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The Role of Personality in the Development of Health Disparities during Late-mid Life

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List of Abbreviations

SPAN: St. Louis Personality and Aging Network

SES: Socioeconomic status

FFM: Five factor model

SLE: Stressful life events

JH: John Henryism

LTE-Q: List of Threatening Events Questionnaire

NEO-PI-R: NEO Personality Inventory Revised

HSI: Health Status Inventory

C-DIS: Computerized Diagnostic Interview Schedule

LGCM: Latent Growth Curve Modeling

CI: Confidence Interval

CFI: Comparative Fit Index

RMSEA: Root Mean Square of Approximation

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Dedicated to my boys.

Abstract

Objectives: The current study examined race/gender disparities in initial levels and trajectories of self-reported physical and mental health, and health care utilization, as well as the impact of personality and stressful life events on race/gender disparities. We hypothesized that health disparities would remain stable or decrease over time; that at-risk personality traits (e.g., high neuroticism) would have a more robust negative impact on health for black participants; that trust would mediate racial disparities in health; and that personality traits would moderate the association between stressful life events and health trajectories differentially across race/gender. **Methods:** Analyses utilized the first six waves of data from a representative sample of 1,577 Black and White adults (mean age 60) recruited from the greater St. Louis area. Participants were assessed every 6 months for 2.5 years. Using multigroup latent growth curve modeling, we examined initial levels and changes in health among White men (n=482), White women (n=578), Black men (n=226), and Black women (n=291). **Results:** Black participants reported lower initial physical health than White participants. Women's physical health was stable over time whereas men's declined. Men reported greater initial health care use than women, and this difference remained stable over time. There were no disparities in self-reported mental health. Neuroticism was associated with worse health across groups, while race/gender moderated associations of openness with mental health. Lower baseline levels of interpersonal trust among Black participants mediated racial disparities in physical and mental health 2.5 years later. Personality traits did not moderate associations between stressful life events and health trajectories. **Conclusions:** Race and gender influence health trajectories and personality-health associations. Interpersonal trust may be an important mechanism contributing to racial health disparities.

CHAPTER 1: OVERVIEW

Disparities in health between Black and White Americans are pervasive across a range of health outcomes and throughout the lifespan (Dressler, Oths, & Gravlee, 2005). Compared with White adults, Black adults have higher mortality rates from several leading causes of death (e.g., heart disease, certain cancers, diabetes), and experience earlier illness onset, greater severity of illness, poorer perceptions of health, worse physical functioning, and steeper increases in chronic illness onset over time (Brown, O'Rand, & Adkins, 2012; Dressler et al., 2005; Kochanek, Arias, & Anderson, 2013; Warner & Brown, 2011; Williams & Collins, 1995). Black individuals are equally or less likely to suffer from major mental disorders, but tend to report greater chronicity and severity of illness and a higher burden of unmet mental health needs (SAMHSA, 2015; Ault-Brutus, 2012; Hahm, Cook, Ault-Brutus, & Alegría, 2015; Wang et al., 2005; Williams et al., 2007). Despite organized efforts to understand Black-White health disparities and achieve health equity, these disparities remain inadequately understood and are a pressing public health concern (Dressler et al., 2005; Williams & Mohammed, 2010).

Research to date has focused on understanding the contributions of socioeconomic factors and health behaviors (e.g., tobacco and alcohol use) to racial disparities in health. This research shows that in many instances, these factors do not fully explain disparities (Lillie-Blanton, Parsons, Gayle, & Dievler, 1996; Richardson & Brown, 2016; Warner & Brown, 2011). As such, researchers have become increasingly interested in identifying additional behavioral and psychosocial determinants of racial health disparities. Psychosocial stress is prominent in this research. Various types of stressors are associated with racial differences in health, even after accounting for SES and health behaviors (e.g., tobacco and alcohol use) (Williams et al., 1997; Lantz et al., 2005; Kreuger et al., 2011). The next step in this research is to identify factors

that influence the impact of stress on racial differences in health. Most compelling would be factors that can be modified to prevent stressors or health-damaging reactions to them.

Personality traits predict the occurrence of stressful events (Kendler et al., 2003; Gleason et al., 2012; Liu & Kleiman, 2012; Powers et al., 2013) and shape physiological and behavioral responses to stress (Bennett et al., 2004; Korotkov, 2008; Kupper et al., 2013). Personality traits are furthermore robustly associated with health outcomes (Weston, Hill, & Jackson, 2015), and thus may be conceptualized as psychosocial resources that advantage or disadvantage health. The effect of personality traits on mortality is as large as those of socioeconomic status and obesity, and larger than that of heavy alcohol consumption (Ferguson, 2013). However, their role in the development of racial health disparities has been understudied (Chapman, Roberts, & Duberstein, 2011).

Personality traits may contribute to racial health disparities independently and through their influence stress-health associations (Gallo, 2009). Studies examining associations among personality, stress, and racial health disparities are limited. Existing studies have not focused on the widely used five-factor model (FFM) of personality (i.e., Neuroticism, Conscientiousness, Agreeableness, Extraversion and Openness; Costa and McCrae, 1992) and have tended to consider only one aspect of health (e.g., blood pressure) (Jonas and Lando, 2000; Bennett et al., 2004). Only a few have been longitudinal and none have examined health change over more than two time points.

The current study will help fill these research gaps by investigating the impact of the FFM on racial differences in various health outcomes in a community sample of black and white late mid-life adults. Latent growth curve modeling will be utilized to examine predictors of initial levels of health and changes in health over multiple time points. Longitudinal studies of

this kind are crucial to conceptualizing racial health disparities accurately as a developmental process.

This study examines four research questions: 1) What is the developmental pattern of race and gender disparities in initial levels of health and health trajectories during late mid-life? 2) Are there race and gender differences in the impact of personality traits on these health outcomes? 3) Do racial differences in the personality trait of trust mediate health disparities? 4) Do personality traits influence the associations between stressful life events and health differentially by race? We investigate these questions in regard to self-rated physical and mental health, and health care utilization (doctor visits) over 2.5 years in a sample of late mid-life adults.

CHAPTER 2: BACKGROUND

Overview

The first part of this chapter summarizes research on Black-White disparities in health and health trajectories. The second section provides a review of the research to date on personality, health, and racial health disparities. The third section delineates the psychosocial stress model of racial health disparities as well as its empirical basis. All three sections describe how the variables of interest are defined in this dissertation. Finally, the fourth section describes the theoretical basis for the current study and details previous research supporting the current aims.

Black-white disparities in health

Race is a construct that represents the social and environmental conditions that particular groups are subjected to as a consequence of racism, and must be "measured with a wide array of covariates" (Hayward, 2000). The most scientifically sound definition and measurement of race and ethnicity remains an empirical consideration. Nonetheless, compared with self-identified white race, self-identified black race is consistently associated with poorer health on a vast array of outcomes (Dressler et al., 2005; Williams et al., 2010). For the purposes of this dissertation, race is measured by self-report of membership in either White/Caucasian or Black/African-American racial categories.

At birth, blacks have a lower life expectancy than whites by 5 years. In infancy, black infants are less likely than white infants to see their first birthday (Williams, 2008). By middle age, black adults are more likely to be diagnosed with several leading causes of death (e.g., heart disease, cancer, diabetes), and experience earlier onset and greater severity of illness (Kochanek, Arias, & Anderson, 2013). Compared with white middle-aged adults, black adults report poorer

perceptions of health, worse physical functioning, and steeper declines in health over time (Warner and Brown, 2011; Brown, O'Rand, & Adkins, 2012).

A primary environmental correlate of race is socioeconomic status (SES), which determines access to resources such as housing, education, wages, and health care. SES is a crucial determinant of racial health disparities, but race tends to exert a unique effect on health even after accounting for SES, as well as other correlates of health such as marital status and health behaviors (e.g., tobacco and alcohol use) (Williams, Yu, Jackson and Anderson, 1997; Williams et al., 2010; Warner and Brown, 2011). For example, one study found that, in an epidemiological sample of adults age 40 and older, blacks had elevated high-risk indicators for blood pressure and inflammation compared with whites and Hispanics, even after controlling for income, education, health behaviors (i.e., exercise, tobacco use and eating behavior), and access to health care (Crimmins et al., 2007).

Black-white disparities in health trajectories

It is important to study the progression of health disparities during middle age and beyond, as this is when the lifetime accumulation of health risk factors most markedly results in health problems (Geronimus, Hicken, Keene, & Bound, 2006). As individuals age, the development of health disparities may follow several different patterns as the balance of social determinants and resources shifts and changes uniquely across demographic groups. Studies of racial disparities in health trajectories during middle age have examined whether disparities remain stable, grow narrower, or grow wider over time (Brown et al., 2012; Kim & Miech, 2009; Shuey & Willson, 2008; Warner & Brown, 2011).

The *persistent inequality hypothesis* posits that social determinants and resources have relatively invariant socially-patterned impacts on health throughout the life span, leading to stable disparities over time (Ferraro & Farmer, 1996). The *aging-as-leveler hypothesis* postulates

that health disparities will decline as individuals age, possibly through the more even distribution of health-promoting resources (e.g., Medicare and social security), or the leveling effects of aging on biological vulnerability to disease (House et al., 1994; Kim & Miech, 2009). Conversely, the *cumulative disadvantage hypothesis* posits that disparities increase over time, indicating an accumulation of disparities in health promoting resources over the life span (Kim & Miech, 2009).

Some studies find a combined effect of gender and race such that being Black *and* female is associated with worse initial health than either alone (Warner and Brown, 2012; Brown et al., 2016). During early mid-life (mid-40's to early 60's), evidence suggests that some health outcomes (i.e., physical functioning and serious illness onset) follow a *cumulative disadvantage* trajectory, as health declines more rapidly for Black than for White participants. Then, during late mid-life (late 50's/early 60's and beyond), the magnitude of these disparities either remains constant (*persistent inequality*) or converges (*aging-as-leveler*) (Brown et al., 2012; Brown, Richardson, Hargrove, & Thomas, 2016; Kim & Miech, 2009; Warner & Brown, 2011).

Research on race and gender differences in mental health trajectories is limited. One study found that, following traumatic brain injury, elevated depression and anxiety symptoms among Black as compared with White participants followed a *persistent inequality* pattern over two years (Perrin et al., 2015). Cross-sectional research suggests that compared with White adults, Black adults have similar or lower rates of most mental disorders and greater levels of psychological flourishing (Gibbs et al., 2013; Hasin, Goodwin, Stinson, & Grant, 2005; Himle, Baser, Taylor, Campbell, & Jackson, 2009; Keyes, 2009; Williams et al., 2007), but greater chronicity and severity of mental illness (Himle et al., 2009; Williams et al., 2007).

Studies have seldom focused on race and gender differences in trajectories of health care utilization. Cross-sectional studies of older adults (over 65) suggest that Black adults utilize

health care resources more often, perhaps due to racial disparities in physical health (Artiga, Young, Garfield, & Majerol, 2015; Fields, Cubanski, Boccuti, & Neuman, 2016; Gale & Erickson, 1997; Holden & Xanthos, 2009; Lum, Chang, & Ozawa, 1999). The current study examines patterns of race/gender disparities in trajectories of physical health, mental health, and doctor visits. Specific hypotheses are detailed in Chapter 3.

