reverse coded), "felt sad", and "could not get going". Loneliness is posited to operate differently and independently from other measures of depressive symptoms among older populations (Cacioppo, Hughes, and Waite 2006). As such, this analysis utilizes a shortened measure of the CES-D scale outcome in which loneliness is excluded. "Yes" CES-D symptom responses from the remaining indicators were summed to create a CES-D score, with higher scores representing elevating levels of depressive symptoms, with a maximum score of depressive symptoms of 7. A binary variable indicating baseline CES-D score was created for individuals reporting 0-1 CES-D depressive symptoms (low), and 2-7 (CES-D depressive symptoms (high), during the first wave of analysis (1998).

Demographic Information

This analysis includes a dummy variable to indicate AHEAD, CODA or HRS cohort membership. Age is measured in years[5]. This analysis focuses on differences between non-Hispanic Black and non-Hispanic White respondents. As such, Race is measured as non-Hispanic Black and non-Hispanic White. The respondent being alive through 2012, versus dying during the observation period, is as an indicator of survival.

Socioeconomic Status

Education is measured as years of education. Income is measured as total household income. Due to a positively skewed distribution of income among the HRS sample, income is

[5] Age is rescaled by dividing by 100 for analyses to maintain similar scales for predictor variables in the models. Results transformed into original scale (years) for reported coefficients.

logged in this analysis. Wealth is measured using a RAND HRS wealth extract, which combines total wealth holdings (including real estate, transportation, business, and investments holdings), net of mortgage loans and other debts. Due to a positively skewed distribution of wealth among the sample, positive wealth is logged in this analysis. Negative wealth values (debt) are converted to near-zero values (0.0000001) before logging (Smith and Cicchetti 1974).

Functional Limitations

Functional limitations are measured as positive responses yes or no questions pertaining to if respondents, due to a physical health problem, have difficulty: "walking several blocks", "jogging 1 mile", "walking 1 block", "sitting 2 hours", "getting up from chair", "climbing stairs", "climbing 1 flight of stairs", "stooping", "reaching arms", "pull/push large objects", "lifting weights", and "picking up dime". "Yes" responses were summed to create a functional limitation score, with higher scores representing elevating levels of limitations, with a maximum score of 12. A binary variable indicating baseline functional limitations was created for individuals reporting 0-3 functional limitations (low), and 4-12 functional limitations (high), during the first wave of analysis (1998).

Results

The weighted characteristics of the HRS 1998 data (baseline) are reported in Table 4.1. The weighted HRS sample includes 4,327 White males (32.6%), 6,732 White females (50.7%), 746 Black males (5.6%) and 1,471 Black females (11.1%). Over the course of the observation period for this study (1998-2012), the percentage of HRS sample respondents who survived throughout the duration of the observation period include 37.4% of White males, 43.7% of White females, 39.0% of Black males, and 47.8% of Black females.

Among White males, the average age at baseline is 72.92 years, with 37.4% surviving all eight waves of observation through 2012. Among those who do not survive to 2012, the average age of death is 74.07. The distribution of cohort membership is 58.1% AHEAD, 23.6% CODA, and 18.3% HRS. The socioeconomic status indicators include average completed education of 11.71 years, an income of $44,395.26 and wealth equal to $367,892.33. The average number of functional limitations is 1.72, with 16.4% of individuals reporting 4 or more functional limitations at baseline. The average number of reported CES-D depressive symptoms is 0.77, with 13.7% of individuals reporting 2 or more CES-D depressive symptoms at baseline.

Among White females, the average age at baseline is 73.47 years, with 43.7% surviving all eight waves of observation through 2012. Among those who do not survive to 2012, the average age of death is 74.12. The distribution of cohort membership is 56.2% AHEAD, 25.9% CODA, and 17.9% HRS. The socioeconomic status indicators include average completed education of 11.52 years, an income of $31,473.43 and wealth equal to $251,915.67. The average number of functional limitations is 2.46, with 25.3% of individuals reporting 4 or more functional limitations at baseline. The average number of reported CES-D depressive symptoms is 1.14, with 20.7% of individuals reporting 2 or more CES-D depressive symptoms at baseline.

Among Black males, the average age at baseline is 69.95 years, with 39.0% surviving all eight waves of observation through 2012. Among those who do not survive to 2012, the average age of death is 73.46. The distribution of cohort membership is 47.7% AHEAD, 16.2% CODA, and 36.1% HRS. The socioeconomic status indicators include average completed education of 9.02 years, an income of $25,310.06 and wealth equal to $61,733.09. The average number of functional limitations is 1.77, with 20.9% of individuals reporting 4 or more

functional limitations at baseline. The average number of reported CES-D depressive symptoms is 0.94, with 17.8% of individuals reporting 2 or more CES-D depressive symptoms at baseline.

Among Black females, the average age at baseline is 70.14 years, with 47.8% surviving all eight waves of observation through 2012. Among those who do not survive to 2012, the average age of death is 71.64. The distribution of cohort membership is 45.6% AHEAD, 13.5% CODA, and 40.9% HRS. The socioeconomic status indicators include average completed education of 10.05 years, an income of $16,632.92 and wealth equal to $26,169.41. The average number of functional limitations is 2.65, with 31.9% of individuals reporting 4 or more functional limitations at baseline. The average number of reported CES-D depressive symptoms is 1.32, with 27.1% of individuals reporting 2 or more CES-D depressive symptoms at baseline.

Table 4.1 Descriptive Characteristics by Sex and Race: Health and Retirement Study, 1998 (Baseline)

	White		Black		
	Male	**Female**	**Male**	**Female**	
N (13,276)	4327	6732	746	1471	
	Mean (SD) or N (%)	Mean (SD) or N (%)	Mean (SD) or N (%)	Mean (SD) or N (%)	p-value
Age	72.92 (8.55)	73.47 (8.63)	69.95 (9.76)	70.14 (9.95)	<0.001
Alive through 2012	1617 (37.4)	2942 (43.7)	291 (39.0)	703 (47.8)	<0.001
Non-survivors age at death	74.07 (4.14)	74.12 (4.33)	73.46 (6.29)	71.64 (7.29)	<0.001
Cohort					<0.001
AHEAD	2514 (58.1)	3784 (56.2)	356 (47.7)	671 (45.6)	
CODA	1023 (23.6)	1744 (25.9)	121 (16.2)	198 (13.5)	
HRS	790 (18.3)	1204 (17.9)	269 (36.1)	602 (40.9)	
Socioeconomic Status					
Education (Years)	11.71 (3.67)	11.52 (3.26)	9.02 (4.25)	10.05 (3.69)	<0.001
Income	44,395.26 (72,126.35)	31,473.43 (62,975.30)	25,310.06 (39,353.78)	16,632.92 (28,563.52)	<0.001
Wealth	367,892.33 (716,733.12)	251,915.67 (622,960.00)	61,733.09 (294,493.92)	26,169.41 (249,065.63)	<0.001
Functional Limitations	1.72 (2.63)	2.46 (3.00)	1.77 (2.86)	2.65 (3.27)	<0.001
High FL (4+)	711 (16.4)	1702 (25.3)	156 (20.9)	469 (31.9)	<0.001
CES-D Depressive Symptoms	0.77 (1.40)	1.14 (1.65)	0.94 (1.52)	1.32 (1.80)	<0.001
High CES-D (2+)	591 (13.7)	1396 (20.7)	133 (17.8)	399 (27.1)	<0.001

Attrition due to death is a concern for researchers assessing late-life mental and physical health trajectories. Thus, initial analyses evaluate trajectories according to survivorship status, in which individuals who survive the eight time periods of observation (1998-2012) are evaluated separately from individuals who do not survive to 2012. Further, in order to account for differences in CES-D trajectories which may occur due to differing baseline levels of CES-D depressive symptoms, initial analyses also evaluate trajectories according to baseline CES-D score.

Observed CES-D depressive symptoms across the late-life period (by time period of HRS observation), by CES-D score at baseline, survivorship, and sex and race, are shown in Figure 4.1. Distinct trends are evident for individuals based upon survivorship. Non-survivor trajectories show decreases across the periods of observation for all sex and race groups. For

survivors, trajectories differ according to CES-D score at baseline. Survivors with high 1998 CES-D scores experience overall declines in CES-D depressive symptoms across the late-life period for all sex and race groups. However, for survivors with low 1998 CES-D scores, White males, White females, and Black males show overall increases in CES-D depressive symptoms across the periods of observation. Black female survivors with low 1998 CES-D scores show overall decreases in CES-D depressive symptoms across the late-life period. These observations lend support to modeling CES-D trajectories with consideration of baseline CES-D score and survivorship indicators.

