

**THE DETERMINANTS AND HEALTH CONSEQUENCES OF SUBJECTIVE SOCIAL
STATUS IN YOUNG ADULTHOOD**

Karen Gerken

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Approved by:

Kathleen Mullan Harris

Y. Claire Yang

Robert Hummer

Ted Mouw

Michael Shanahan

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ABSTRACT

KAREN GERKEN: THE DETERMINANTS AND HEALTH CONSEQUENCES OF SUBJECTIVE SOCIAL STATUS IN YOUNG ADULTHOOD (Under the direction of Dr. Kathleen Mullan Harris)

Subjective social status (SSS) is becoming an increasingly relevant tool for sociologists and health researchers to investigate socioeconomic disparities and their associations with health. Prior research has found a strong relationship between subjective social status and a variety of health outcomes. However, little is known about how exactly subjective status may be impacting health in a way distinct from objective socioeconomic status. In order to better understand the process by which SSS “gets under the skin” to create health disparities in a young adult cohort, this dissertation investigates not only the relationship between SSS and health, but also how SSS is formed in young adulthood, and how relative subjective position is similar yet different from relative objective position. First, this dissertation further expands on the role early life objective socioeconomic status has in continuing to shape subjective social status throughout the life course by connecting it to psychosocial mechanisms previously explored in relationship to SSS. Then, this dissertation examines how SSS in young adulthood is associated with a variety of objective health measures, including exploring how certain stress and health behavior mechanisms may mediate the SSS-health relationship. Finally, a new measure of relative objective position is introduced, further adding to our understanding of how relative subjective socioeconomic status is formed early in the life course and how it impacts health.

To my family, and Travis – I love you all so much.

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LIST OF ABBREVIATIONS

AHPVT	Add Health Picture Vocabulary Score
AO	Absolute Objective
BMI	Body Mass Index
CESD	Center for Epidemiological Studies Depression Scale
CRP	C-reactive protein
DF	Deaton's Formulation of the Yitzhaki Index
logCRP	Log adjusted (C - reactive protein + 1)
OSS	Objective Social Status
RO	Relative Objective
RS	Relative Subjective
SBP	Systolic Blood Pressure
SES	Socioeconomic Status
SSS	Subjective Social Status
YI	Yitzhaki Index

CHAPTER 1. – INTRODUCTION

Introduction

A person's place within the hierarchy of the social stratification system matters a great deal for a wide range of outcomes, including mental and physical health (Adler and Rehkopf, 2008; Braveman et al. 2010), life expectancy (Lynch et al., 1994; Phelan et al., 2004), academic achievement (White 1982; Sirin 2005), residential location (Evans and Kantrowitz 2002), among other life chances. Social stratification literature has used a number of criteria for determining location in the social structure, including a variety of objective measures of socioeconomic status such as income, occupation, education and wealth (Braveman et al., 2005; Elo, 2009). It is fairly well established that objective social status (OSS) matters for mortality and morbidity, among other outcomes, but how and why different OSS indicators matter is contentious (Adler et al., 1994; Braveman et al., 2005; Link and Phelan, 1995; Winkleby et al., 1992). Part of the problem may be that despite the intercorrelation and predictive properties of OSS markers, no individual measure can completely capture the multidimensionality and life course-spanning nature of social status.

On the other hand, subjective social status (SSS), or one's own perception of their social standing, has long intrigued sociologists, public health researchers and psychologists for decades, both as a theoretical construct and a tool in survey design (Jackman and Jackman, 1973; Kluegel, et al. 1977; Operario et al., 2004). SSS likely captures a more accurate and nuanced representative of SES, whereas objective measures of material socioeconomic status, such as income, education, occupation, and wealth, assume everyone with the same level of

socioeconomic resources experiences their socioeconomic status in the same way. In addition, SSS processing requires a degree of social comparison, as one must reflect upon their relative position in the social hierarchy. In the health disparities literature, there is emerging evidence that suggests SSS is more strongly related to morbidity and mortality than OSS (Adler et al., 2000; Singh-Manoux et al., 2003; Singh-Manoux et al., 2005; Ostrove et al., 2000; Demakakos et al., 2008). Overall, research on SSS as a comprehensive measure of position in the social hierarchy has increased in the past decade. However, research on the determinants and consequences of SSS is scattered, mostly cross-sectional, and often derived from non-representative studies of populations. To understand how SSS is internalized and related to health outcomes, among other things, we must first comprehend how SSS is formed and experienced.