Personality traits and health disparities

Personality traits are psychosocial constructs that represent a collection of relatively stable and global traits that influence thoughts, feelings and behaviors (Chapman et al., 2011). In personality and health research, personality traits are frequently defined in terms of the five-factor model (FFM). The FFM includes five major domains of personality (i.e., Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness (Costa Jr. & McCrae, 1992; Ferguson, 2013). Extraversion is the tendency to seek stimulation and engage socially; Agreeableness the tendency to be trusting and cooperative; Conscientiousness the tendency to be thoughtful and goal-directed; Neuroticism a tendency to experience negative emotions; and Openness the tendency to prefer a variety of experiences and ideas.

Personality traits predict a range of health outcomes, including subjective mental and physical health, illness onset, mortality, physical functioning, health care utilization, and health trajectories. In general, higher levels of neuroticism, and lower levels of conscientiousness, extraversion, openness and agreeableness are associated with poorer health outcomes (Ferguson, 2013; Hampson, 2012; Iacovino, Bogdan, & Oltmanns, 2016; Jackson, Weston & Schultz, 2017; Letzring, Edmonds, & Hampson, 2014; Turiano et al., 2012; Weston et al., 2015). The nature of personality-health associations may vary across different social contexts (Chapman, Fiscella, Kawachi, & Duberstein, 2010; Chapman et al., 2011; Elliot, Turiano, & Chapman, 2016; Jonassaint & Siegler, 2011). For example, black race may be conceptualized as a proxy for a

social context characterized by exclusion and marginalization. This social context (race) may accentuate or attenuate personality-health associations (moderation), or may be associated with higher or lower specific trait levels, leading to health disparities (mediation). To date, few studies have examined the extent to which personality moderates or mediates racial health disparities. This is a crucial step as personality and health researchers begin to consider the role of personality traits in personalizing medicine (Israel et al., 2014).

Personality as a moderator. The selective vulnerability hypothesis posits that social disadvantage has a more robust negative impact on health among individuals with personality traits that are associated with poorer health outcomes (Chapman et al., 2011). Stated differently, being from a disadvantaged racial group may accentuate the impact of "at-risk" personality traits, such as neuroticism, on health. Conversely, personality traits found to be associated with better health, such as conscientiousness, may have a less positive impact on health among those from disadvantaged racial groups, also contributing to health disparities.

Though there is limited research on the selective vulnerability hypothesis, some findings support it. An epidemiological study conducted with adults ages 25 to 64 at baseline found that negative affect, which the authors assessed as a symptom-based measure related to neuroticism (i.e., depression and anxiety symptoms), had a more robustly detrimental impact on subjective and objective measures of hypertension in Black as compared to White participants, both cross-sectionally and over a follow-up period lasting up to 22 years (Jonas & Lando, 2000). There is also some support for the selective vulnerability hypothesis for mental health; one study found that neuroticism had a more detrimental impact on mental health functioning in Black as compared with White older adults undergoing cancer treatment (Krok-Schoen & Baker, 2014).

Further research is needed to examine the selective vulnerability hypothesis. The current study examines this hypothesis in relation to longitudinal health disparities. We hypothesized

that personality traits associated with poorer health outcomes (i.e., high neuroticism, low conscientiousness, extraversion, agreeableness, and openness) would be more strongly associated with poorer health and greater health declines among Black as compared with White participants.

Personality as a mediator. Black Americans are consistently found to endorse lower levels of various types of trust (e.g., in the dominant culture, health care, physicians) compared with whites (Armstrong et al., 2013; Lee & Lin, 2011; Saha, Jacobs, Moore, & Beach, 2010; Whaley, 2001). Low trust, in turn, has been found to negatively impact health outcomes, including self-reported health problems, symptoms of depression and anxiety, changes in health-related quality of life, utilization of preventive care, emergency room visits, cancer detection, treatment adherence, and satisfaction with mental health services (Lee & Lin, 2011; Musa, Schulz, Harris, Silverman, & Thomas, 2009; Platonova, Kennedy, & Shewchuk, 2008; Saha et al., 2010; Schneider, Konijn, Righetti, & Rusbult, 2011; Verhaeghe & Bracke, 2011; Whaley, 2001; Whetten et al., 2006).

Few studies of race, trust, and health have conceptualized trust as an interpersonal style or personality trait. In the FFM of personality, trust is a facet of Agreeableness reflecting the tendency to view people as honest, trustworthy, and as having good intentions. It represents a general interpersonal style that pervades across life domains, including relationships, work, and other interpersonal interactions. In one study in which trust was conceptualized as an interpersonal style, community social trust was associated with higher self-rated health only when interpersonal trust was also high (Subramanian, Kim, & Kawachi, 2002). In another, lower trust in one's romantic partner predicted declines in self-rated health through increases in depression and anxiety (Schneider et al., 2011). These findings suggest that interpersonal trust plays an important role in how individuals view their health.

Interpersonal trust may reflect negative social experiences that damage physical and mental health, such as discrimination and trauma (Demaris & Yang, 1994; Iacovino, Jackson, & Oltmanns, 2014; Lewis, Cogburn, & Williams, 2015; Miller et al., 2011; Whaley, 1998). As a consequence of low interpersonal trust, individuals may in turn become less likely to trust the health care system and its providers (Armstrong et al., 2013; Lee & Lin, 2011; Saha et al., 2010). They may also benefit less from health-buffering factors such as social support (Lincoln, Chatters, & Taylor, 2003; Mortenson, 2009; Park et al., 2013). These precursors and consequences of low interpersonal trust may increase psychosocial and physiological stress, which in turn increase risk for disease while also reducing health-promoting behaviors, such as health care use (McEwen, 1998; Miller et al., 2011). Because trust is often found to be significantly lower among Black as compared with White adults, it may mediate racial health disparities, and serve as a mechanism by which environmental and social experiences shape racial disparities in health.

The psychosocial stress model of racial health disparities

The psychosocial stress model of racial health disparities has received considerable research attention. This model posits that blacks experience poorer health than whites because they are exposed to a disproportionate stress burden (Dressler et al., 2005). Indeed, many types of stress, ranging from racial discrimination to trauma to major life events, are more densely distributed among black Americans and those living in lower SES tracts (Hatch & Dohrenwend, 2007).

One way in which stress is hypothesized to impact physical health is through the process of *allostatic load*, whereby physiological responses to stress cause adaptations in biological systems that, over time, accumulate to increase risk for disease (McEwan, 1998; Sternthal, Slopen and Williams, 2011). Allostatic load is measured as the number of high-risk biomarkers

evidenced by an individual, such as metabolic (e.g., cholesterol), circulatory (e.g., blood pressure), and inflammatory (e.g., C-reactive protein) indicators. The higher the allostatic load, the more at risk an individual is for illness. In a national epidemiological sample of adults, blacks were found to endorse higher levels of allostatic load than whites (Geronimus et al., 2006). Racial differences persisted even after controlling for SES and were particularly pronounced among women and for individuals ages 55 to 64 (the age of participants included in current analyses).

Studies of the psychosocial stress model of racial health disparities have defined stress in a number of ways. Sociologists, in particular, have focused on the impact of stress related to racial discrimination (Krieger & Sidney, 1996; Williams & Mohammed, 2009). Results from these studies demonstrate that perceived discrimination is related to health outcomes such as blood pressure and low birth weight, though effects are sometimes moderated by other factors (e.g., gender, responses to discrimination) (Dressler et al., 2005). Studies that have conceptualized stress as negative affect (e.g., symptoms of depression and anxiety) or stress reactivity have generally found that stress is more detrimental to the health of blacks than whites, in terms of ambulatory blood pressure (Knox et al., 2002; Reimann et al., 2012), and risk for hypertension (Jonas & Lando, 2000). One drawback to the conceptualizations described above is that they rely heavily on subjective experience, which makes it difficult to distinguish the potentially unique and/or interactive effects of objectively stressful events and the psychopathological, physiological, and dispositional aspects of stress.

Measures of stressful life events address some of these drawbacks. Stressful life events refer to occurrences of discrete stressors (e.g., death of a loved one, financial crisis), and are thus distinct from (though overlapping with) the subjective experience of stress (Rosmalen et al., 2012). When stressful life event checklists are confirmed by an interview, a large number of

events can be assessed while reducing intracategory variability (i.e., responses to a given event category vary significantly among respondents, such as flu versus a broken arm versus a heart attack) and recall bias (e.g., responses influenced by experiences at the time of reporting) (Dorhenwend, 2006; Gleason et al., 2012). This method leads to a more accurate recording of the nature and frequency of objectively stressful events. Furthermore, stressful life events measured in this way can be more reliably distinguished from psychopathology and personality traits.

Stressful life events predict the onset of health problems, including chronic illnesses (e.g., stroke, cancer, diabetes, asthma) (Renzaho et al., 2013; Loerbroks et al., 2009); however, this topic is understudied. Stressful life events are more likely to impact blacks as compared with whites, regardless of socioeconomic status (Hatch and Dohrenwend, 2007; Turner & Avison, 2003), a discrepancy that likely contributes to health disparities. Conceptualizing stress in a more objective way enables a more precise examination of the intricate transactions between stress and personality to influence racial health disparities.

Personality, stress, and racial health disparities

Personality traits intervene at various stages in the stress process, and likely play important roles in the connections between stress and health. Personality may accentuate the impact of stress on behavioral proclivities and/or on hormonal dysfunction and inflammation, ultimately leading to chronic illness (Miller et al., 2011). The disproportionate stress burden experienced by black Americans sets them at elevated risk for poor health compared to their white counterparts, and the presence of elevated levels of certain personality traits may furthermore exacerbate the health-damaging impacts of stress. Clarifying how stress and personality interact to influence racial inequalities in health promises to enhance interventions that target the stress process.

The hypothesis that personality moderates the impact of stress on health is based on the

theory that personality traits influence physiological and psychological reactivity to stress, in turn impacting downstream consequences of stress, including coping, biological adaptations, and subsequent mental and physical illness (Bolger & Zuckerman, 1995). One focus of past research in this area is on hardiness (e.g., focus on change and growth, internal locus of control, interest and curiosity in the environment) (Kobasa, 1979). This research suggests that hardiness buffers the impact of stressful life events on negative health outcomes (Kobasa, 1979; Kobasa, Maddi, & Puccetti, 1982). Research examining FFM personality traits as moderators of the association between stress and health are limited. Findings from a study examining associations between FFM personality traits, stress and health behaviors suggested that higher extraversion and neuroticism are associated with poorer health behaviors under conditions of higher stress, and that conscientiousness buffers the impact of life stress on psychological distress (Korotkov, 2008). Studies suggest that Type D personality, which is associated with negative affect and social inhibition, increases reactivity to stress and is associated with negative health outcomes (Mols & Denollet, 2010).

The John Henryism (JH) hypothesis is a culturally-specific model of the associations among stress, health and dispositional factors. The JH hypothesis was developed to understand elevated rates of cardiovascular disease among African-Americans. JH is characterized by a behavioral tendency to engage in high-effort coping with difficult psychosocial stressors, such as racial discrimination and poverty (James, Hartnett, & Kalsbeek, 1983). A number of studies demonstrate that high levels of JH lead to increases in blood pressure when socioeconomic resources are limited and associated with high levels of perceived stress (Bennett et al., 2004; Subramanyam et al., 2013). Some evidence suggests that the JH hypothesis is specific to blacks as compared with whites (James et al., 1987; Merritt et al., 2011). Therefore, this disposition

may play a role in the higher prevalence of hypertension and cardiovascular diseases among blacks.