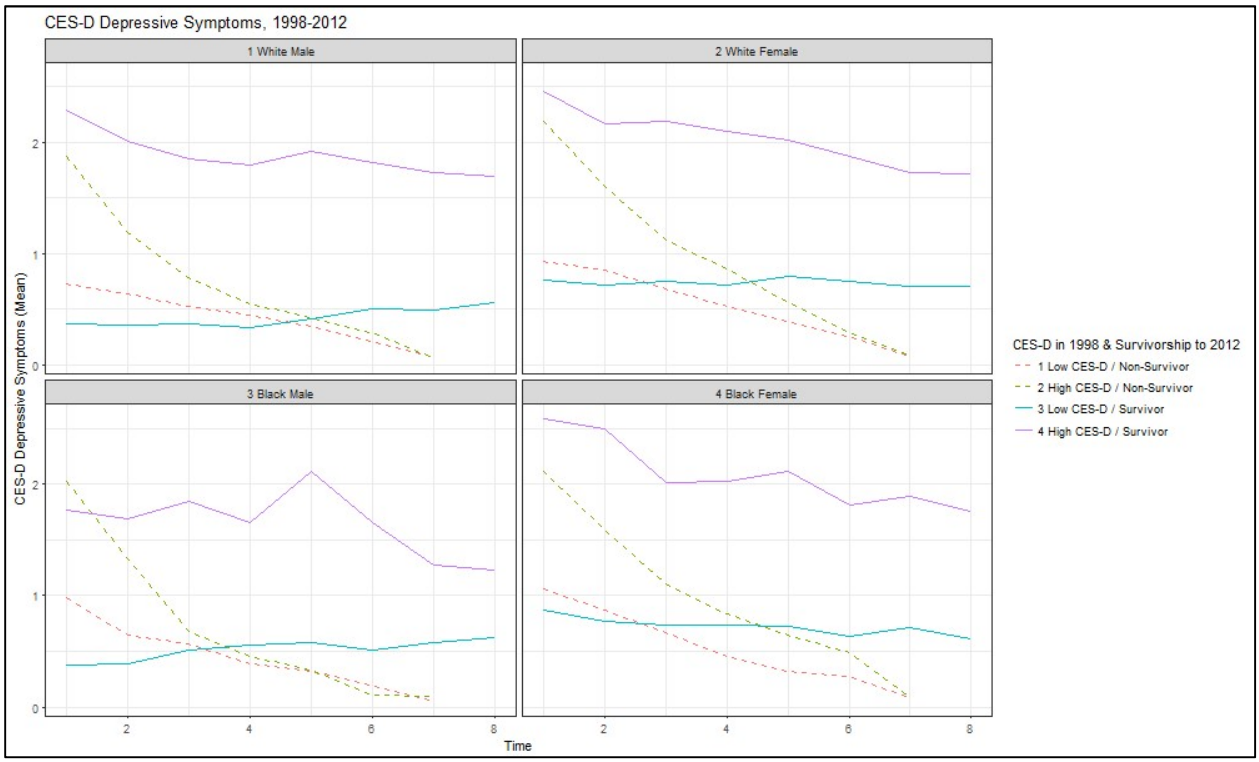

Figure 4.1 Average CES-D Depressive Symptoms by Time of HRS observation (1998-2012). Upper: White Males and White Females. Lower: Black Males and Black Females.

Functional limitations across the late-life period (by time period of HRS observation), by functional limitations at baseline, survivorship, and sex and race, are shown in Figure 4.2. Distinct trends are evident for individuals based upon survivorship. Non-survivor trajectories show overall decreases across the late-life period for all sex and race groups. For survivors,

trajectories differ according to functional limitations at baseline and race. White male and White female survivors with high 1998 functional limitations experience overall increases in functional limitations across the late-life period. For Black male and Black female survivors with high 1998 functional limitations, however, functional limitations remain relatively stable throughout the late-life period. Survivors with low 1998 functional limitations experience increases in functional limiations throughout the late-life period for all sex and race groups. These observations lend support to modeling functional limitation trajectories with consideration of baseline functional limitations and survivorship indicators.

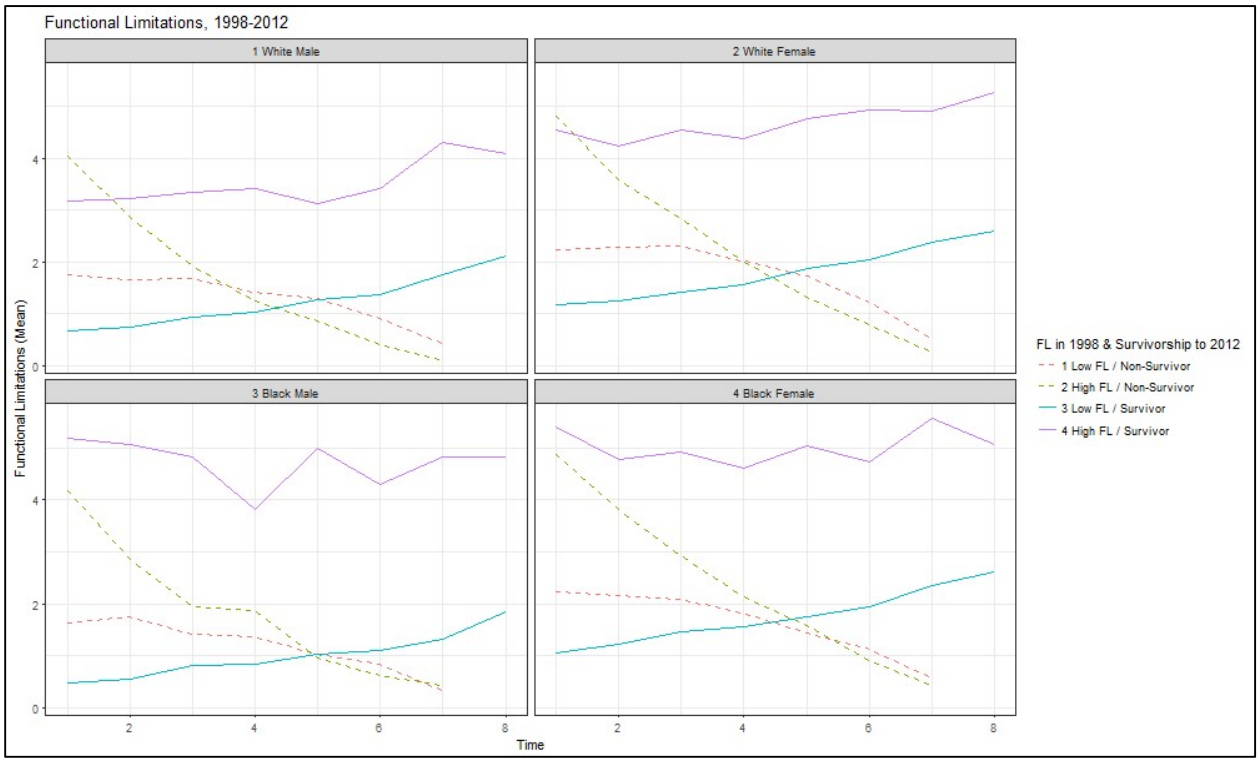

Figure 4.2 Average Functional Limitations by Time of HRS observation (1998-2012). Upper: White Males and White Females. Lower: Black Males and Black Females.

Table 4.2 reports growth curve estimates of CES-D depressive symptom trajectories (1998-2012) for survivors (Model 1a) and non-survivors (Model 1b) by sex and race group. Utilizing person fixed-effects, Models 1a and 1b specify age, the linear effect of time, baseline CES-D score (low=referent), and an interaction between the linear effect of time and baseline

CES-D score, which allows the slope of CES-D over time to vary according to baseline CES-D score.