My dissertation aims to further elucidate the concept of subjective status, which I theorize reflects a multidimensional and multilevel life course accumulation of social status. Using a nationally representative and longitudinal data set, I examine the determinants of SSS in young adulthood, and the extent to which SSS, rather than OSS, is a better predictor of objective measures of health, including immune, cardiovascular and metabolic functioning. I then examine how relative objective status relates to SSS and health, in addition to the extent to which individuals accurately estimate their social ranking compared to a variety of reference groups. This introduction describes the main theoretical background and motivations for my dissertation, the specific empirical questions I address, the data set I use, and how these papers contribute to the sociological literature.

Important Concepts And Theoretical Frameworks

Life Course Perspective

I use a life course framework that generally argues early life conditions and contexts matter for later life outcomes. Life course theories and frameworks have been utilized in a number of disciplines, including sociology, epidemiology and developmental psychology. To investigate the causes, consequences and contexts of SSS, I integrate three disciplinary strands of the life course perspective: the foundational life course perspective developed in sociology by Elder (1998), life course epidemiology (Ben-Shlomo and Kuh 2002) and the ecological model of human development (Bronfenbrenner, 1979; Bronfenbrenner and Morris, 1998; Lerner, 2005). While related, each perspective contributes uniquely to the dissertation as a whole and specifically in each individual chapter. Therefore, I outline here how each strand of the life course perspective is considered relevant to my entire dissertation.

Life course sociological theory aims to study human life across historical periods and individual ages, within many domains and in interaction with institutions and structural characteristics. To understand later life outcomes, life course methodology examines early life events and contexts and how they shape trajectories of growth, development and progress across the life course (Elder 1998). In addition, life course theory prioritizes the analysis of cohorts and specific life course stages. Specifically, life course theory puts much emphasis on examining the transitions between life course stages, key life events marked by change that are structured by social constraints and which have long-lasting implications (Elder 1998). Of these life course events, the transition to adulthood is typically given special attention (Hogan and Astone, 1986; Shanahan, 2000; Mayer, 2009), as are considerations about how these transitions vary by socially

structured characteristics such as race (Farley, 1996; Mare 1995), gender (Mare 1995) and social class (Sweeney, 2002; Oppenheimer et al., 1997).

While life course sociology is the foundation for much of the life course perspective used in this paper, I focus on life course epidemiology as the basis for the health elements of this dissertation. Life course epidemiology specifically focuses on how social and biological risks interact across the life course to affect health, and how the accumulation of such risks, either experienced all at once at one point in time and/or across time as individuals age, worsen health (Ben-Schlomo and Kuh 2002). In an epidemiological sense, the accumulation of risk means that across the life course, people can be exposed to a number of risks that “get under the skin” to affect biological processes that emerge later as a health problem (Ben-Schlomo and Kuh 2002). These risks, both physical and social, include environmental exposure to physical toxins and psychosocial stress, poor nutrition in childhood, low-quality schools and difficult family lives, among others, that “get under the skin” by activating the physiological stress response (Evans et al., 2012; Seeman et al., 2001). When the stress response is activated occasionally and appropriately, this is a healthy and normal response to acute stressors. However, chronic activation leads to psychological dysregulation in the body, increasing inflammation and allostatic load (McEwen and Stellar 1993) resulting in premature aging, increased disease risk and higher mortality (Seeman et al. 1997).