JH is associated with high levels of conscientiousness and extraversion (Stanton, Jonassaint, Williams, & James, 2010); thus, these traits may have a detrimental impact on the health of blacks in the presence of low SES and/or high levels of stress. Notably, these traits are found be to associated with better health outcomes in studies that do not consider racial differences (e.g., Turiano et al., 2012), suggesting that personality and race may interact to predict health outcomes. No studies have directly investigated the transactions among FFM personality traits and stressful life events to predict racial health disparities, particularly not as pertains to racial differences in health trajectories.

Important considerations

It is essential to take a developmental perspective when studying psychosocial determinants of racial health disparities. Investigating determinants of racial differences in changes in health during middle age is particularly important but understudied. Middle age is the time during which many chronic diseases (e.g., cardiovascular diseases, type 2 diabetes) most commonly develop. The "weathering" hypothesis posits that under high-risk circumstances, age is associated with greater exposure to health-damaging experiences (Geronimus, 1992; Geronimus et al., 2006). Thus, older adulthood is a prime developmental stage during which to examine predictors of declines in health, particularly as it pertains to racial disparities.

Research on race and gender differences in health suggest that an intersectional approach to studying health disparities, whereby the intersections of multiple social identities are considered, is warranted. Race and gender shape access to resources and life experiences, both independently and through mutually reinforcing one another, thus jointly impacting health (Warner & Brown, 2011). Women have a longer life expectancy than men, but experience higher

morbidity (Williams, 2008). Notably, gender differences in life expectancy are larger among blacks than they are among whites (Williams et al., 2010). Thus, considering both aspects of identity simultaneously is important to characterize accurately the nature of health disparities. The current study utilizes a comprehensive personality assessment that includes both self and informant reports. Informant reports of personality are being increasingly used in health psychology research because they independently predict a range of health outcomes, thus enhancing the robustness and meaningfulness of conclusions (Huprich, Bornstein, & Schmitt, 2011; Jackson, Connolly, Garrison, Leveille, & Connolly, 2015).

Finally, this dissertation introduces a novel framework for studying racial health disparities. Few studies have drawn on research from various disciplines to construct integrative models of black-white differences in health. The current approach bridges gaps between the individual differences perspective of health psychology and the population-based perspective of public health, sociology, and social epidemiology. This dissertation aims to instigate interdisciplinary research dedicated to eliminating health inequalities.

CHAPTER 3: RATIONALE AND SPECIFIC AIMS

Rationale

Psychosocial stress and personality are associated with racial health disparities, but longitudinal investigations that include comprehensive assessments of stressful life events, personality and overall health are lacking. Clarifying the complex interplay of these factors during middle age, when declines in health are most salient, will contribute in novel ways to health equity efforts. Furthermore, this dissertation will shed light on the intersections of race, gender and socioeconomic disparities in health.

Personality traits are compelling intervention targets because meaningful changes in research suggests that personality can be produced over relatively short periods of time with treatment (Israel et al., 2014; J. J. Jackson, Hill, Payne, Roberts, & Stine-Morrow, 2012). Personality change may lead to fewer occurrences of certain stressful life events, and may impact downstream predictors of health such as health behaviors and stress coping strategies. Importantly, personality changes may lead to more long-lasting improvements in health than interventions directly targeting behaviors with high relapse rates, such as abstinence from alcohol and tobacco, or the actual occurrence of stressors.

If the proposed hypotheses are confirmed, findings will show that personality is an important determinant of racial health disparities. Results will encourage researchers from a range of disciplines to examine the contribution of personality to health disparities in other populations and across the lifespan, as well as additional mechanisms by which personality exerts its effects. In sum, studying personality-related barriers to health will lead to the development of more effective health interventions aimed at eliminating racial health disparities.

Specific Aims

The aims of this dissertation are to establish a relationship between personality and racial differences in health trajectories, as well as to examine the moderating effects of personality on the relationship between stressful life events and racial differences in health trajectories. Analyses will utilize data from a longitudinal study that includes a racially representative sample (33% black, 65% white) of 1,577 adults ages 55 to 64 from St. Louis, Missouri. We will employ latent growth curve modeling to examine whether personality traits measured at baseline are associated with black-white differences in baseline health and developmental health trajectories, with health measured every 6 months over 2.5 years.

Specific aim 1. The first aim of this dissertation is to examine racial differences in health trajectories. I hypothesize that black participants will report poorer physical health than white participants, and that this racial disparity will persist over time, supporting the *persistent inequality hypothesis*. I predict that black women will follow a different trajectory than black men in comparison with white participants, whereby black women will report the poorest health of all race/gender groups at baseline, which will then converge towards the other groups over time, following the *aging-as-leveler* hypothesis.

Research has not examined racial disparities in mental health or health care utilization trajectories, and thus it is difficult to make predictions concerning these outcomes. However, based on cross-sectional research on racial differences in the prevalence of mental disorders (Gibbs et al., 2013; Hasin, Goodwin, Stinson, & Grant, 2005; Himle, Baser, Taylor, Campbell, & Jackson, 2009; Keyes, 2009; Williams et al., 2007), black participants may report similar levels of mental health to white participants at baseline, a pattern that remains stable over time. Alternatively, a *persistent inequality* pattern may emerge for mental health if racial disparities match up with cross-sectional research on racial disparities in psychological distress (Himle et al., 2009; Williams et al., 2007). Cross-sectional research of racial differences in health care

utilization suggests that black participants may show higher levels of doctor visits at baseline, which then may follow a *persistent inequality* pattern.

Specific aim 2. The second aim of this dissertation examines whether personality traits are associated with racial differences in health trajectories, controlling for SES and other risk factors for health problems. I offer two hypotheses. First, I hypothesize that I will find support for the selective vulnerability hypothesis, whereby personality traits associated with poorer health (i.e., higher neuroticism, and lower conscientiousness, extraversion, openness and agreeableness) will moderate the impact of race on health, such that among black participants, these personality traits will have a stronger impact on health. Second, I hypothesize that trust mediates racial disparities in health, whereby black participants will experience poorer health and greater declines in health than white participants indirectly through lower levels of trust.

Specific aim 3. The third aim of this dissertation examines whether personality traits influence the impact of stressful life events on health trajectories differentially for black and white participants. For this aim, I offer two hypotheses based on the John Henryism hypothesis. First, I predict that elevated conscientiousness and extraversion will exacerbate the impact of stress on health trajectories for black participants, whereas they will buffer the impact of stress on health for white participants. Second, I hypothesize that elevated neuroticism and impulsivity will exacerbate the impact of stress on health trajectories more robustly for black than white participants.

CHAPTER 4: METHODS

Overview

The specific aims described above will be tested in a sample of middle-aged adults recruited from the St. Louis, Missouri community as part of a larger study conducted by Dr. Thomas Oltmanns (St. Louis Personality and Aging Network; SPAN) (Oltmanns, Rodrigues, Weinstein, & Gleason, 2013). Procedures used to recruit and assess participants, as well as the measures and analyses relevant to the current study will be described below.

Participants

Black (n=517) and white (n=1060) participants taking part in the ongoing longitudinal St. Louis Personality and Aging Network (SPAN) study were included in the current analyses (Oltmanns, Rodrigues, Weinstein, & Gleason, 2014). Black and white participants comprised 97.4% of the sample (n=1,588; 33% black; 65% white), which is representative of the greater St. Louis area. Exclusion criteria included lacking a permanent residence, a lower than 6th grade reading level, and active psychotic symptoms at the time of the wave 1 assessment. The attrition rate for black (8.4%) and white (6.6%) participants over the first six waves of the study did not differ significantly (χ^2=1.76; p=.19). Demographic characteristics and descriptive statistics for all variables by race and gender are shown in Table 1.

Twenty-nine percent of participants reported having a high school diploma or equivalent and 68% reported post-secondary education. The median income of the sample was $40,000 – $60,000 per year, which is comparable to that of St. Louis residents. A significant number of participants reported physical health problems. At baseline, 12% reported having ever been under a doctor's care for heart disease, 13% for cancer, 25% for arthritis and 16.5% for diabetes. Seventy-one percent of participants reported experiencing at least one serious illness sometime in their life, 51% reported a current serious illness, and 31% reported a current disability. Over the

course of 2.5 years, 43.5% of participants reported the onset of a new serious illness, and 88% experienced at least one stressful life event.

Procedure

Participants were recruited using listed phone numbers that were crossed with current census data in order to identify households with at least one member in the eligible age range. The Kish method (Kish, 1965) was used to identify a target participant in each household if more than one person was in that age range. If the target refused to participate, we did not include other eligible residents.

Initially, 31% of black participants were males, compared with 46% of white participants. Measures were taken to ensure that black males were adequately represented. We sent slightly modified letters to homes in predominantly black zip codes, and for which a phone number was listed under a male's name (see Spence & Oltmanns, 2011). At the end of baseline recruitment, males comprised 43% of the black sample.

Data from the first six waves of data collection are included in current analyses. Each participant completed two 3-hour in person assessments, one at baseline (wave 1) and one approximately 2.5 years later (wave 6), as well as a shorter sequence of mailed self-report questionnaires every 6 months (waves 2 – 5) in between the two major assessments. Written informed consent was obtained from participants prior to the wave 1 assessment. Each participant received $60 compensation to complete each 3-hour assessment and $20 to complete each follow-up assessment packet. All procedures were approved by the Institutional Review Board.

Participation at each wave was as follows: wave 2 n=1,434; wave 3 n=1,380; wave 4 n=1,329; wave 5 n=1,250; wave 6 n=1,260. Approximately 20% of participants (n=263) experienced a delay in completion of the wave 6 assessment because of a temporary lapse in

funding for the project. This subset completed wave 6 more than 2.5 years after wave 1 (range: 3.5 - 6.7 years). In order to control for the effects of the timing of wave 6 completion, a variable representing the time at which participants completed this wave (i.e., ≤2.5 years or >2.5 years) was included as a predictor in all models that included wave 6 data.

The majority of participants (88%) chose at least one person who knew them best to provide data about the participant's personality. Ninety-six percent of White participants and 95% of Black participants matched their informant in race. Participants had known their informants for an average of 30 years. The majority of White participants' informants were significant others (55.1%), and the majority of Black participants' informants were family members (42.5%). Black and White participants knew their informants equally well. Informants were compensated $30 for the wave 1 assessment and $10 for subsequent assessments.

Measures

Personality. Personality was measured at wave 1 using the NEO Personality Inventory-Revised (NEO PI-R) (Costa Jr. & McCrae, 1992). The NEO-PI-R is a widely used 240-item assessment of five personality domains (i.e., Extraversion, Agreeableness Conscientiousness, Neuroticism and Openness), as well as six facets that define each domain. NEO-PI-R items are rated on a 5-point scale, with responses ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Adequate reliability and validity have been shown for both clinical and community samples, including for older Black American adults (Savla, Davey, Costa, & Whitfield, 2007). Participants and informants completed the NEO-PI-R about participants. The five personality domains, impulsivity and the facet of trust (from Agreeableness) were calculated as an average of the participant and informant scales. Impulsivity was composed of four facets: impulsiveness (from neuroticism), excitement-seeking (from extraversion), deliberation, and self-discipline

(both from conscientiousness) (Whiteside and Lynam, 2001; Iacovino, Powers, & Oltmanns, 2014).

Self-reported health. *The RAND Short Form 36 Health Status Inventory (HSI)* (Hays & Morales, 2001) is a self-report questionnaire that was used to measure health-related quality of life within physical and emotional health spheres. Extensive data are available regarding the reliability and validity of these scales (Moorer, Suurmeijer, Foets, & Molenaar, 2001).