Table 4.2 Growth Curve Estimates of CES-D Depressive Symptom Trajectories (1998-2012) for Survivors (Left) and Non-Survivors (Right)

	Model 1a (Survivors)				Model 1b (Non-Survivors)			
	White		Black		White		Black	
	Male	Female	Male	Female	Male	Female	Male	Female
Age	0.02 (0.02, 0.02)	0.03 (0.03, 0.03)	0.04 (0.03, 0.05)	0.03 (0.02, 0.04)	0.03 (0.03, 0.03)	0.03 (0.03, 0.03)	0.02 (0.01, 0.03)	0.02 (0.02, 0.02)
Time	-0.01 (-0.02, 0)	-0.07 (-0.08, -0.06)	-0.04 (-0.07, -0.01)	-0.09 (-0.12, -0.06)	-0.14 (-0.15, -0.13)	-0.17 (-0.18, -0.16)	-0.15 (-0.17, -0.13)	-0.17 (-0.19, -0.15)
High CES-D in 1998	2.01 (1.8, 2.22)	1.75 (1.6, 1.9)	1.62 (1.18, 2.06)	1.79 (1.5, 2.08)	0.87 (0.74, 1)	1.09 (0.97, 1.21)	0.84 (0.53, 1.15)	1.06 (0.8, 1.32)
Time*High CES-D in 1998	-0.1 (-0.14, -0.06)	-0.09 (-0.11, -0.07)	-0.09 (-0.17, -0.01)	-0.09 (-0.13, -0.05)	-0.13 (-0.15, -0.11)	-0.16 (-0.18, -0.14)	-0.13 (-0.18, -0.08)	-0.14 (-0.18, -0.1)
(cons)	-0.97	-1.38	-1.82	-1.08	-1.61	-1.18	-0.42	-0.27
AIC	35525.8	77653.8	6777.7	18491.5	60058.6	91712.7	10321.3	19153.9

Source: Health and Retirement Study, 1998-2012.
Note: Coefficients with 95 percent confidence intervals in parentheses.

In Model 1a (See Table 4.2), among individuals who survived through the last period of observation in this analysis (2012), age was significantly associated with higher CES-D scores for all sex and race groups. The linear time term was significantly associated with lower CES-D scores for White females, Black males, and Black females, indicating CES-D depressive symptoms decrease with time, when the other indicators are controlled. Among those sex and race groups, the magnitude of the time coefficient is greatest for Black females (β=-0.09, p<0.001), followed by White females (β=-0.07, p<0.001), and Black males (β=-0.04, p<0.01). The larger and significant time coefficients indicate CES-D scores decrease more rapidly for females than males.

High CES-D at baseline was significantly associated with higher CES-D score for all sex and race groups. The interaction between time and high CES-D at baseline was significant in the

models for all sex and race groups (White males β=-0.1, p<0.001; White females β=-0.09, p<0.001; Black males β=-0.09, p<0.05; Black females β=-0.09, p<0.001), indicating baseline CES-D score significantly changes the time trajectory of CES-D. As low CES-D at baseline is the referent category and the time coefficients are negative for all sex and race groups (although not significant for White males), the negative interaction coefficient indicates CES-D score has a sharper negative slope for individuals who reported high CES-D at baseline. Predicted CES-D depressive symptoms from Model 1a are displayed in Figure 4.3.

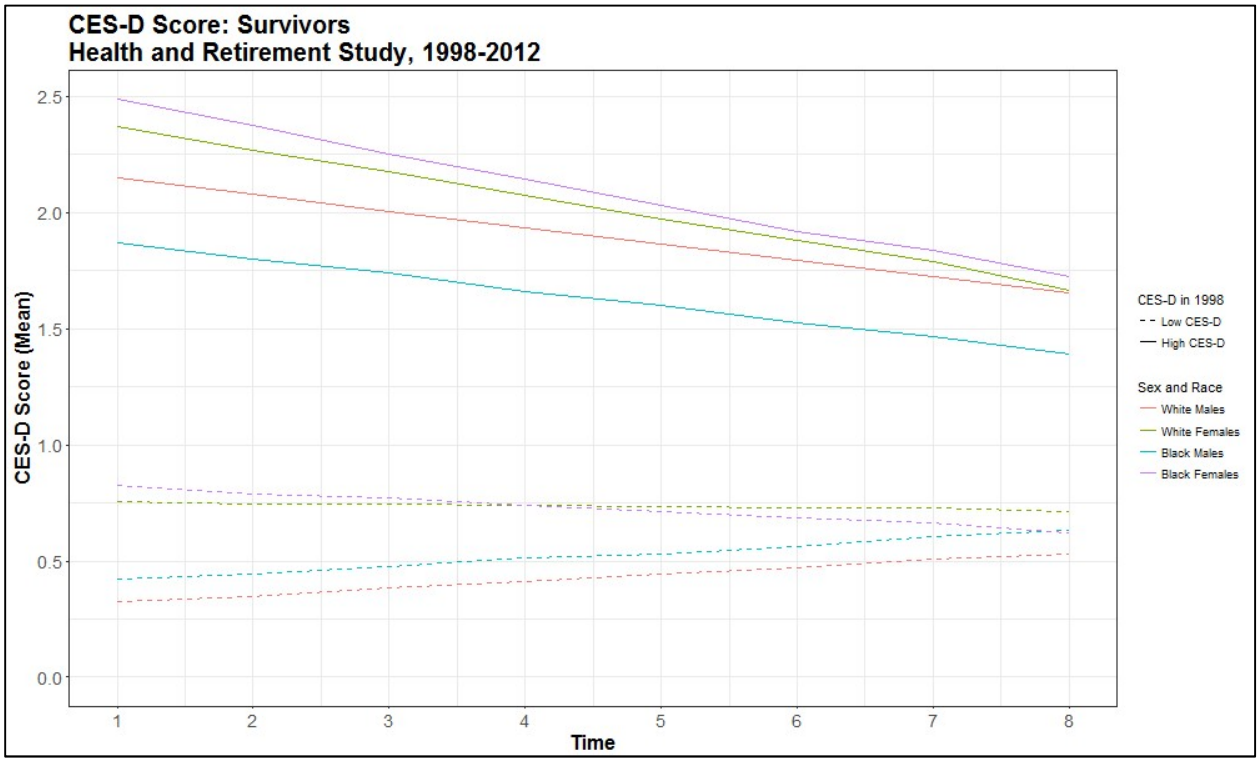

Figure 4.3 Predicted CES-D Score for Survivors by Baseline CES-D Score and Sex and Race group.

In Model 1b (See Table 4.2), among individuals who did not survive to the last period of observation in this analysis (2012), age was significantly associated with higher CES-D score for all sex and race groups. The linear time term was significantly associated with lower CES-D score for all sex and race groups, indicating CES-D score decreases with time. The magnitude of the time coefficients are larger for females than for males (Black females β=-0.17, p<0.001;

White females *β*=-0.17, *p*<0.001; Black males *β*=-0.15, *p*<0.001; White males *β*=-0.14, *p*<0.001), indicating CES-D scores decrease more rapidly for females than males.

High CES-D score at baseline was significantly associated with higher CES-D score for all sex and race groups. The interaction between time and high CES-D at baseline was significant, indicating baseline CES-D score significantly changes the time trajectory of CES-D for all sex and race groups (White males *β*=-0.13, *p*<0.001; White females *β*=-0.16, *p*<0.001; Black males *β*=-0.13, *p*<0.001; Black females *β*=-0.14, *p*<0.001). As low CES-D score at baseline is the referent category and the time coefficients are negative for all sex and race groups, the negative interaction coefficient indicates CES-D scores have a sharper negative slope for individuals who reported high CES-D score at baseline. Predicted CES-D depressive symptoms from Model 1b are displayed in Figure 4.4.