Life course perspectives, especially life course epidemiology, have paid special attention to sensitive periods in the life course, or stages in the life course that hold particular importance for development (Elder, 1998; Ben-Shlomo and Kuh, 2002). Most research focuses on sensitive periods during fetal origins or very early childhood (Barker, 1995; Harding, 2001), but adolescence may also represent a sensitive period, as puberty brings about large physical and

physiological changes and adolescents begin to spend less time with their family and more time with peers and in a larger social context (Harris, 2010; Steinberg and Morris, 2001). In interacting with a wider social world, adolescents begin for the first time to compare their own characteristics with those around them, developing their self-identity (Erikson, 1968; Marcia, 1993). This identity process stretches from adolescence through the transition to adulthood, until identity formation tends to stabilize in young adulthood (see Kroger et al. 2010 for a meta-analysis of ego identity solidification across the early life course).

Finally, life course frameworks also draw on an ecological, or “linked lives” perspective, which acknowledges the importance of the social contexts and institutions in which human development occurs (Bronfenbrenner, 1979; Elder and Rockwell, 1979). Human development and behavior may vary based on or depend on context; for example, parents use different parenting behaviors depending on the safety of the environment in which their family resides (Hill and Herman-Stahl, 2002; Roche et al., 2007). Social context can refer to a number of environments in which people are imbedded, including place (neighborhoods, states, countries, etc.), families and historical periods (Elder and Rockwell 1979). My papers focus on the importance of many of those contexts and social structures, including family, neighborhoods, schools, and peers.

Subjective Social Status

Early sociological work on subjective status focused primarily on social class identification, or one’s “perceived self-location in the SES structure” (Jackman and Jackman 1973). Interest in respondents’ attachment to social classes was in response to ideas about class consciousness, and how one acts upon their perceived class location with regards to political identification and participation and cultural ideals and attitudes (Morris and Murphy, 1966;

Hodge and Treiman, 1968; Jackman and Jackman, 1973; Guest, 1974; Vanneman and Pampel, 1977; Kluegel and Smith, 1981). Typically, subjective social class was measured with categories such as lower, working middle or upper class (Jackman and Jackman 1973).

Two major problems arise, however, when relying on categorical class identification to classify individuals (Goodman et al. 2003). First, we lose information regarding the full, linear SES hierarchy, which is especially relevant to health research and step-wise health-SES gradients (Elo 2009). Second, reliance on charged naming of categories such as “middle” or “upper” class may influence people’s selection of a social class, which may not accurately reflect their perceptions of their standing. While some have utilized a measure of whether research subjects feel better, worse or about the same regarding their relative SES compared to various communities (Wolff et al. 2010), a new linear measure has been growing in popularity to help people report their relative social standing (Singh-Manoux et al. 2003). The linear measure, which asks people to report where on a ladder they’d place themselves, with the best-off people at the top rung and the least well-off on the bottom, has been used in numerous population and health surveys across many countries (Adler et al., 2000; Singh-Manoux et al., 2003; Operario et al., 2004).

Some may be critical of such a linear measure of social status, arguing that a gradational perspective on social hierarchy ignores issues of class position and class conflict supported by neo-Marxist theory (Kelly and Evan 1995; Wright 1985). Neo-Marxist theory rejects the notion that a gradational subjective social measure could be an accurate scale, arguing that ideas of subjective social status are influenced by reference groups (Kelly and Evans 1995) and other concepts that influence class consciousness (Wright 1985). Therefore, these perspectives suggest that an individual’s subjective social status, even on a linear scale, would be affected by different

ideas about what “average” and “middle class” really are, shaped by their interactions with others and their subjective understanding of equality (Kelly and Evans 1995). Still, these previous works have focused on class groupings rather than a linear scale. Furthermore, a recent study on subjective social status in young adulthood found support for the gradient model of subjective social status (Nielsen et al. 2015). Therefore, while I acknowledge these critiques, I choose to rely on the gradation explanation of social status, particularly for my measure subjective social status, for the reasons discussed below.

A linear measure of subjective social status abandons the need for charged categories and instead creates room for more nuanced and subtle differences in social status to be reflected. Instead of simply reporting the quantity of education, wealth or income, subjective linear measures can allow individuals to report a social standing that may also reflect the quality of education (Ivy League versus community college), the stability of one’s income, and the persistence of wealth over generations (Braveman et al., 2005; Schnittker and McLeod 2005). Some concern has arisen that SSS reflects something besides strict objective SES and instead encompasses a number of psychological processes in addition to the cognitive averaging of one’s OSS (Sign-Manoux et al., 2003; Cundiff et al., 2013). However, as I further explore in later sections, I argue that this internalizing and psychosocial process of self-status assessment makes SSS a more ideal measure rather than a more flawed one, especially for health research.