The physical health scales assess four aspects of health over the previous 4 weeks. *Physical Functioning* items ask participants to rate how much their health has limited their functioning in daily activities (e.g., lifting or carrying objects; walking). *Role Limitations Due to Physical Health Problems* items measure whether or not physical problems have limited work or other activities. *General Health Perceptions* items include questions about self-rated health (ranging from "poor" to "excellent") and general health (e.g., I seem to get sick easier than other people). *Pain* items ask participants to rate the amount of bodily pain experienced, as well as how much this pain interfered with work and activities.

The mental health scales also span 4 weeks. *Role limitations due to emotional problems* assess the extent to which emotional problems have limited work or other activities. *Social functioning* assesses the extent to which emotional problems interfered with social activities. *Emotional well-being* assesses emotional state (e.g., feeling downhearted and blue; feeling nervous). *Energy/fatigue* assesses the extent to which participants felt energetic and tired. Self-reported physical health and self-reported mental health were each calculated as an average of the items used to create their subscales.

Doctor visits. Data on doctor visits were collected via a demographics questionnaire developed by the SPAN study team. These questions were asked at each follow up, starting at wave 2. Participants were asked to indicate how often they had visited a physician's office or

clinic in the previous 6 months. Responses were rated on a 4-point scale (0 = never, 1 = 1-2 times, 2 = 3-5 times, 3 = 6 or more times).

Stressful life events. Stressful life events were measured with the List of Threatening Experiences Questionnaire (LTE-Q) (Brugha, Bebbington, Tennant, & Hurry, 1985). The LTE-Q is composed of a list of 12 life events found to have a long-term negative impact on individuals who experience them, such as a financial crisis, legal problem, relationship conflict, and death of a loved one. The LTE-Q was shown to be a reliable and valid measure of stressful life events in a population sample of adults (Rosmalen et al., 2012).

At each wave, participants were asked to indicate whether they had experienced any of the events within the previous 6 months. If a participant endorsed at least one event, a trained interviewer called them within one year and asked for a brief description of the event to determine whether it actually occurred within the specified time frame and was independent from the other events endorsed. Events were coded as a stressful life event if they were re-classified as either a Major Event (acute, distinct from any other event, and causes distress) or a Main Event (primary event that caused other reported events and causes distress) (see Gleason et al., 2012).

In analyses, stressful life events were collapsed across follow ups and coded as a categorical variable with three levels: no SLE (n=481), 1-2 SLE (n=601), and >2 SLE (n=547). Two dummy variables were created with no SLE as the reference. SLE were collapsed across follow ups rather than included as a time-varying covariate given the study design of predicting trajectories over a relatively short time period. The variable used in analyses has skew of -.07 and kurtosis of -1.4.

Total diagnosed illnesses. *The Computerized version of the Diagnostic Interview Schedule (C-DIS)* (Robins & Helzer, 1994) was used to collect information on physical illness at

wave 1. The physical health portion of the assessment includes participant reports of being under a doctor's care for any long-lasting physical illness (e.g., diabetes). These data were used to calculate the total number of chronic illnesses for which participants were under a doctor's care at wave 1. This variable was included as a covariate in health care utilization models.

Health insurance and other demographics. At wave 6, the demographics questionnaire also asked participants to indicate whether they had health insurance and whether and at what age they had ever experienced a lapse in their insurance coverage. Participants who responded "yes" to insurance coverage and "yes" to a lapse that occurred within the timeframe of the study were re-coded as missing data, since we did not have enough information to determine how long the lapse lasted and whether they had insurance coverage at wave 1. The demographics questionnaire also measured self-reported race, annual household income, and education.

Statistical Analyses

Full information maximum likelihood estimation was used for all analyses, which enables the inclusion all available data, even from participants who did not complete every follow-up. All significant results are at the $p<.05$ level.

Latent growth curve modeling (LGCM). LGCM for longitudinal data was conducted using *lavaan* in R (Rosseel, 2012). LGCM takes full advantage of repeated measures to model individual differences in change over time. In LGCM, two parameters, the intercept (initial status) and slope (rate of change/trajectory) for each person, are treated as latent variables. Predictors of each parameter can be identified, and the putative processes (i.e., mediation or moderation) by which each predictor exerts its effects may be tested (Jackson & Allemand, 2014).

Wave 1 self-reported physical health and mental health as measured by the RAND-36, and wave 2 health care utilization (the first point at which each measure was collected) were

used to define the latent intercept for each of these models. Wave 1 through 6 physical health and mental health, and waves 2 through 6 health care utilization scores with equally spaced intervals were used to define the latent linear slope. Using multigroup LGCM, we examined mean intercepts and slopes of White men (n=482), White women (n=578), Black men (n=226), and Black women (n=291).

For specific aim 1, we compared nested models to examine whether the health intercepts and slopes differed among race/gender groups. For specific aim 2, we compared nested models to examine whether the magnitude of the associations among the personality traits and each health outcome differed among race/gender groups. For specific aim 3, we conducted similar analyses as for aim 2, with the addition of SLE and SLE by personality interactions as predictors of health trajectories. For aims 2 and 3, the more unconstrained model was accepted when a likelihood ratio test comparing the models was found to be significant at $p<.05$.

Participant age, education and household income at wave 1, as well as a variable representing the time at which participants completed wave 6 were included as predictors of the intercept and slope in all models. In health care utilization models, we also included variables indicating whether participants had health insurance, and the total number of physical illnesses that participants reported being diagnosed with at wave 1 (measured by the C-DIS). All continuous covariates were mean-centered and categorical covariates were dummy coded. Zero-order correlations among variables are shown in Table 2.

Indirect effects models. To examine whether race exerts an indirect effect on health through trust, I fit a path analysis model including the direct effect of race on the outcome and the indirect effect of race on the outcome through trust. The indirect effect was modeled as the product of the coefficients for the path from the predictor to the mediator (i.e., from race to trust) and from the mediator to the outcome (i.e., from trust to outcome). The total effect was modeled

as the sum of the direct and indirect effects. We used the *sem()* function from *lavaan* with bootstrapped standard errors to conduct mediation analyses. Standardized regression coefficients and 95% confidence intervals (CI) for indirect effects are reported.

CHAPTER 5: RESULTS

Demographics and Descriptive statistics

Demographics and descriptive statistics for wave 1 variables (wave 2 for health care utilization) are reported in Table 1. There were no significant differences among race/gender groups in age (χ^2[30]=26.56, p=.65). Black participants had significantly lower self-reported physical health, openness and trust, and more total diagnosed illnesses. White women had significantly higher rates of insurance coverage than Black participants, and White men had significantly higher rates than Black men. Other race/gender group differences in personality and health variables are noted in Table 1. Zero-order correlations among wave 1 variables are shown in Table 2.

Aim 1: Do race and gender groups differ in initial levels of health and health trajectories?

The unconstrained models for physical health (χ^2[128]=656.37; CFI=.94; RMSEA=.10), mental health (χ^2[128]=345.61; CFI=.97; RMSEA=.07), and health care utilization (χ^2[112]=140.37; CFI=.98; RMSEA=.03) all demonstrated adequate fit. Estimates for predictors included in these models are shown in Table 3.

White men had the highest mean intercept for self-reported physical health and mental health, followed by White women, Black men, and Black women. Mean slopes for physical health and mental health were not significantly different from zero for Black men, Black women and White women, whereas the mean slopes were significantly negative for White men. For doctor visits, Black men had the highest mean intercept, followed by White men, Black women, and White women. All groups had stable mean slopes. Descriptive statistics for the latent intercepts and slopes are included in Table 4.

For self-reported physical health, a likelihood ratio test suggested that, compared with the unconstrained model, the best fit to the data was one in which the intercept was set equal

between Black men and women and between White men and women, and the slope was set equal between Black and White men and between Black and White women ($\chi^2[4]=1.91$; p=.75). These analyses suggest that Black participants had significantly lower initial levels of self-reported physical health, compared with White participants. The magnitude of physical health change differed significantly between men and women, such that women's health remained stable while men's health declined. Physical health trajectories are depicted in Figure 1.

For self-reported mental health, compared to the unconstrained model, a model in which the intercepts and slopes were constrained equal across all groups was the best fit to the data ($\chi^2[6]=6.35$, p=.38). These analyses suggest that initial levels and trajectories of self-reported mental health did not differ significantly among race/gender groups.

For doctor visits, a constrained model in which the intercept was constrained equal within gender groups and the slope was set equal across all groups was the best fit to the data compared with the unconstrained model ($\chi^2[5]=1.62$, p=.90). The partially constrained model was also a better fit compared to a fully constrained model in which the intercept and slope were set equal across all groups ($\chi^2[1]=4.09$, p=.04). These analyses suggest that men had significantly higher initial levels of doctor visits than women, and the trajectories of doctor visits were similar across groups (Figure 2).

Aim 2: Do personality traits contribute to racial health disparities?

Hypothesis 1: Personality traits moderate race-health associations. We examined the associations between personality traits with intercept and slope parameters for each health outcome. The effects of each personality trait on health across race/gender was examined in separate models. The same covariates were included in these models as in the previous models. A likelihood ratio test compared the unconstrained model to a model in which regression coefficients were constrained equal across race/gender groups. In the case that the unconstrained

model was found to be a better fit for the data (i.e., $p<.05$ for likelihood ratio test), specific constraints were set across race/gender groups based on hypotheses and the pattern of differences in regression coefficients from the corresponding unconstrained model, and a likelihood ratio test determined the best fitting model.

Physical Health. The unconstrained models for neuroticism ($\chi^2[144]=190.16$), extraversion ($\chi^2[144]=187.55$), conscientiousness ($\chi^2[144]=190.32$), agreeableness ($\chi^2[144]=188.19$), and openness ($\chi^2[144]=193.35$) demonstrated good fit (CFI=.99; RMSEA=.03). Regression estimates for physical health models are illustrated in Table 5.

Neuroticism was significantly negatively associated with the latent intercept of physical health for all race/gender groups, and was positively associated with the latent slope of physical health for white women. The best fit to the data was a model in which all regression coefficients were constrained equal across race/gender groups ($\chi^2[30]=39.31$, $p=.12$). Conscientiousness was significantly positively associated with the latent intercept for all groups, and the constrained model was the best fit for the data ($\chi^2[30]=36.67$, $p=.19$). Extraversion was significantly positively associated with the latent intercept for white men and women, and negatively associated with the slope for white women. The constrained model was the best fit for the data ($\chi^2[30]=41.99$, $p=.07$). Openness was not significantly associated with the latent intercepts or slopes, and the fully constrained model was the best fit for the data ($\chi^2[30]=41.39$, $p=.08$). Agreeableness was significantly positively associated with the latent intercepts for black men and white women. A likelihood ratio test indicated that compared to the constrained model, a better fit for the data was a model in which the equality constraints were removed for the regression coefficient of the intercept on agreeableness, and in addition were set equal between black men and white women, and equal between white men and black women ($\chi^2[1]=8.27$, $p=.004$).

Overall, these results suggest that the positive association between agreeableness and the intercept of physical health was significant and of similar magnitude for black men and white women, whereas this association was not significant for black women and white men. There were no significant group differences in the magnitude of the associations among neuroticism, extraversion, conscientiousness or openness with the intercept or slope of physical health.