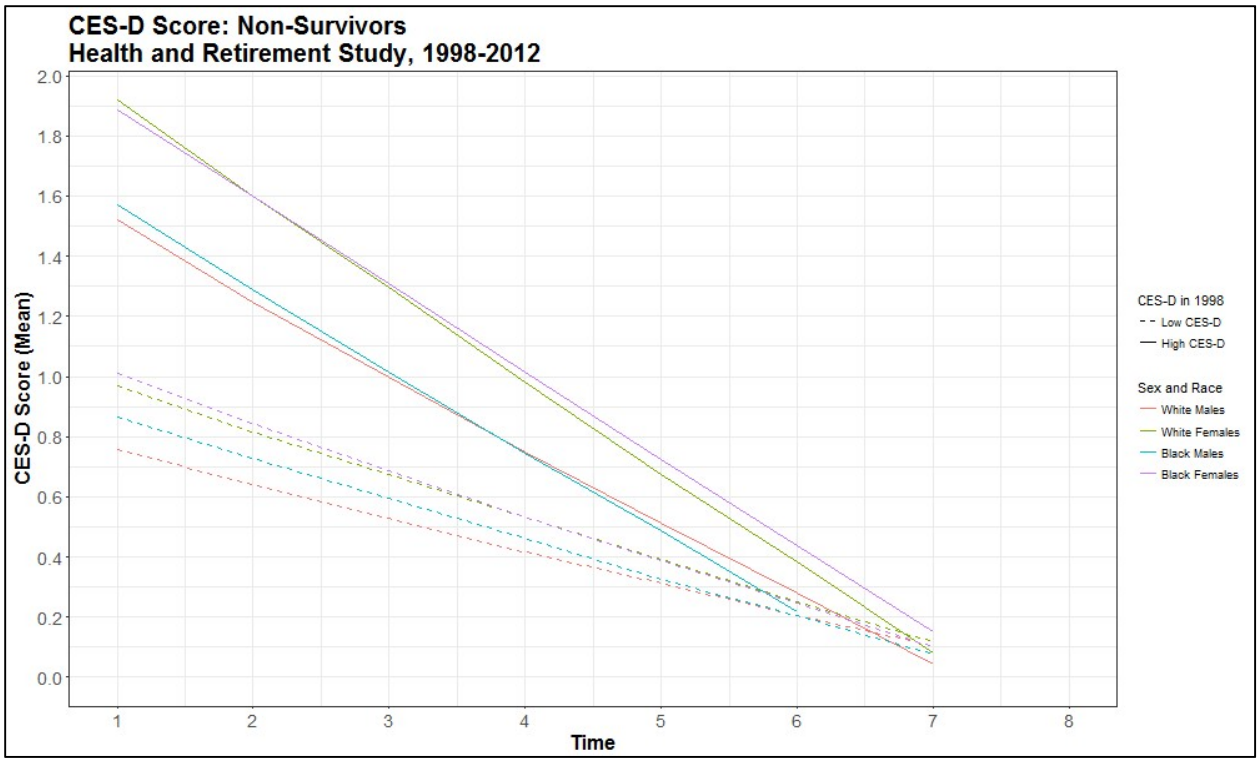

Figure 4.4 Predicted CES-D Score for Non-Survivors by Baseline CES-D Score and Sex and Race group.

Table 4.3 reports growth curve estimates of functional limitation trajectories (1998-2012) for survivors (Model 2a) and non-survivors (Model 2b) by sex and race group. Utilizing person fixed-effects, Models 2a and 2b specify age, the linear effect of time, baseline functional limitations (low=referent), and an interaction between the linear effect of time and baseline functional limitations, which allows the slope of functional limitations over time to vary according to baseline functional limitations.

Table 4.3 Growth Curve Estimates of Functional Limitation Trajectories (1998-2012) for Survivors (Left) and Non-Survivors (Right)

	Model 2a (Survivors)				**Model 2b (Non-Survivors)**			
	White		**Black**		**White**		**Black**	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Age	0.07 (0.06, 0.08)	0.13 (0.12, 0.14)	0.08 (0.06, 0.1)	0.11 (0.09, 0.13)	0.21 (0.2, 0.22)	0.31 (0.3, 0.32)	0.15 (0.13, 0.17)	0.18 (0.17, 0.19)
Time	0.06 (0.04, 0.08)	-0.03 (-0.05, -0.01)	-0.01 (-0.07, 0.05)	0.01 (-0.04, 0.06)	-0.48 (-0.5, -0.46)	-0.66 (-0.68, -0.64)	-0.42 (-0.47, -0.37)	-0.52 (-0.57, -0.47)
High FL in 1998	2.65 (2.23, 3.07)	3.37 (3.13, 3.61)	4.91 (4.05, 5.77)	4.13 (3.67, 4.59)	1.49 (1.23, 1.75)	1.62 (1.38, 1.86)	1.8 (1.16, 2.44)	2.28 (1.76, 2.8)
Time*High FL in 1998	-0.06 (-0.15, 0.03)	-0.1 (-0.14, -0.06)	-0.2 (-0.39, -0.01)	-0.2 (-0.28, -0.12)	-0.33 (-0.36, -0.3)	-0.33 (-0.36, -0.3)	-0.31 (-0.39, -0.23)	-0.36 (-0.43, -0.29)
(cons)	-4.4	-7.61	-5.04	-6.11	-13.64	-19.95	-8.7	-10.03
AIC	48270.4	94527.8	8989.1	23499.9	93203.3	138166.2	16448.7	28852.3

Source: Health and Retirement Study, 1998-2012.
Note: Coefficients with 95 percent confidence intervals in parentheses.

In Model 2a (See Table 4.3), among individuals who survived through the last period of observation in this analysis (2012), age was significantly associated with higher functional limitations for all sex and race groups. The linear time term was associated with significantly different functional limitations for White males (β=0.06, p<0.001) and White females (β=-0.03, p<0.05). High functional limitations at baseline was significantly associated with higher functional limitations for all sex and race groups. The interaction between time and high functional limitations at baseline was significant in the models for White females, Black males,

and Black females (White females β=-0.1, p<0.001; Black males β=-0.2, p<0.05; Black females β=-0.2, p<0.001). The significant interaction coefficient indicates the slope of functional limitations over time is dependent upon levels of functional limitations at baseline for these groups. Predicted functional limitations values from Model 2a are displayed in Figure 4.5.

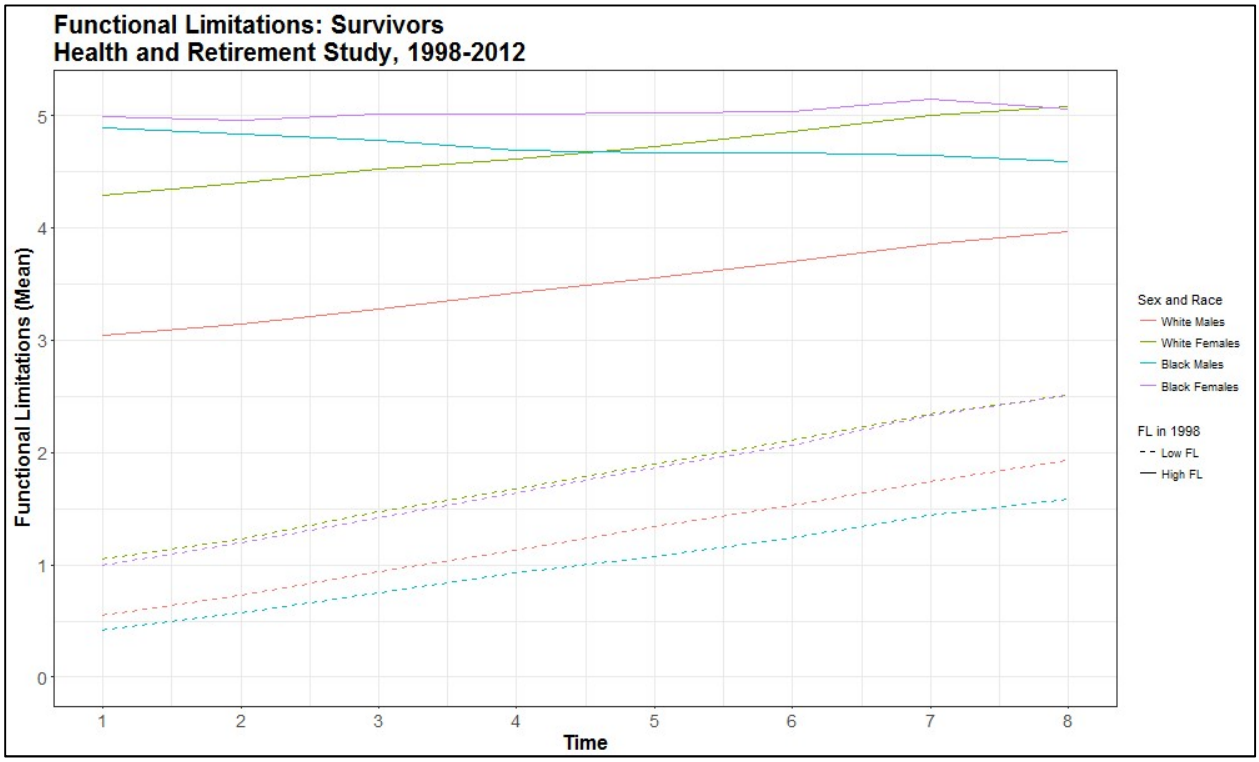

Figure 4.5 Predicted Functional Limitations for Survivors by Baseline Functional Limitations and Sex and Race group.

In Model 2b (See Table 4.3), among individuals who did not survive through the last period of observation in this analysis (2012), age was significantly associated with higher functional limitations for all sex and race groups. The linear time term was significantly associated with lower functional limitations for all sex and race groups, indicating functional limitations decrease with time, when the other indicators are controlled. The magnitude of the time coefficients are larger for females than for males (White females β=-0.66, p<0.001; Black females β=-0.52, p<0.001; White males β=-0.48, p<0.001; Black males β=-0.42, p<0.001), indicating functional limitations decrease more rapidly for females than males.