Subjective Social Status in the Life Course: From Adolescence to Young Adulthood

Of the few papers that have examined determinants of SSS, only one has done so in young adulthood (Nielsen et al 2015), even though this measure of SES may do a better job than traditional markers of OSS of capturing socioeconomic status in a life course stage marked by change and heterogeneity. SSS typically has been conceived as a measure of socioeconomic

status for certain groups for whom traditional markers of OSS are inappropriate, either by virtue of their age, both children (Goodman et al., 2001, 2003, 2007) and the elderly (Hu et al. 2005), or by their marginalized status, such as prisoners (Friestad 2010). While these groups may not have their own incomes or occupations, they still have a sense as to where they fit into the social hierarchy (Goodman 2007). I argue that, even though we can rely on these OSS measures for young adults, they may still not be as important or reliable for this life course stage as they are later in the life course. Recent attention has been given to the lengthening of the transition to adulthood, as individuals are delaying or abandoning all together the traditional markers of adulthood, such as marriage, buying a home and childbearing (Berlin et al. 2010). Thus, SSS in young adulthood may do a better job measuring SES during a critical transition in socioeconomic status during a life stage marked by fluid change and identity formation.

I also argue that research should pay attention to intra- and intergenerational processes that begin in adolescence in order to better understand SSS formation during the transition to young adulthood, a period marked by substantial individual and contextual change. From a life course perspective, adolescence can be thought of as a sensitive period for development such that certain exposures, such as socioeconomic disadvantage and family instability, may be particularly detrimental with irreversible impacts later in the life course. Beyond the health outcomes that life course epidemiology focuses on, I apply the concept of sensitive periods to understanding the relative importance of past socioeconomic status exposures for the development of subjective social status during this critical transition from adolescence into young adulthood.

Adolescence, the life course stage sandwiched between the dependence on parents of childhood and the independence of adulthood, is a sensitive period for cognitive and personal

development (Erikson, 1968; Steinberg and Morris, 2001). As adolescents transition away from the family-dominated contexts of childhood and into broader social institutions, peers and other adult figures besides their parents begin to play a larger role in their lives (Larson and Richards 1991). Inside this larger social context, adolescents may begin to consider their place in the social hierarchy for the first time as they interact with people from different socioeconomic backgrounds. Just as adolescents begin to develop their own sense of identity independent of that of their parents' as they transition to adulthood, they also begin to develop their own sense of socioeconomic status, and thus their own SSS.

Without their own occupations or income, adolescents first turn to their parent's OSS as a proxy for their own, and SSS among adolescents is strongly related to the OSS of their parents (Goodman 2007). Because adolescence is the first time individuals become aware of their socioeconomic position, this begins to shape their perceptions of their SSS across the rest of their life course. Easterlin (1973) found that fertility decisions in young adulthood were shaped by the extent to which young adults felt they had reached a certain level of economic success, for which their parent's economic status served as a reference point. The concept of sensitive periods suggests that throughout the entire life course, the objective social status of one's parents will continue to cast a long shadow on SSS perceptions, even as individuals transition into adulthood and have their own OSS markers to include in their cognitive averaging processes.

Scholars have theorized that SSS is the accumulation of personal reflections of past, current and ideas of future status (Jackman, 1979; Hu et al., 2005; Ghaed and Gallo, 2007) and thus the formation of SSS is by definition a life course process, as objective and subjective status likely accumulate and interact across the early life course to affect SSS in young adulthood. The extent to which parental OSS will continue to matter for young adult SSS has been touched on in