Mental Health. The unconstrained models for neuroticism (χ^2[144]=347.19), extraversion (χ^2[144]=362.36), conscientiousness (χ^2[144]=341.67), agreeableness (χ^2[144]=347.95), and openness (χ^2[144]=342.87) demonstrated adequate fit (CFI=.97; RMSEA=.06). Regression estimates for mental health models are illustrated in Table 6.

Neuroticism was significantly negatively associated, and conscientiousness and extraversion positively associated, with the latent intercept of mental health for all race/gender groups. For these personality traits, likelihood ratio tests suggested that the models with regression coefficients constrained equal across groups fit the data best (neuroticism: χ^2[30]=27.94, p=.57; conscientiousness: χ^2[30]=32.46, p=.34; extraversion: χ^2[30]=30.61, p=.43). Openness was not significantly associated with the latent intercept or slope, and the constrained model was the best fit for the data (χ^2[30]=33.07, p=.32). Agreeableness was significantly positively associated with the latent intercept for black men, white women and white men. The constrained model was the best fit for the data (χ^2[30]=30.98, p=.42). Overall, results suggest that there were no significant group differences in the magnitude of the associations among any of the five personality domains with the intercepts or slopes of mental health.

Doctor visits. The unconstrained models for neuroticism (χ^2[124]=162.85), extraversion (χ^2[124]=159.64), conscientiousness (χ^2[124]=168.67), agreeableness (χ^2[]=), and openness

(χ^2[124]=155.88) demonstrated adequate fit (CFI=.98; RMSEA=.03). Regression estimates for physical health models are illustrated in Table 7.

Neuroticism was significantly positively associated with the intercept for white women, white men and black women. Compared to the unconstrained model, a model in which all regression coefficients were set equal across groups was the best fit to the data (χ^2[42]=42.26, p=.48). Extraversion, conscientiousness and openness were not significantly associated with the intercept or slope of doctor visits for any group, and the constrained models were the best fits for the data (extraversion: χ^2[42]=39.03, p=.60; conscientiousness: χ^2[42]=39.44, p=.58; openness: χ^2[42]=40.25, p=.55). Agreeableness was significantly negatively associated with the slope for white men. The constrained model was the best fit for the data (χ^2[42]=40.06, p=.55).

Hypothesis 2: Trust mediates race-health associations. Next, we utilized a mediation analysis to examine the indirect effect of race on wave 6 self-reported physical health, mental health and doctor visits through trust. Age, gender, education, and household income were included as covariates for all models. Total illnesses at wave 1 was included as a covariate for the self-reported physical health and doctor visit models, and health insurance was also included in doctor visit models.

Each model explained a significant amount of variance in physical health (R^2=.31 F=117.56, p<.01), mental health (R^2=.11, F=38.83, p<.01), and doctor visits (R^2=.08, F=19.49, p<.01). Black participants reported significantly lower levels of trust than White participants, and lower levels of trust significantly predicted lower self-reported physical health and mental health. There were significant indirect effects of race on wave 6 physical health (-.03, 95% CI: -.04 to -.01; p<.001) and mental health (-.05, 95% CI: -.07 to -.04; p<.001) through trust. Thus, Black participants had lower self-reported physical health and mental health compared with White participants indirectly through lower trust (Figure 3).

The total effect of race on self-reported physical health was significant, whereas the direct effect was marginally significant. On the other hand, there was a significant direct effect of race on mental health, suggesting that when covariates and trust are accounted for, Black participants have higher levels of self-reported mental health. For doctor visits, there was not a significant total effect (.01; p=.64) or direct effect (.01; p=.87) of race on doctor visits, nor did trust significantly predict wave 6 doctor visits (-.04; p=.17). When wave 1 physical health or mental health was controlled in relevant models, the indirect effect remained significant (physical: -.01, p=.02; mental: -.01, p=.04) and a greater amount of variance was accounted for in the outcome (physical: R^2=.58, p<.01; mental: R^2=.44, p<.01). This suggests that trust also mediated black-white differences in changes in physical and mental health over time.

Aim 3: Do personality traits influence the impact of stressful life events on race/gender associations with health?

Hypothesis 1: Conscientiousness, extraversion, neuroticism and impulsivity moderate the impact of SLE on race-health associations. Separate multigroup (black, white) latent growth curve models for self-reported physical health or mental health were built for each personality trait (i.e., conscientiousness, extraversion, neuroticism, impulsivity). Wave 1 age, education, annual household income, and personality trait score were entered as predictors of the intercept and slope. Tobacco use, exercise (both measured at wave 2), average SLE, and the SLE by personality interaction term were also entered as predictors of the slope. Health behaviors were included as covariates due to their known association with stress and health outcomes (Jackson, Knight, & Rafferty, 2010; Korotkov, 2008). Continuous covariates were centered and categorical covariates were dummy coded. SLE was broken into three variables: No SLE, 1-2 SLE, and >2 SLE. Two dummy variables were then created with “no SLE” as the reference.

Conscientiousness. The unconstrained models for physical health (χ^2 [240] = 316.247; CFI=.99; RMSEA=.03) and mental health (χ^2 [240] = 446.59; CFI=.97; RMSEA=.05) demonstrated good fit. There were no significant interactions between SLE and conscientiousness for the slope of physical heath or mental health for any race/gender groups. Both SLE dummy variables were significantly associated with the slope of physical health for white women, so a model excluding personality variables was examined to determine if the strength of the association between SLE and physical health differed significantly among race/gender groups. A likelihood ratio test comparing the unconstrained model to one in which the regression coefficients of the slope on each SLE dummy variable were constrained equal across groups indicated that neither SLE-health association differed significantly among groups (χ^2[4] = 4.81; p=.31). There were no significant main effects of SLE on mental health slopes.

Extraversion. The unconstrained models for physical health (χ^2 [240] = 282.87; CFI=.99; RMSEA=.02) and mental health (χ^2 [240] = 465.43; CFI=.97; RMSEA=.05) demonstrated good fit. There were no significant interactions between SLE and extraversion for the slope of physical heath or mental health for any race/gender groups.

Neuroticism. The unconstrained models for physical health (χ^2 [240] = 308.65; CFI=.97; RMSEA=.05) and mental health (χ^2 [240] = 472.63; CFI=.97; RMSEA=.05) demonstrated good fit. There were no significant interactions between SLE and neuroticism for the slope of physical heath or mental health for any race/gender groups.

Impulsivity. The unconstrained models for physical health (χ^2 [240] = 324.53; CFI=.97; RMSEA=.05) and mental health (χ^2 [240] = 470.12; CFI=.97; RMSEA=.05) demonstrated good fit. There were no significant interactions between SLE and impulsivity for the slope of physical heath or mental health for any race/gender groups.

CHAPTER 6: DISCUSSION

The current study examined race and gender disparities in self-reported physical and mental health, and health care utilization (doctor visits) in a sample of late mid-life Black and White adults. Several findings are notable. Black participants reported lower initial self-reported physical health than White participants; over time, women's physical health was stable while men's declined. Men reported greater health care use than women, and this gender difference remained stable over time. There were no racial or gender disparities in self-reported mental health. Personality associations with health were of similar magnitude across race and gender, with the exception of the association between agreeableness and initial levels of physical health, which were positively associated only for black men and white women. Finally, lower baseline levels of trust among Black participants mediated racial disparities in physical and mental health 2.5 years later.

Do race and gender groups differ in initial levels of health and health trajectories?

As in previous research, our analyses found support for the *persistent inequality hypothesis* between racial groups within the same gender (Brown et al., 2012, 2016; Kim & Miech, 2009; Warner & Brown, 2011). That is, Black men had lower initial self-reported physical health than White men, and the magnitude of this disparity remained stable over time. A similar pattern was seen for Black and White women. Also in line with past work, we found support for the *aging-as-leveler hypothesis* between Black women and White men, whereby Black women started out reporting worse physical health than White men, then their trajectories began to converge as White men reported worsening health and Black women reported stable health.

In contrast to past research, we also found support for the *cumulative disadvantage hypothesis* during mid-life, which previously had been found for physical functioning during

early middle-age (45-60 years) and for serious illness trajectories during later mid-life (Brown et al., 2012). This hypothesis was supported by disparities between gender groups (within racial groups) such that Black men and women reported similar levels of physical health initially, then their trajectories diverged as self-reported physical health declined for Black men. A similar pattern was found for White men and women. This pattern was also supported between Black men and White women, with Black men reporting worse health than White women initially, followed by diverging trajectories as Black men reported worsening health. Our findings may differ from previous studies because we compared various models to both fully unconstrained and fully constrained models to identify the most parsimonious and best fitting model to the data. In doing so, we were able to examine within-race gender differences in health trajectories. This approach may have revealed findings that were missed by previous analytic approaches.

White people and men likely have the greatest access to health-promoting resources (e.g., income, education, quality health care) throughout the lifespan (Kail & Taylor, 2014; Shuey & Willson, 2008). Conversely, more marginalized demographic groups, such as Black people and women, may experience health problems earlier in life due to "weathering," an accelerated aging process brought on by experiencing a disproportionate stress burden (Geronimus et al., 2006). Earlier onset of health problems may lead some individuals to increased medical monitoring and/or improved health behavior and stabilization of health during late mid-life. This may be especially true for Black women, who may be particularly inclined to care for their health due to greater caregiving responsibilities. Particularly in areas like St. Louis with a striking criminalization of Black men, as well as high residential segregation, unemployment, and community violence, Black men may experience a higher stress burden than even Black women – despite Black women's doubly-marginalized identities – which may, in turn, exacerbate declines in their health over time.

Mental health trajectories support a *persistent equality* pattern, whereby there are no significant racial differences initially, which then persists over time. These findings are in line with past research showing that compared with White adults, Black adults report similar prevalence of most major mental disorders, and that racial differences in psychological distress are eliminated when accounting for income and education (Hasin et al., 2005; Himle et al., 2009; Keyes, 2009; Lincoln et al., 2010; Tran et al., 2015; Williams et al., 2007, 1997). Future studies may find racial disparities in other types of mental health trajectories, for example, mental illness severity or chronicity, which have been found to be exacerbated among Black as compared with White adults (Himle et al., 2009; Williams et al., 2007). Nonetheless, our findings suggest that patterns should be considered in which racial groups have similar levels of health at baseline, which then remain similar (*persistent equality*) or diverge over time, particularly when studying mental health. Past studies have not considered this type of trajectory pattern, most likely because of their focus on physical health outcomes, which by and large are characterized by racial disparities.

In terms of health care utilization, measured by the number of doctor or clinic visits over 6 month intervals, men reported higher levels of initial health care use than women, and the magnitude of changes in health care utilization were similar across groups. This pattern supports the *persistent inequality hypothesis* between men and women, whereby gender disparities in health care utilization remained stable over time. Notably, despite less health care utilization than men, women reported stable physical health. It is possible that women are engaging in more healthy behaviors and/or adhering to treatment regimens for physical illnesses, leading to better health and less need for health care visits over the course of 2.5 years.

Overall, current results suggest that it is crucial to investigate disparities in health trajectories from an intersectional perspective that considers the contribution of our multiple

identities to health and well-being. Not only are there important racial disparities in health, but there are also gender disparities both within and between racial groups that must be understood and addressed. Future research may seek to better elucidate the factors that contribute to within-race gender differences in health and health care use. Furthermore, our understanding of health disparities would be aided by investigating the connections among health and health care use trajectories.

Do personality traits moderate the impact of race on health?