High functional limitations at baseline was significantly associated with higher functional limitations for all sex and race groups. The interaction between time and high functional limitations at baseline was significantly associated with functional limitations for all sex and race groups (White males β=-0.33, p<0.001; White females β=-0.33, p<0.001; Black males β=-0.31, p<0.001; Black females β=-0.36, p<0.001). As low functional limitations at baseline is the referent category and the time coefficients are negative for all sex and race groups, the negative interaction coefficient indicates functional limitations have a sharper negative slope for individuals who reported high functional limitations score at baseline. Predicted functional limitations values from Model 2a are displayed in Figure 4.6.

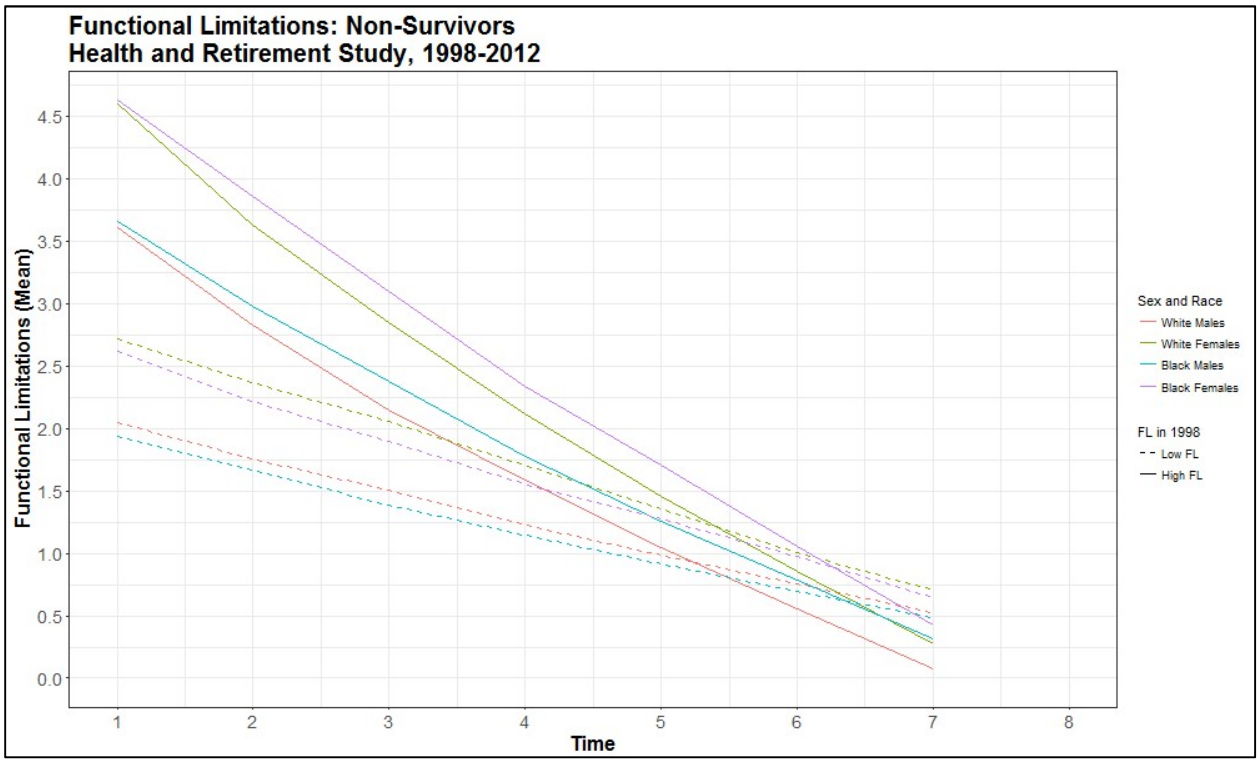

Figure 4.6 Predicted Functional Limitations for Non-Survivors by Baseline Functional Limitations and Sex and Race group.

Table 4.4 reports the correlations between CES-D depressive symptom trajectories and functional limitation trajectories. For survivors, correlations between CES-D and functional limitation trajectories are moderate and positive (White Males 0.28; White Females 0.23; Black

Males 0.33; Black Females 0.2). For non-survivors, correlations between CES-D and functional limitation trajectories are moderate and positive (White Males 0.39; White Females 0.37; Black Males 0.34; Black Females 0.36).

Table 4.4 Correlations of CES-D Trajectory and Functional Limitation Trajectory for Survivors (Top) and Non-Survivors (Bottom)

	White		**Black**	
CES-D Trajectory & FL Trajectory	**Male**	**Female**	**Male**	**Female**
Survivor	0.28***	0.23***	0.33***	0.2***
Non-Survivor	0.39***	0.37***	0.34***	0.36***

Source: Health and Retirement Study, 1998-2012.
*Note: ***p<0.001*

Discussion and Conclusions

Discussion

In this study, I strengthen understandings of trajectories of mental health outcomes in late-life. Particularly, this dissertation adds depth to the research landscape questioning whether mental health disparities along sex and racial lines decrease, remain stable, or increase. I highlight the need to consider baseline levels of CES-D depressive symptoms and survivorship when assessing trends in mental health outcomes and disparities across sex and race groups. Results from this study show similiar trends of CES-D depressive sypmptoms in late-life across sex and race groups.

Results of this study show CES-D trajectories – for all sex and race groups – are obscured by attrition due to death. The non-survivor models show steep declines in CES-D trajectories across the late-life period, yet these trends are a function of attrition[6], as these steep declines

[6] As depression and depressive symptoms are associated with heightened risk of mortality (Hicken et al. 2013; Barry et al. 2008), individuals with higher CES-D scores tend to die at earlier time periods. Thus, individuals with higher CES-D scores are observed during earlier time periods, and raise the average observed CES-D scores therein.

are not observed among individuals who survived the eights waves of HRS observation used in this study. Among survivors, CES-D depressive symptoms remain, relatively, more consistent over time. Individuals who start with higher levels of CES-D depressive symptoms tend to experience decreases in CES-D depressive symptoms over time, while individuals who start with lower levels of CES-D depressive symptoms tend to experience more consistent levels of CES-D depressive symptoms over time. In this way, the two groups became more similar by the end of the periods of observation, while sex and race groups remains similar in CES-D depressive symptoms within the baseline CES-D and survivorship lines.

To understand mental health trajectories in late-life more fully, I assess trajectories of a physical health outcome, functional limitations, due to its co-morbidity with depressive symptoms in late-life. As with CES-D depressive symptoms, results from this study highlight the need to consider baseline levels of functional limitations and survivorship when assessing trends in physical health outcomes and disparities across sex and race groups. Again, results of this study show functional limitation trajectories – for all sex and race groups – are obscured by attrition due to death.

The non-survivor models show steep declines in functional limitations across the late-life period, yet these trends are a function of attrition[7], as these steep declines are not observed among individuals who survived the eight waves of HRS observation analyzed in this study. Indeed, among survivors, more consistent levels of functional limitations were observed. Individuals who started with lower levels of functional limitations tended to experience increases in functional limitations over time. However, there are sex and race differences for survivors in functional limitation trajectories, affirming previous research which highlights

[7] Individuals with higher functional limitations tend to die at earlier time periods. Thus, individuals with higher functional limitations are observed during earlier time periods, and raise the average observed functional limitations therein.

continued physical health disparities across sex and race in late-life. Despite these differences, as with CES-D depressive symptoms, the high and low groups (according to baseline functional limitations) became more similar by the end of the periods of observation.

The positive association observed between CES-D depressive symptoms trajectories and functional limitation trajectories call for further assessment into the relationship between mental and physical health outcomes in the late-life period. Particularly, results from this study show a positive association between CES-D depressive symptoms and functional limitations. This finding is consistent with prior research indicating functional limitations are comobrid with depression and depressive symptoms (Lynch and George 2002; Muramatsu et al. 2010). While this study aids understanding of the role of functional limitations on trajectories of mental health outcomes in late-life, further research into the mechanisms driving this finding is needed.

This study aims to assess the aging-as-leveler hypothesis for CES-D depressive symptoms across sex and race in late-life. Results from the growth curve models indicate survivorship is the most prominent indicator of mental health trajectories in the late-life period. As highlighted by Bordieu's "similiarly shaped problems" hypothesis, which lends support to the aging-as-lever framework, results from this study mimic what others have theoretically and empircally tested. Unlike earlier periods, when researchers observe disparities in mental health, physical health, and mortality across groups, during the late-life period, everyone will eventually experience illness and death, and therefore, a reduction in differences attributable to sociodemographic characteristics.