Contrary to the selective vulnerability hypothesis, which posits that specific personality traits more robustly impact the health of individuals from disadvantaged groups, the relationship of lower initial levels of self-reported physical health with higher neuroticism, and lower conscientiousness and extraversion was of similar magnitude across all race/gender groups. A negative association between neuroticism and physical health is one of the most robust findings in personality and health research (Ferguson, 2013; Hampson, 2012). Individuals with higher levels of neuroticism are at higher risk for experiencing stressful life events (Iacovino et al., 2016; Kendler, Gardner, & Prescott, 2003), may be more likely to use unhealthy coping mechanisms (e.g., tobacco and alcohol) (Korotkov, 2008), and/or may have less access to social support (Michal, Wiltink, Grande, Beutel, & Brähler, 2011). Each of these factors may be pathways by which neuroticism influences physical or mental health (Cummings, Neff, & Husaini, 2003; Iacovino et al., 2016; Keyes, Barnes, & Bates, 2011; Miller et al., 2011; Takahashi, Edmonds, Jackson, & Roberts, 2013; Taylor, Repetti, & Seeman, 1997).

Conscientiousness is defined by impulse control, and being task- and goal-oriented (Costa & McCrae, 1992; Hampson, 2012). It appears to impact health primarily through its association with health behaviors and education (Hampson, Goldberg, Vogt, & Dubanoski, 2007; Korotkov, 2008; Lodi-Smith et al., 2010). Individuals with higher levels of conscientiousness

may take better care of their health by avoiding health-damaging behaviors and effectively managing medical needs. Education may impact health through its influence on occupational outcomes and socioeconomic resources (Hampson, 2012). Future research would benefit from examining whether these two mechanisms of action operate similarly across race and gender. Past work has shown that education does not have as beneficial an effect on the health of Black as compared with White Americans (Farmer & Ferraro, 2005); future work may elucidate whether this pattern is seen in terms of the indirect effect of conscientiousness on health through education. Extraversion may impact health through its influence on effective stress coping (i.e., problem-solving vs. avoidant coping), greater social contact and social support, and higher overall well-being (Hampson, 2012). Extraversion and its sequelae may buffer the negative impacts of stress on health, leading to better health outcomes.

Agreeableness was positively associated with physical health only for black men and white women. Agreeableness represents individual differences in interpersonal connectedness, warmth, trust, and low hostility (Costa & McCrae, 1992; Hampson, 2012). Agreeableness has been associated with self-rated health and health-related factors (e.g., obesity) in cross-sectional and longitudinal studies (Letzring et al., 2014; Sutin, Ferrucci, Zonderman, & Terracciano, 2011). Current findings suggest that interpersonal connection may be particularly beneficial for the physical health of black men and white women. Since this is the first study to find race/gender differences, more research is needed to buttress and expand current findings of race and gender effects on the association between agreeableness and physical health. Future work may examine specific mechanisms of this association, as well as race/gender differences in personality associations with other health outcomes (e.g., mortality, illness onset).

Personality-health associations were found primarily for the health intercepts rather than slopes, suggesting that these associations are cross-sectional in nature. This opens the

possibilities that health impacts personality, that the relationship is transactional, and/or that there is some third variable that accounts for both. Current findings controlled for various major factors associated with health, such as SES and age, but other factors such as childhood adversity may impact both personality and health, leading to current findings. Further research is needed to examine these possibilities and to clarify the nature of associations among race, gender, personality and health.

Current results support the theory that personality traits are psychosocial resources that impact health similarly across race and gender. Past studies have rarely examined the intersection of race and gender as moderators of personality-health effects. As researchers begin to investigate the possibility of modifying personality traits in order to personalize medicine and influence health outcomes (Israel et al., 2014; J. J. Jackson et al., 2012), it is crucial to establish that personality-health effects operate similarly across race and gender. In addition, future research may better elucidate whether the mechanisms by which personality impacts health differ across demographic groups.

Does trust mediate the association between race and health?

Our findings suggest that trust, as conceptualized by the FFM, partly accounted for lower levels of self-reported physical and mental health among Black participants. These results are consistent with previous research showing that Black people report lower levels of trust, and that lower trust is associated with poorer health outcomes (Armstrong et al., 2013; Halbert, Armstrong, Gandy, & Shaker, 2006; Saha et al., 2010; Lee & Lin, 2011; Musa et al., 2009; Platonova, Kennedy, & Shewchuk, 2008; Saha et al., 2010; Verhaeghe & Bracke, 2011; Whaley, 2001; Whetten et al., 2006). These past studies have not, however, tested a mediational model of the associations among race, trust and health. Contrary to our initial hypotheses, trust did not mediate the association between race and health care use. This may be because, in our sample,

health care use differed between genders, rather than racial groups.[1] Previous studies have specifically examined the impact of health care-related distrust on *lower* levels of health care utilization among Black participants.

Black participants may report lower levels of trust due to experiences with racial discrimination, social exclusion, and traumatic events (Demaris & Yang, 2010; Iacovino et al., 2014; Whaley, 1998). These experiences increase psychological distress and risk for a range of mental illnesses (Cecil, Viding, Fearon, Glaser, & McCrory, 2017; Iacovino et al., 2014; Lewis, Cogburn, & Williams, 2014; Macinnes, Macpherson, Austin, & Schwannauer, 2016). Lower trust may also have a negative impact on stress-buffering factors such as social support (Dressler et al., 2005; Thoits, 2010), exacerbating psychological distress. Furthermore, negative psychosocial experiences cause physiological stress, which in turn increases allostatic load, stress-related adaptations in biological systems that, over time, accumulate to enhance risk for chronic disease (McEwen, 1998). Indeed, in a national epidemiological sample of adults, blacks were found to endorse higher levels of allostatic load than whites (Geronimus et al., 2006). Thus, trust and stress-related precursors may contribute to disparities in psychological distress, allostatic load and disease burden. Additional research is needed to tease apart the aspects of trust that are most relevant to racial disparities in health, and mechanisms of action.

Do personality traits influence the impact of stressful life events on race-health associations?

None of the Aim 3 hypotheses were supported by results. There were no significant interactions between SLE and personality to impact physical or mental health. Conceptually, personality traits may impact an individual's reactivity to stress, influencing downstream consequences of stress on health. Current results suggest that personality traits do not buffer or

[1] Trust did not mediate the association between gender and health care use (-.01; p=.19).

exacerbate the impact of stressful life events on physical or mental health trajectories, after controlling for SES, health behaviors, and marital status.

Past research on the impact of FFM personality traits on stress-health associations is limited. One study found that FFM traits moderated the impact of perceived stress on health behaviors (Korotkov, 2008). Future work may examine associations among FFM traits, health and other forms of stress, such as daily hassles or perceived stress. It may be that personality effects on stress reactivity have a stronger moderating effect on the impact of chronic, ongoing stress on health, and that these effects differ among race/gender groups. More research is needed to examine this hypothesis and elucidate how stress and personality interact to impact health. The nature of the relationship between personality and SLE to impact health may be predominantly mediational, whereby personality predicts health outcomes through increasing SLE. This has has been found in previous research from the SPAN study (Iacovino et al., 2016).

Limitations and future directions

The current study is not without limitations. Health change was examined over a relatively short time period; thus, analyses may not have detected race/gender differences and personality effects that may emerge over a longer follow-up period. In addition, the current sample is restricted both by age and geography. Patterns seen here may not be replicated in samples from other regions of the United States or in other countries. We also did not have the ability to examine our hypotheses in other racial/ethnic groups, given the composition of the community in which our study was conducted. Our sample was representative, however, of the urban and suburban population from which it was drawn. Furthermore, health outcomes were self-reported, and we did not have access to objective health outcomes, such as blood pressure, or repeated measures of health outcomes like diagnosed illnesses. Past work suggests that disparities in trajectories of self-reported health differ from disparities in serious illness

trajectories (Brown et al., 2012); thus future work may examine race/gender disparities in trajectories of more objective health outcomes, as well as the contribution of personality and stress to these disparities.

Strengths of our study include the examination of a large sample of Black and White late mid-life adults. Black people are often underrepresented in studies of personality and health, making it difficult to draw any conclusions about the impact of personality on health within this important population. The current study starts to fill this gap in the literature. In addition, few studies have examined racial disparities in both static levels of health and health trajectories as well as the impact of personality on these disparities. Even fewer have considered the range of outcomes examined in the current study, focusing typically on physical functioning and/or cardiovascular disease. Current analyses also took an intersectional approach to understanding health disparities, which enables a more appropriately nuanced view of health disparities and their determinants. Finally, the use of comprehensive personality questionnaires based on both self-reports and informant-reports strengthens current analyses by improving the reliability and validity of personality measurements and therefore, personality effects.

Conclusions

Our findings have implications for the study of health disparities as well as personality and health. First, our findings show that racially diverse samples are crucial in personality and health research. In recent years, samples of participants have become more representative of the U.S. population, a trend that must continue. Our findings furthermore suggest that an intersectional framework is needed to accurately characterize disparities in health trajectories, as well as the contribution of risk factors to these disparities. In addition, our findings show that examining race and gender as moderators of personality-health associations is warranted. Doing so will enable a more comprehensive and accurate understanding of how personality influences

health. Finally, within the framework of more inclusive samples and intersectional approaches, both racial disparities and personality and health research would benefit from more closely evaluating potential mechanisms of action that explain the impacts of race and/or personality on health. This will involve analytical methods that can model both simple and complex mediating and moderating relationships among risk and protective factors that link race and/or personality with health, including psychological, social, biological, and environmental variables.

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101.

Figure 1. Physical health trajectories by race and gender

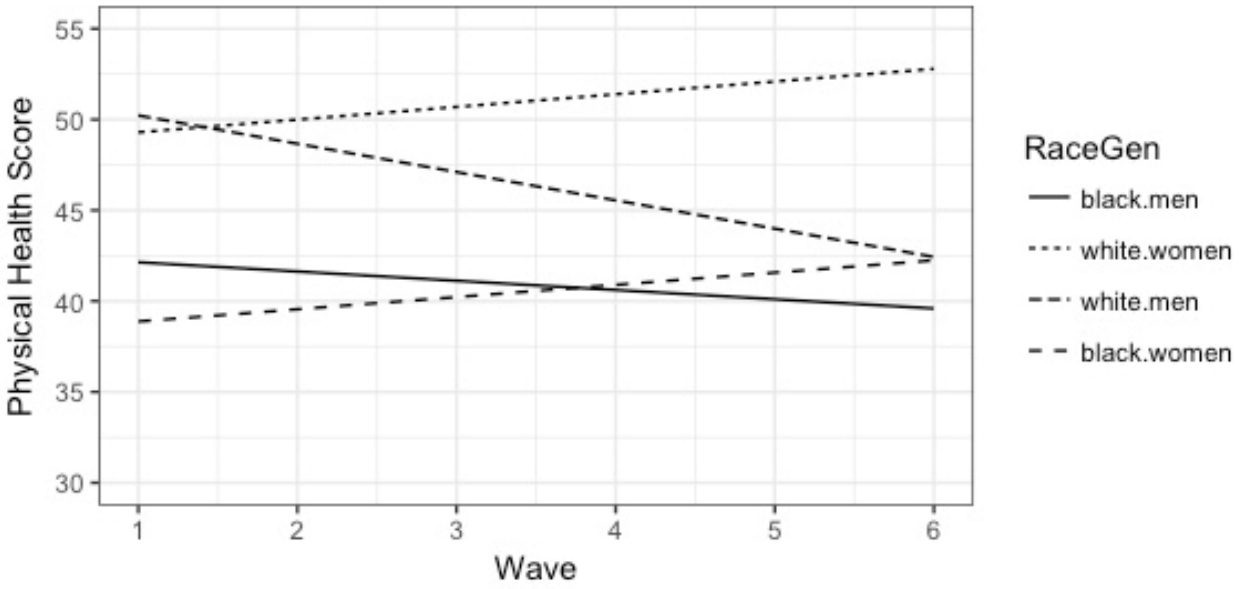


Figure 2. Doctor visit trajectories by race and gender

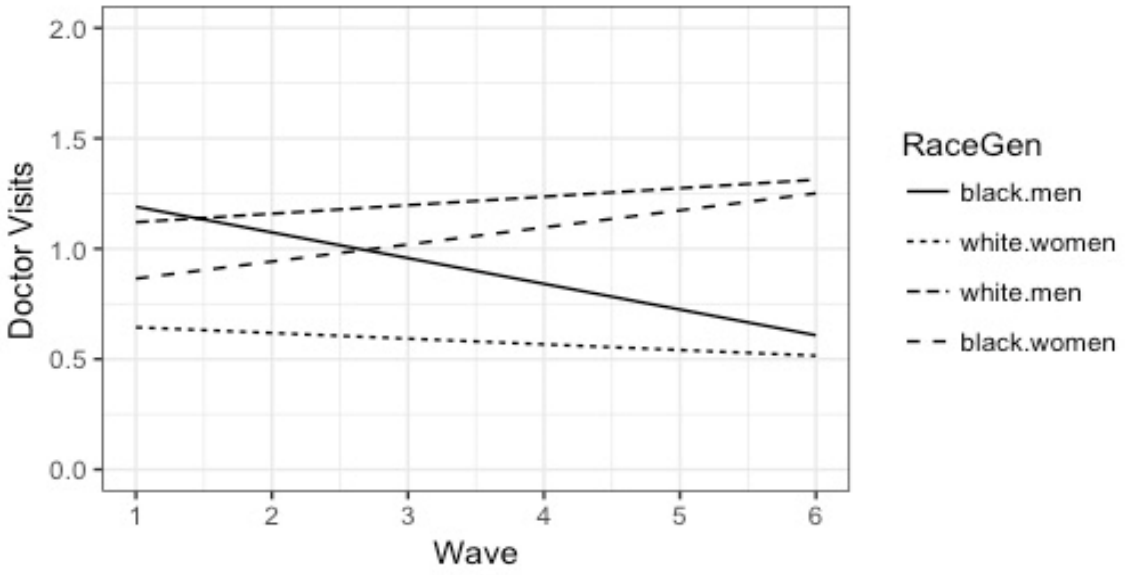
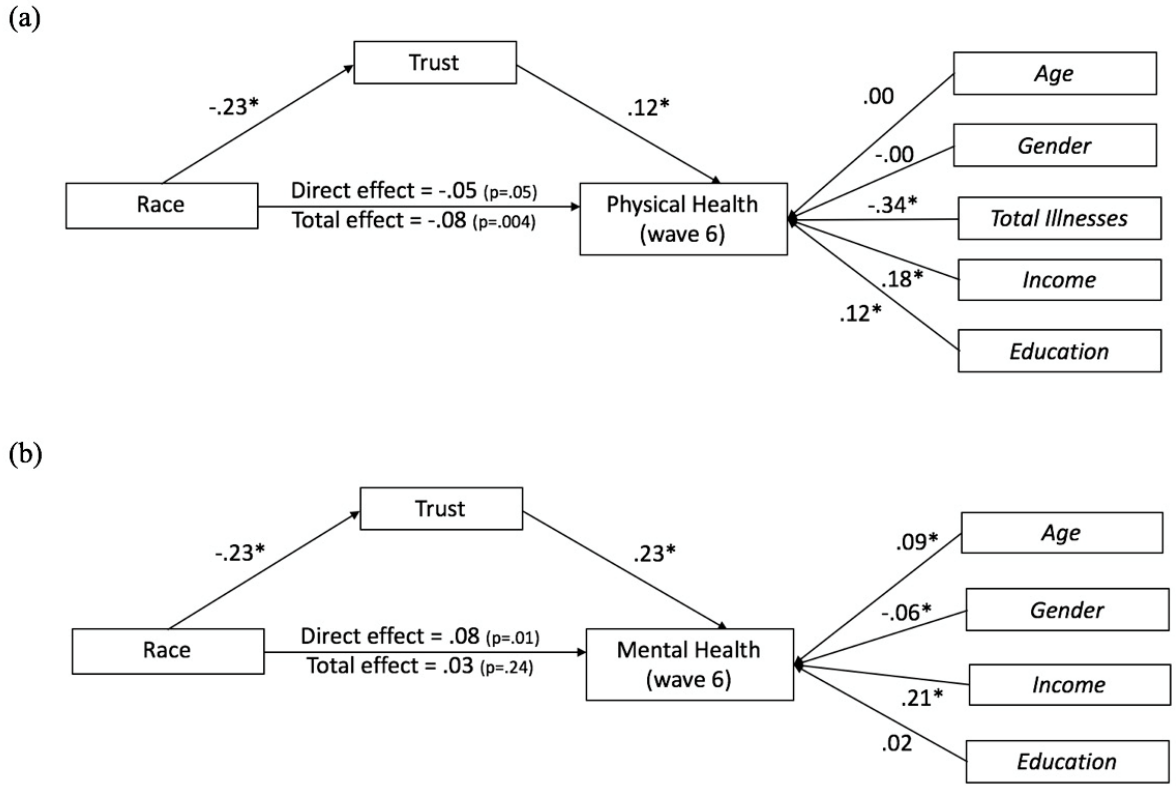


Figure 3. Indirect effect of race on (a) physical health and (b) mental health through trust



Black race = 1; Female gender = 1; Results were robust to the inclusion of wave 1 health as a covariate.

Table 1. Demographics, Health Characteristics and Descriptive Statistics

Demographic Characteristics				
	Black Men n (%)	**Black Women n (%)**	**White Men n (%)**	**White Women n (%)**
Annual Household Income				
Under $20,000	42 (19.8)	66 (23.4)	35 (7.5)	41 (7.5)
$20,000 – $39,999	50 (23.6)	89 (31.6)	46 (9.8)	99 (18.0)
$40,000 - $59,999	42 (19.8)	76 (27.0)	72 (15.4)	138 (25.0)
$60,000 – $79,999	33 (15.6)	24 (8.5)	65 (13.9)	81 (14.7)
$80,000 – $99,999	16 (7.5)	17 (6.0)	62 (13.2)	61 (11.1)
Above $100,000	29 (13.7)	10 (3.5)	188 (40.2)	130 (23.6)
Education				
Less than high school	8 (3.6)	10 (3.5)	3 (.6)	6 (1.0)
High school diploma or GED	52 (23.3)	61 (21.3)	40 (8.3)	62 (10.8)
Post-secondary education	76 (34.1)	102 (35.5)	80 (16.6)	112 (19.4)
College degree	67 (30.0)	80 (27.9)	168 (34.9)	217 (37.7)
Graduate degree	20 (9.0)	34 (11.8)	190 (39.5)	179 (31.1)
Doctor visits (wave 2)				
Never	25 (12.6)	24 (10.5)	94 (21.6)	90 (16.9)
1-2 times	121 (52.1)	99 (50.6)	232 (53.2)	276 (52.0)
3-5 times	65 (24.2)	46 (27.2)	79 (18.1)	123 (23.2)
6 or more times	28 (11.1)	21 (11.7)	31 (7.1)	42 (7.9)
Health Insurance				
Yes	115 (50.9)[a]	190 (65.3)[a,c]	342 (71.0)[b,c]	438 (75.8)[b]
No	30 (13.3)	27 (9.3)	37 (7.7)	25 (4.3)

Descriptive Statistics for Wave 1 Variables				
	Black Men M (SD)	**Black Women M (SD)**	**White Men M (SD)**	**White Women M (SD)**
Age	60.1 (2.8)[a]	60.0 (2.7)[a]	60.0 (2.8)[a]	60.2 (2.8)[a]
Self-reported Physical Health	51.3 (12.3)[b]	50.8 (12.7)[b]	58.1 (9.4)[a]	56.6 (10.4)[a]
Self-reported Mental Health	57.0 (13.9)[b]	56.2 (13.3)[b]	59.9 (11.4)[a]	58.2 (12.7)[a,b]
Doctor Visits (wave 2)	1.3 (.8)	1.4 (.8)	1.1 (.8)	1.2 (.8)
Neuroticism	71.0 (16.0)[a]	73.0 (17.9)[a]	73.2 (20.7)[a]	77.8 (21.3)[b]
Extraversion	107.9 (15.0)[a,b]	110.3 (14.9)[b]	106.1 (18.9)[a]	110.5 (18.2)[b]
Openness	103.3 (12.9)[c]	105.0 (13.4)[c]	108.9 (18.3)[a]	113.2 (17.1)[b]
Agreeableness	121.8 (16.9)[a]	128.1 (14.7)[c]	123.1 (16.7)[a]	131.8 (14.8)[b]
Conscientiousness	125.1 (15.9)[a,b]	128.0 (16.0)[b]	123.7 (19.6)[a]	124.8 (19.4)[a,b]
Trust	19.3 (3.8)[c]	20.1 (3.7)[c]	21.0 (4.2)[a]	22.4 (3.8)[b]
Total Diagnosed Illnesses	3.5 (1.3)[b]	3.7 (1.4)[b]	3.0 (1.0)[a]	3.2 (1.1)[a]

Different superscripts denote significant differences after bonferroni correction.
Group differences tested with pairwise independent samples t-test.

Table 2. Zero-order Correlations for Wave 1 Variables

	2	3	4	5	6	7	8	9	10	11	12	13
1. Physical Health	.70*	-.38*	-.33*	.16*	.10*	.14*	.23*	.23*	-.50*	.35*	.30*	.05
2. Mental Health		-.28*	-.49*	.29*	.08*	.18*	.33*	.30*	-.25*	.28*	.16*	.04
3. Doctor Visits (wave 2)			.14*	-.01	-.02	-.02	-.04	-.04	.33*	-.07*	-.08*	.05
4. Neuroticism				-.36*	-.08*	-.34*	-.56*	-.44*	.14*	-.21*	-.13*	-.05
5. Extraversion					.38*	.21*	.29*	.45*	-.03	.16*	.09*	.03
6. Openness						.20*	.05*	.28*	-.03	.15*	.30*	.02
7. Agreeableness[a]							.32*	.52*	-.04	.05*	.08*	.08*
8. Conscientiousness								.28*	-.10*	.20*	.17*	.05
9. Trust									-.08*	.23*	.24*	.13*
10. Total Illnesses										-.23*	-.20*	-.01
11. Income											.48*	.20*
12. Education												.11*
13. Health Insurance												

* $p<.05$; [a]Trust facet removed from Agreeableness for Agreeableness-Trust correlation

Table 3. Parameter estimates for unconstrained latent growth curve trajectory models