The assumption that individuals face similar trajectories of morbidity and mortality in late-life stems from observations of a narrowing in disparities across health and wellness outcomes during this stage (Adler and Stewart 2010; A. E. Willson, Shuey, and Elder 2007). This

study confirms similar trends across sex and race groups for survivors, and a considerable attrition during late-life due to death. Among survivors, then, convergence in mental and physical health outcomes during the late-life period among sex and race groups is observed, supporting an aging-as-leveler framework. Descriptive statistics from this sample indicate, among individuals who did not survive to 2012, Black males and females tend to die younger than White males and females (average age of death for 73.46 years, 71.64 years, 74.07 years, and 74.12 years, respectively). Thus, differences in longevity across sex and race may account for observed differences in mental and physical health outcomes in the late-life period.

Conclusions

In this paper, I analyze the aging-as-leveler, peristent inequality, and cumulative disadvantage perspectives to analyze social and economic related sources of depression and the trajectories of CES-D depressive symptoms in order to better understand the causes, consequences, and relationships of depression with the causes and consequences of physical health disparities in late-life. Previous research from life course scholars have emphasized social context on determining access to health-promoting behaviors and to risk factors for disease for both mental and physical health (Jackson and Knight 2006). This study bolsters sociological understandings of the mechanisms through which individual-risk factors for mental health outcomes are contextualized and carried into the late-life period (Piccolo et al. 2015; Wheaton and Montazer 2010).

Sociological examinations of health disparities over the past several decades have extensively emphasized the impact of social context on risk factors for disease (Link and Phelan 1995). Particularly, recent scholars have documented and highlighted the social patterning of disease (Link and Phelan 1995). Sociological models attempt to understand how an individual's characteristics and context interact with stressors to impact health (Piccolo et al. 2015).

Research has consistently found disparities in both mental and physical health tend to fall along sex, racial/ethnic and socioeconomic lines (Link and Phelan 1995).

The key strength of the sociological study of health is that sociology conceptualizes features of the social context as socially patterned, particularly the distribution of stressors and factors related to morbidity (Aneshensel 1992; Pearlin 1989). Sociology is making great strides in documenting the unequal distribution of stressors and factors related to morbidity while further identifying and assessing stress-related health outcomes (Aneshensel 1992; Pearlin 1989). The importance of longitudinal and life course analyses mechanisms driving mental and physical health disparities are particularly important in uncovering features of health and well-being in late-life.

This study confirmed what others have found; functional limitations are detrimental to mental health outcomes for individuals in late-life (Fiske et al. 2009). Theorists relate this relatively large impact of functional limitations on mental health outcomes to these particular types of limitations being threats to "competence", which are increasingly prominent throughout the life course (Fiske et al. 2009). Specifically, limitations of, or threats to, one's ability to hold onto competence are important drivers of individuals' ability to maintain independence and control in their life.

Long-held analytic and theoretical approaches to studying depression and depressive symptoms point to declining physical functioning as causes of poor quality of life in the late-life period (Ailshire and Crimmins 2011; Mills and Henretta 2001). Research finds individuals with greater physical impairments hold more negative views of their experiences of aging (Ailshire and Crimmins 2011; Mills and Henretta 2001). There is strong and growing evidence for the relationship between poor mental and physical health outcomes to social stress (Link and Phelan 1995; Massey 2004). Additionally, health disparities throughout the late-life period

result in heightened mortality among disadvantaged individuals. As a result, disadvantaged individuals are less likely to survive to old age than their more advantaged counterparts. Analytic and theoretical approaches toward understandings of the impact of social context on mental and physical health outcomes among late-life adults must consider the role of morbidity and mortality throughout the life course.

Social stress researchers have made tremendous strides in what is known about the associations between social stressors and physical and mental health outcomes (Link and Phelan 1995). Much of the harm to health among disadvantaged individuals occurs before they reach late-life (Abramson 2015). As such, scholars have begun to highlight the importance of life course context on later health outcomes. Results of this study call for greater attention to be paid to trajectories of physical health declines on mental health outcomes throughout the life course, particularly in the late-life period, when functional limitations occur at greater rates relative to earlier life stages.

In addition to individual experiences, circumstances and behaviors throughout the life course, birth year, and cohort memberships are posited to have independent impacts on an individual's mental and physical health (Elder, George, and Shanahan 1996). Birth year can impact health through altering an individual's exposure to technological, material and political options (Elder et al. 1996). Cohort effects can impact health trajectories by exposing individuals to different social contexts and social worlds, such as exposure to economic depression or war (Elder et al. 1996). As such, understanding the association between social context and mental or physical health outcomes across the life course must consider varying historical contexts in which individuals experience their social world. Among historically marginalized minority groups, the health impact of birth year and cohort effects can be particularly acute, due to changing cultural and political climates.

Limitations

In this study, left-censoring in the survey data may have occurred due to mortality, particularly heightened mortality among disadvantaged individual. As such, this study is limited in its ability to assess how that censoring may impact disparities in CES-D depressive symptom prevalence and functional limitations across sex and race in late-life. Current understandings of the impact of social context on mental and physical health outcomes among late-life adults is limited due to the issue of left-censoring, and this study is not exempt from this limitation. Further, due to small sample size in the older ages, this study only analyses individuals up to age 95. Thus, this study is unable to draw conclusions about the relationships between mental and physical health outcomes with aging for individuals in these later years of life.

Additionally, issues of endogeneity between CES-D depressive symptoms and functional limitations may exist, as depression and depressed mood have been found to negatively impact physical health status, as well (Fiske et al. 2009). Specifically, lost appetite due to depression is a common cause of weight loss among late-life adults, particularly among late-life women (Blazer 2003; Fiske et al. 2009; Tiemeier 2003). In elderly populations, appetite disturbance and weight loss can lead to compromised nutritional status, frailty, and failure to thrive (Blazer 2003; Fiske et al. 2009; Gruenewald et al. 2009). As physical health can deteriorate due to increased nutritional intake in association with depressed state, depression can then worsen (Blazer 2003; Fiske et al. 2009; Gruenewald et al. 2009; Tiemeier 2003). The comorbidity between physical and mental health outcomes makes the causal direction of this relationship difficult to discern (Blazer 2003; Fiske et al. 2009; Tiemeier 2003).

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APPENDIX 4.A

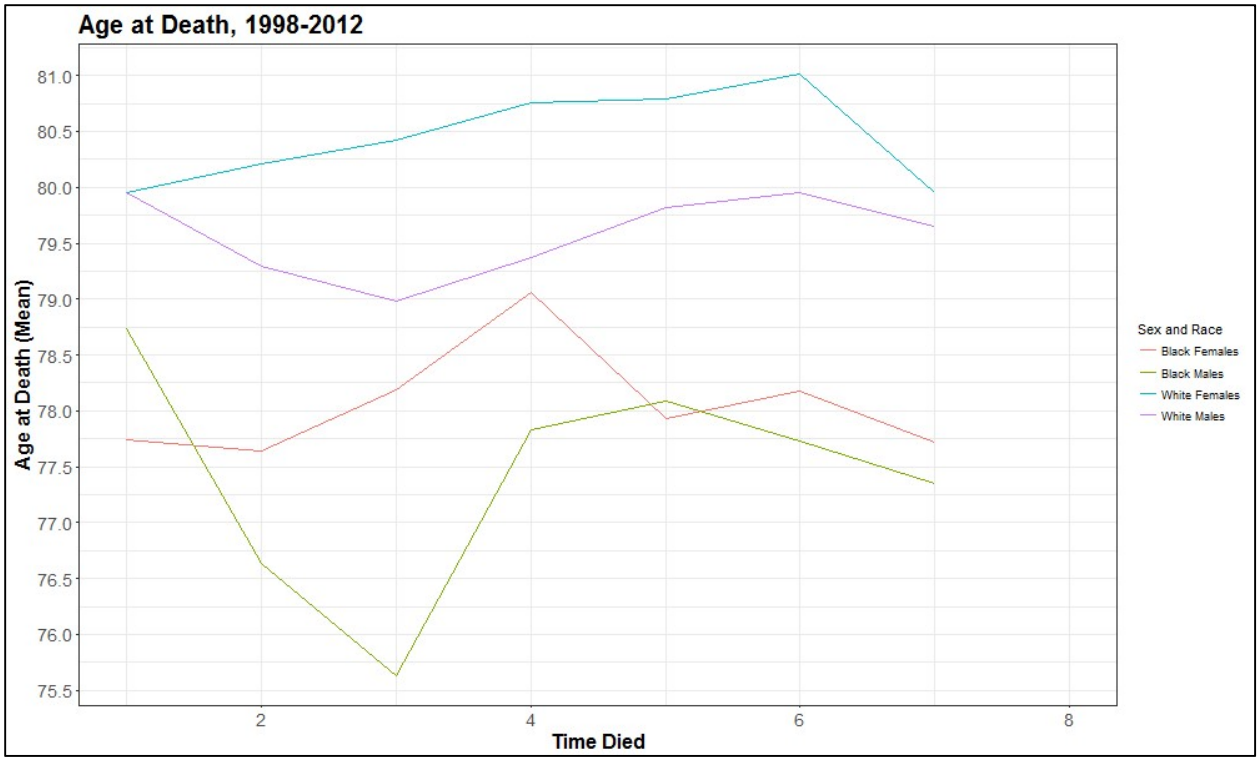

Figure 4.7 Among individuals who did not survive to the end of the observation period (time period 8; 2012), average age of death by time period of death, sex and race.