	Physical Health		Mental Health		Doctor Visits	
	Intercept	**Slope**	**Intercept**	**Slope**	**Intercept**	**Slope**
Black Men						
Wave 5 completion time	.01	-.20	.01	.01	-.02	.14
Education	.18*	.26	.11	.18	.03	-.10
Income	.20*	.27	.22*	-.03	.00	.15
Age	-.08	.04	.03	.00	-.05	.09
Insurance					.07	.04
Total illnesses					.45*	-.23
Black Women						
Wave 5 completion time	.01	-.24*	-.02	-.16	.07	.05
Education	.17*	.06	.17*	-.16	-.08	.08
Income	.28*	.04	.21*	.23	.06	-.16
Age	-.02	.07	.08	-.01	.00	-.09
Insurance					.20*	-.18
Total illnesses					.57*	-.04
White Men						
Wave 5 completion time	-.01	-.02	-.03	.09	-.03	-.02
Education	.10	.28*	-.09	.26*	-.04	-.07
Income	.28*	.13	.40*	-.10	.04	.01
Age	-.03	-.16	.11*	-.09	.07	.02
Insurance					.05	.10
Total illnesses					.40*	-.05
White Women						
Wave 5 completion time	-.04	-.18*	-.06	-.03	.13*	-.00
Education	.12*	-.04	.05	-.05	.10	.07
Income	.25*	.05	.28*	-.04	.00	-.11
Age	.07	-.17*	.15*	-.07	.08	.05
Insurance					.10	.03
Total illnesses					.29*	.08

*p≤.05; Standardized estimates

Table 4. Latent parameter estimates and slope effect sizes for unconstrained models

	Physical Health		Mental Health		Doctor Visits	
Black Men	**Intercept**	**Slope**	**Intercept**	**Slope**	**Intercept**	**Slope**
Mean	42.14*	-.51	48.13*	-.94	1.19*	-.12
Variance	112.16*	.53	141.43*	3.35	.42*	.05*
Effect size[a]		-.24		-.40		-.74
Black Women						
Mean	38.88*	.67	46.77*	.49	.87*	.08
Variance	119.04*	4.10*	129.63*	5.88*	.24*	.06*
Effect size		.31		.22		.65
White Men						
Mean	50.22*	-1.56*	53.78*	-1.54*	1.12*	.04
Variance	62.34*	1.24*	92.81*	2.49*	.34*	.08*
Effect size		.11		-.80		.27
White Women						
Mean	49.29*	.70	52.14*	.01	.64*	-.03
Variance	80.45*	3.49*	100.63*	3.15*	.30*	.05*
Effect size		.10		.00		-.22

**p<.05; [a]All effect sizes for final, best-fitting model; covariates: Timing of wave 6 assessment, education, income, age. For doctor visits, additional covariates include insurance and total illnesses at wave 1.*

Table 5. Parameter Estimates for LGC Personality Unconstrained Physical Health Models

	Neuroticism		Extraversion		Openness		Agreeableness		Conscientiousness	
	Intercept	**Slope**	**Intercept**	**Slope**	**Intercept**	**Slope**	**Intercept**	**Slope**	**Intercept**	**Slope**
Black Men										
Wave 5 completion time	-.02	-.05	-.01	-.04	-.00	-.05	-.02	-.05	-.01	-.06
Income	.16*	.16	.18*	.16	.18*	.17	.20*	.16	.18*	.15
Education	.15*	.16	.19*	.13	.24*	.11	.17*	.16	.17*	.12
Age	-.10	.29	-.07	.28	-.08	.29	-.06	.29	-.07	.27
Neuroticism	-.26*	.04								
Extraversion			.04	.12						
Openness					-.12	.10				
Agreeableness							.17*	-.06		
Conscientiousness									.14*	.17
Black Women										
Wave 5 completion time	-.00	-.21*	-.00	-.21*	.01	-.21*	.01	-.21*	.01	-.21*
Income	.20*	.10	.25*	.08	.26*	.08	.26*	.08	.23*	.09
Education	.13*	.00	.16*	-.01	.19*	-.02	.17*	-.02	.15*	-.01
Age	-.02	.28*	-.01	.27*	-.01	.27*	-.01	.27*	-.03	.28*
Neuroticism	-.30*	.10								
Extraversion			.08	-.03						
Openness					-.04	.02				
Agreeableness							.04	.05		
Conscientiousness									.16*	-.05
White Men										
Wave 5 completion time	-.02	.07	-.01	.07	-.01	.07	-.01	.07	-.02	-.07
Income	.18*	.10	.24*	.08	.28*	.07	.27*	.08	.23*	.09
Education	.11*	.24*	.12*	.24*	.12*	.23*	.11*	.24*	.08	.25*
Age	-.04	.17	-.03	.16	-.01	.16	-.02	.16	-.02	.16
Neuroticism	-.33*	.10								
Extraversion			.14*	-.01						
Openness					-.02	.04				
Agreeableness							.05	.05		
Conscientiousness									.24*	-.09
White Women										
Wave 5 completion time	-.03	-.13	-.06	-.11	-.04	-.13	-.04	-.13	-.04	-.13
Income	.16*	.04	.22*	.03	.25*	-.00	.22*	.01	.19*	.02
Education	.09*	-.02	.13*	-.03	.12*	-.00	.13*	-.03	.09*	-.02
Age	.02	.09	.07	.07	.07	.06	.06	.07	.04	.08
Neuroticism	-.43*	.17*								
Extraversion			.22*	-.19*						
Openness					.07	-.13				
Agreeableness							.22*	-.08		
Conscientiousness									.27*	-.10

**p<.05; All estimates standardized*

Table 6. Parameter Estimates for LGC Personality Unconstrained Mental Health Models

	Neuroticism		Extraversion		Openness		Agreeableness		Conscientiousness	
	Intercept	**Slope**	**Intercept**	**Slope**	**Intercept**	**Slope**	**Intercept**	**Slope**	**Intercept**	**Slope**
Black Men										
Wave 5 completion time	-.03	.02	.01	.03	.01	.03	-.01	.01	.00	.01
Income	.18*	.04	.20*	.03	.21*	.04	.23*	.05	.20*	.02
Education	.03	.12	.09	.06	.18*	.15	.09	.07	.08	.06
Age	-.02	-.14	.03	-.17	.02	-.17	.04	-.14	.03	-.17
Neuroticism	-.42*	.11								
Extraversion			.14	.21						
Openness					-.16	-.12				
Agreeableness							.17*	.11		
Conscientiousness									.21*	.24
Black Women										
Wave 5 completion time	-.03	-.15	-.04	-.15	-.02	-.16	-.01	-.15	-.02	-.15
Income	.10	.25*	.19*	.24*	.20*	.25*	.19*	.25*	.16*	.21
Education	.09	-.15	.13	-.15	.19*	-.20	.14*	-.14	.11	-.18
Age	.04	-.13	.06	-.14	.07	-.14	.06	-.14	.03	-.16
Neuroticism	-.56*	.01								
Extraversion			.19*	.01						
Openness					-.07	.14				
Agreeableness							.12	.03		
Conscientiousness									.27*	.15
White Men										
Wave 5 completion time	-.03	.05	-.02	.05	-.02	.04	-.02	.05	-.04	.05
Income	.23*	-.06	.34	-.10	.40*	-.07	.40*	-.07	.34*	-.06
Education	-.11*	.26*	-.08	.26*	-.09	.27*	-.09	.26*	-.14*	.27*
Age	.05	-.20*	.08	-.21*	.10*	-.20*	.10*	-.20*	.09*	-.20*
Neuroticism	-.59*	.05								
Extraversion			.24*	.11						
Openness					-.02	-.05				
Agreeableness							.10*	.03		
Conscientiousness									.32*	-.04
White Women										
Wave 5 completion time	-.05	-.03	-.10	-.01	-.06	-.03	-.06	-.03	-.07	-.03
Income	.13*	.04	.22*	.03	.28*	.01	.24*	.01	.18*	.02
Education	.00	-.03	.06	-.03	.06	-.01	.06	-.03	.00	-.03
Age	.06	-.19*	.14*	-.21*	.14*	-.21*	.13*	-.21*	.08*	-.21*
Neuroticism	-.66*	.10								
Extraversion			.34*	-.14						
Openness					.03	-.10				
Agreeableness							.24*	.03		
Conscientiousness									.42*	-.01

**p<.05; All estimates standardized*

Table 7. Parameter Estimates for LGC Personality Unconstrained Doctor Visits Models

	Neuroticism		Extraversion		Openness		Agreeableness		Conscientiousness	
Black Men	**Intercept**	**Slope**	**Intercept**	**Slope**	**Intercept**	**Slope**	**Intercept**	**Slope**	**Intercept**	**Slope**
Wave 5 completion time	-.03	.16	-.02	.13	-.02	.14	-.02	.15	-.02	.14
Income	.00	.19	-.01	.16	.00	.13	-.00	.15	-.01	.18
Education	.02	-.06	.01	-.06	-.01	.01	.02	-.07	.01	-.05
Age	-.05	.14	-.06	.10	-.05	.08	-.06	.10	-.06	.11
Insurance	.07	.03	.07	.04	.07	.04	.07	.04	.08	.02
Total illnesses at wave 1	.44*	-.24	.45*	-.24	.45*	-.23	.45*	-.23	.45*	-.23
Neuroticism	.01	.18								
Extraversion			.04	-.08						
Openness					.06	-.18				
Agreeableness							-.05	-.06		
Conscientiousness									.02	-.19
Black Women										
Wave 5 completion time	.08	.04	.07	.06	.07	.04	.05	.06	.07	.06
Income	.11	-.22	.05	-.17	.06	-.17	.07	-.19	.08	-.20
Education	-.07	.09	-.09	.10	-.07	.04	-.07	.08	-.07	.08
Age	.01	-.09	.00	-.08	.00	-.09	.02	-.10	.02	-.10
Insurance	.19*	-.04	.19*	-.04	.19*	-.03	.19*	-.04	.19*	-.04
Total illnesses at wave 1	.52*	-.15	.57*	-.18	.57*	-.20	.56*	-.18	.56*	-.17
Neuroticism	.24*	-.18								
Extraversion			.06	-.07						
Openness					-.04	.14	-.10	.08		
Agreeableness										
Conscientiousness									-.09	.12
White Men										
Wave 5 completion time	-.02	-.02	-.03	-.02	-.02	-.02	-.02	-.02	-.02	-.02
Income	.07	.00	.06	-.03	.04	.01	.04	.01	.05	.02
Education	-.02	-.07	-.03	-.06	-.03	-.08	-.03	-.07	-.01	-.07
Age	.08	.02	.08	.01	.07	.01	.07	.02	.07	.02
Insurance	.06	.10	.05	.11	.05	.10	.04	.13	.05	.10
Total illnesses at wave 1	.38*	-.05	.40*	-.06	.40*	-.06	.40*	-.06	.39*	-.06
Neuroticism	.15*	-.06								
Extraversion			-.09	.12						
Openness					.01	.06				
Agreeableness							.09	-.17*		
Conscientiousness									-.09	.00
White Women										
Wave 5 completion time	.13*	-.00	.13*	-.00	.13*	-.00	.13*	-.00	.13*	-.00
Income	.04	-.08	.01	-.11	.01	-.10	.02	-.10	.00	-.07
Education	.09	.08	.08	.07	.09	.07	.08	.08	.08	.09

Age	.09	.07	.07	.05	.08	.05	.08	.06	.07	.07
Insurance	.10	.08	.10	.07	.09	.08	.10	.08	.10	.07
Total illnesses at wave 1	.28*	.02	.29*	.03	.29*	.03	.29*	.03	.29*	.02
Neuroticism	.13*	.13								
Extraversion			.01	.00						
Openness					-.06	.02				
Agreeableness							-.04	-.06		
Conscientiousness									.01	-.11

**p<.05; All estimates standardized*