Table 4.5 Among individuals who did not survive to the end of the observation period (time period 8; 2012), frequency by last time period of observation.

Last Time Period (N)	
1	1126
2	1161
3	986
4	945
5	843
6	992
7	638
Survived to 2012	5453

Table 4.6 Average CES-D within each time period (t), split by whether or not individuals survive into the next time period (t+1).

Time Period (t)	Mean CES-D at time t for survivors through 2012	Mean CES-D at time t for those alive at Time(t) and Time(t+1)	Mean CES-D at time t for those alive at Time(t) but NOT Time(t+1)
1	0.84 (sd=1.48) (N=5553)	1.36 (sd=1.71) (N=5539)	1.34 (sd=1.75) (N=1090)
2	0.78 (sd=1.42) (N=5551)	1.32 (sd=1.72) (N=4376)	1.26 (sd=1.79) (N=1131)
3	0.79 (sd=1.46) (N=5552)	1.26 (sd=1.72) (N=3382)	1.27 (sd=1.82) (N=945)
4	0.76 (sd=1.41) (N=5552)	1.25 (sd=1.7) (N=2435)	1.28 (sd=1.8) (N=911)
5	0.82 (sd=1.48) (N=5550)	1.3 (sd=1.72) (N=1602)	1.24 (sd=1.76) (N=797)
6	0.79 (sd=1.44) (N=5539)	1.23 (sd=1.81) (N=620)	1.28 (sd=1.85) (N=940)
7	0.76 (sd=1.44) (N=5503)		0.97 (sd=1.59) (N=595)
8	0.77 (sd=1.46) (N=5453)		

Table 4.7 Average functional limitations each time period (t), split by whether or not individuals survive into the next time period (t+1).

Time Period (t)	Mean FL at time t for survivors through 2012	Mean FL at time t for those alive at Time(t) and Time(t+1)	Mean FL at time t for those alive at Time(t) but NOT Time(t+1)
1	1.33 (sd=2.18) (N=5553)	3.01 (sd=3.05) (N=5539)	4.79 (sd=3.78) (N=1090)
2	1.36 (sd=2.19) (N=5551)	3.12 (sd=3.12) (N=4376)	4.62 (sd=3.75) (N=1131)
3	1.56 (sd=2.31) (N=5552)	3.5 (sd=3.15) (N=3382)	5.15 (sd=3.74) (N=945)
4	1.65 (sd=2.37) (N=5552)	3.7 (sd=3.22) (N=2435)	5.01 (sd=3.74) (N=911)
5	1.93 (sd=2.61) (N=5550)	4.1 (sd=3.4) (N=1602)	5.33 (sd=3.73) (N=797)
6	2.07 (sd=2.76) (N=5539)	4.07 (sd=3.38) (N=620)	5.11 (sd=3.74) (N=940)
7	2.41 (sd=3.07) (N=5503)		5.4 (sd=3.97) (N=595)
8	2.67 (sd=3.33) (N=5453)		

Chapter 5 Conclusions

"Medicine is a social science."

– Rudolf Virchow

The introductory chapter of this dissertation begins by reviewing recent research attempting to identify different factors and pathways leading to mental and physical health disparities between sex and race groups at older ages. This dissertation is grounded in a basic claim that the late-life period is substantively distinct from other stages in adulthood. The years of transition between midlife and late-life are rife with role transitions, reformation of identity, loss of network ties, and physical and cognitive decline (Abramson 2015; Burke 1996; Elder, George, and Shanahan 1996; Fiske, Wetherell, and Gatz 2009; Perreira and Sloan 2001). This dissertation borrows from the recent framework provided by Arnett (2000). Arnett argues the emerging adulthood period, spanning from the late teen years to the early twenties, encapsulates frequent and drastic changes to daily life and identity (Arnett 2000). In this dissertation, the transition from midlife to late-life, occurring around age 65, is also seen as a time full of frequent and sometimes drastic changes. As such, this dissertation engages with life course theory through framing individual experiences as continually influenced by changing circumstances and contexts (Elder 1998; Elder and Rockwell 1979).

Specifically, this dissertation claims the transition into the late-life period often resembles a dismantling of curated identities surrounding love, work, and interaction with the world built during emerging adulthood and remaining largely stable through midlife (Brown and McGill 1989; Burke 1996; Gross 1970). As summarized in this dissertation, the late-life period is one often marked by change precipitated by loss; loss of kin, roles, function, and agency. Thus,

this dissertation explores the years surrounding and following major life transitions out of one's midlife identity is a distinct period worthy of exploration.

From this basic premise, this dissertation sought to improve upon current understanding of how social support, life role transitions, and unhealthy coping behaviors are associated with CES-D depressive symptoms across sex and race groups in this distinct late-life stage. This dissertation asserted the state of the literature has not yet fully or confidently explained these pathways and trends across sex and race groups in the late-life period. From this foundation, this dissertation assessed if age serves to level or reduce, versus widen or maintain, mental health disparities across the late-life period.

This dissertation strengthens the current literature through several key advantages. First, a core strength of this dissertation comes from the three empirical chapters leveraging nationally representative and longitudinal data from the Health and Retirement Study (HRS) of U.S. adults over 50 years of age (1998-2012). Utilizing longitudinal data allowed for assessment of transitions and trends across different time periods, ages, and cohorts in the late-life period. Second, drawing from an intersectionality perspective, this dissertation strengthens the current literature by exploring these transitions and trends across sex and race groups. This dissertation echoes the calls from other intersectional theorists and researchers that it is imperative to assess sex, race, and other salient sociodemographic characteristics in interaction with one another, and not merely treat these characteristics as independent markers of status or lived experiences (Williams 2002).

Third, this dissertation pulls theoretical perspectives and empirical findings from physical health research into the mental health space. Pulling theories and observed trends from the physical health field allows this dissertation to explore whether and to what extent mental health trends mirror, or differ from, physical health trends. Fourth, this dissertation

pulls theoretical perspectives and empirical findings from earlier life stages into the late-life period to explore whether and to what extent the late-life period is similar to, or markedly different from, other life stages.

Main Findings

In Chapter 2, I argue transitions in roles entering the late-life period make this time substantively distinct from other adult stages. Further, I argue sex and race differences exist in the meaning and effect of transitional experiences on mental health outcomes in late-life. The results of this study show sex and race differences in the association of life transitions and social support with mental health outcomes in late-life. The mental health outcomes of White males and females are more strongly associated with life transitions than are those of Black males and females. As such, this study lends evidence to the notion the years between midlife and late-life are producing fundamental role transitions and reformation of identity (Abramson 2015; Burke 1996; Elder et al. 1996; Fiske et al. 2009; Perreira and Sloan 2001), but the effects of these transitions vary across groups. This finding highlights the need for exploration of buffers and trajectories of stressors and mental health statuses across sex and race groups during the late-life period, which may help elucidate explanations for disparities observed in mental health.

Further, Chapter 2 contributes to burgeoning research identifying different factors and pathways leading to mental health disparities between sex and race groups in late-life. Particularly, this article focuses on bolstering the literature on factors contributing to mental health outcomes in relation to social support and role transitions in the late-life period. This article highlights the specific effects of identity, caregiving and paid labor transitions, and the roles of positive and negative social support, as they relate to CES-D depressive symptoms in a distinct and transitional stage of the late-life period.

In Chapter 3, I argue coping behaviors may be used as mediators between stressful life transitions, negative social support, sociodemographic indicators, and the outcome of CES-D depressive symptoms. Specifically, I argue alcohol use and overeating behaviors may be used as mediators differentially by sex and race group. The results of this study do not indicate indirect effects of stressors, negative social support, and sociodemographic indicators exist through alcohol consumption and overeating behaviors in the late-life period.

Chapter 3 posits a possible explanation for a lack of observed indirect effects could be due to the inclusion of an indicator of social support – negative social support – in the analyses. Previous research, notably a study by Russell and Cutrona (1991), found social support has both direct impacts, and indirect impacts through an indicator of social stress – daily hassles – on change in depression over time for older adults. This study highlights two key points. First, the authors provide evidence that social support is independently and directly meaningful for mental health status in the late-life period. Second, the authors posit that the indirect effects of social support on mental health through social stress indicate social support is a deterrent for experiencing social stress for older adults (Russell and Cutrona 1991; Wheaton 1985, 1996). The ability of social support to prevent social stress is an important mechanism through which social support can deter depression or ameliorate depressive symptoms in late-life (Russell and Cutrona 1991). Thus, future work could delve further into the mechanisms linking social stress, social support, and coping behaviors with mental health outcomes in this age group. Such work would further shed light on the complex and multifaceted pathways explored in this article in relation to mental health.

In Chapter 4, I explore theories of reduction, persistence, or widening of disparities across sex and race groups in late-life for mental health. The results of Chapter 4 highlight the need for researchers to assess and understand survivorship when studying late-life trajectories of mental and physical health. Results show sex and race groups face similar mental and

physical health trajectories in late-life, but only when considering survivorship and baseline mental and physical health level. Among survivors, convergence in mental and physical health outcomes between individuals with high and low baseline mental and physical health levels – across sex and race group – supports an aging-as-leveler framework. However, censoring due to mortality highlights the need to better understand the mental and physical health experiences of individuals who do not survive into the later years. Indeed, there is considerable, and unequal, attrition due to death within the HRS sample.

Findings from the three empirical chapters of this dissertation confirm the late-life period is a unique vantage point for understanding if and how disparities observed during earlier periods of the life course play out in old age (Abramson 2015). Particularly, deviations from expectations developed from theories and empirical evidence from physical health trends and from among midlife adults provide valuable insight into how mechanisms and circumstances differ for mental health in the late-life stage, relative to physical health and to other stages of adulthood. As more individuals survive to old age than at any other point in history, understanding the aging experience is of critical importance (Abramson 2015; Ailshire and Crimmins 2011).

Limitations

There are several methodological issues endemic to social stress and mental health research this dissertation was unable to address. First, despite using the HRS panel data, this study is unable to make definitive assertions about causality regarding life transitions, social support, coping behaviors, and the mental health outcome of CES-D depressive symptoms. Particularly, issues of endogeneity between coping behaviors and CES-D depressive symptoms are known to be problematic. Specifically, changes in both indicators of unhealthy coping

behaviors utilized in this dissertation – alcohol use and BMI – have been shown to be both a cause and a consequence of depression and depressive symptoms.

Second, the measure of BMI utilized in this study is only a proxy for overeating behaviors. Changes in BMI – up or down – can be a long process. Thus, assessing an individual's BMI in association with a specific caregiving transition or other indicators may not accurately capture engagement in overeating as a coping behavior. However, due to data limitations, BMI is the closest available measure for overeating afforded by the HRS data.

Third, this dissertation utilizes CES-D depressive symptoms as a marker of distress and poor mental health status. However, individuals of different sociodemographic backgrounds – such as race/ethnicity, sex, and socioeconomic status – are shown to manifest distress differently (Aneshensel 1992; Aneshensel, Rutter, and Lachenbruch 1991; Umberson, Chen, and House 1996). Thus, utilizing the single mental health indicator of CES-D depressive symptoms does not allow for a full understanding of the pathways and trajectories of mental health status across groups in the late-life period (Mezuk et al. 2010; Perreira et al. 2005).

Fourth, censoring in the survey data may have occurred due to mortality, particularly heightened mortality among disadvantaged individuals. As such, this study is limited in its ability to assess how that censoring may impact disparities in CES-D depressive symptom prevalence and functional limitations across sex and race in late-life. Indeed, current understandings of the impact of social context on mental and physical health outcomes among late-life adults is limited due to the issue of differential survival, and this study is not exempt from this limitation. While some of the models utilized in this dissertation attempt to account for the issue of differential survival among individuals within the HRS sample, it is unclear if the attempts are fully successful. Further, these models are unable to assess to what extent differential survival impacted HRS sample selection.

Fifth, this analysis is restricted to White/Black differences. Thus, this work does not inform other racial/ethnic differences in life transitions, social support, coping behaviors, and/or CES-D trajectories for other groups in late-life.

Future Research

This dissertation lays the groundwork for several specific projects. The first project focuses on examining how specific and differing contexts of life transitions impact mental health outcomes among late-life adults. For paid labor transitions, it is observed that individuals with fewer social and economic resources are more likely to experience disability or other circumstances that lead to unwanted job loss or forced retirement. The likelihood of holding a job, the quality of the job, and the ability to avoid job loss are connected to one's social position (McLeod and Kessler 1990). Further, the consequences of job loss differ according to one's social position. For instance, a job loss can impact familial relationships and cause economic strain, and these effects are more pronounced for individuals with fewer resources (Pearlin 2010; Pearlin et al. 1997). Thus, future work will examine the context leading to paid labor transitions in the late-life period, including choice, physical ability, and financial security.

For caregiving transitions, future work will examine the choice, ability, and other life demands surrounding becoming a caregiver. Particularly, future work will assess differences in contexts surrounding caring for an ailing parent or ailing spouse, relative to other caretaking responsibilities, such as caring for grandchildren. As an example, the actions of assisting and monitoring a parent or spouse with dementia can be time consuming, exhausting, and emotionally and physically draining (Aneshensel 1996). Further, research finds employed caregivers frequently find their familial caregiving responsibilities interrupt work responsibilities, and thus, caregiving stress can cause work-related problems, and caregivers thusly experience job stress, in addition to caregiving stress (Aneshensel 1996). Thus, future

work will examine the context of caregiving transitions in the late-life period in relation to the causes and consequences of the caregiving role.

Second, future work will utilize additional measures of unhealthy behaviors which may be associated social stress coping in the late-life period. Tobacco use has been identified as a social stress coping behavior, for some groups, in earlier life stages (Jackson, Knight, and Rafferty 2010). Assessment of tobacco use as a coping behavior among late-life adults is a current gap in the literature. Future work in this area utilizing the HRS data would be particularly interesting as the data allow for assessment across cohorts. Trends in tobacco use behavior have changed considerably over the past several decades, and thus, late-life adults from different cohorts may have very different utilization of tobacco products in relation to stressful experiences. Further, improved indicators of caloric intake and patterns of alcohol consumption would enable refinements in the modeling of overeating and alcohol use behaviors in late-life.

Third, future work will incorporate additional indicators of mental health, in addition to CES-D depressive symptoms. As prior research indicates individuals of different sociodemographic backgrounds manifest distress differently, and as a result, disparities are difficult to discern using the CES-D depressive symptom checklist and similar indicators (Aneshensel 1992; Aneshensel et al. 1991; Mezuk et al. 2010; Perreira et al. 2005; Umberson et al. 1996). Thus, future work will incorporate additional indicators of mental health status that will better capture the range of outcomes experienced by individuals of different sociodemographic backgrounds during the late-life period. This could include not just measures of distress, such as depression or anxiety, but also measures of well-being and life satisfaction.

Concluding Remarks

The theoretical and methodological approaches utilized within this dissertation place it within the broader literature analyzing mental health disparities and trends from life course and intersectionality perspectives. The three empirical chapters of this dissertation provide insight into factors contributing to mental health outcomes and how disparities in mental health status evolve across groups in the late-life period. Particularly, this dissertation contributes a greater understanding into the factors contributing to mental health outcomes in relation to life transitions, social support, coping behaviors, aging, and functional limitations on mental health status s in the late-life period.

This dissertation highlights the need for more research in the social stress and mental health areas to engage life course and intersectionality perspectives. In the introductory chapter, this dissertation questions the idea of "similarly shaped problems" in late-life – as described by Bordieu – which assumes that all individuals endure declines in functional abilities, cognitive function, and other medical events associated with late-life morbidity and mortality (Abramson 2015). This dissertation builds arguments for different contexts, circumstances, and opportunities afforded to individuals based upon sociodemographic characteristics, which shape and compound experiences throughout the life course. Results from the three empirical chapters of this dissertation lend support to differing mechanisms and trajectories of transitions, support, coping, and mental health outcomes in the late-life period depending upon sex, race/ethnicity, and additional sociodemographic characteristics.

In this way, the late-life period provides a unique lens to understand if and how disparities observed during earlier periods of the life course play out in old age (Abramson 2015). Thus, future work in this area must challenge the assumption that individuals all face "similarly shaped problems", and leverage flexible and unique methods, measures, and data

sets to capture the full range of experiences of people's lives across the life course. As shown in this dissertation, future work can work from the understanding that the late-life period is a unique period through which valuable insight can be drawn into the mechanisms driving stratification throughout the life course.

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VITA

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