Nielsen and colleagues (2015) paper; they found parent income to continue to matter for SSS in young adulthood. However, a more nuanced understanding of why parental background may continue to matter for SSS across the life course remains to be seen. The cumulative advantage framework (DiPrete and Eirich 2006) and the status attainment model (Blau and Duncan 1967) would suggest that people with high parental OSS are likely to reach their own high level of OSS in young adulthood. Since their OSS was consistently high across the life course, these young adults may place themselves higher on the SSS ladder than others with similar current OSS but less advantaged family socioeconomic backgrounds. On the other hand, status-maximizing theory (Plutzer and Zipp, 2001; Yamaguchi and Wang, 2002) would posit that as people with high parental OSS enter young adulthood, even if their own relatively low OSS would suggest otherwise, they might still consider their own SSS high. Similarly, those who are upwardly mobile would abandon the shadow of low parental OSS to rely solely on their own relatively higher OSS to identify with a higher personal SSS in young adulthood.

Interrelationships between OSS, SSS and Health

Currently, our understanding of the interrelationships between OSS, SSS and health outcomes are largely drawn from small, non-nationally representative studies. Nonetheless, these findings are a good starting point for this dissertation. First, the literature has confirmed a strong correlation between SSS and the three typical sociological components of SES, including personal education (Ostrove et al., 2000; Operario et al., 2004; Wright and Steptoe, 2005; Dunn et al., 2006; Goldman et al., 2006; Ghaed and Gallad, 2007; Cohen et al., 2008; Demakakos et al., 2008; Wolff et al., 2010), income (Ostrove et al., 2000; Operario et al., 2004; Dunn et al., 2006; Ghaed and Gallad, 2007; Cohen et al., 2008; Wolff et al., 2010; Cundiff et al., 2013) and

occupation (Ostrove et al. 2000; Singh-Manoux et al. 2003; Singh-Manoux et al., 2005; Ghaed and Gallo, 2007; Demakakos et al., 2008).

Decades of research have confirmed an OSS gradient in health, such that increases in education, income and occupational grade are all associated with better health, as measured by a number of health outcomes (see Elo 2009 and Adler and Rehkopf 2008 for reviews). Within the past decade, public health researchers have found SSS to have similar, if not greater, associations with health (Adler et al., 2000; Ostrove et al., 2000; Singh-Manoux et al., 2005; Demakakos et al., 2008). When mutually adjusting for both OSS and SSS, the subjective assessment of status often persists as the stronger predictor of health outcomes. Perhaps this greater association between SSS and health is because while we know that OSS predicts a portion of SSS, there is still plenty of unexplained variance in the correlates of SSS. I aim to explore this yet unexplained variance in SSS before connecting it to objective health markers and relative objective status in young adulthood with a uniquely appropriate data set with a wealth of sociodemographic, psychological and behavioral data.

Research Questions

Chapter Two

The first empirical chapter provides a clearer understanding of what social forces shape one's perceptions of social status. The previous research on this topic has mainly focused on concurrent markers of OSS and their cross-sectional relationship with SSS (Singh-Manoux et al., 2003; Wolff et al., 2010). However, while SSS has been theorized to be a cumulative construct that reflects the “cognitive averaging” of not only current status but also past status and future prospects, little empirical evidence is available to support this claim (Nielsen et al 2015). This paper will examine markers of OSS from various stages in the life course and their relationship

to SSS in young adulthood. I hypothesize that objective socioeconomic status across the early life course will have important associations with the development of a SSS identity, which I argue is a product of the accumulation of status over the life course. In addition, I find psychosocial variables to be also associated with SSS, which leads me to hypothesize that the SSS cognitive averaging process does not happen in a vacuum.

Chapter Three

Social status has long been connected to morbidity and mortality. SSS has been linked to a number of diseases (e.g. diabetes, respiratory illness, hypertension and cardiovascular disease), mental health, mortality and self-rated health. This relationship is often stronger than similar relationships between OSS markers and health outcomes (Singh-Manoux et al., 2005; Dunn et al., 2006; Ghaed and Gallo, 2007). With the widespread and growing collection of objective biomarkers of physiological regulation in data sets, attention has turned to examining how SES is related to markers of immune, cardiovascular and metabolic function (Wolfe et al. 2012). Yet no one has examined the relationship between SSS and these biomarkers in a nationally representative sample of young adults. This second paper examines the associations between SSS and objective health biomarkers, and compares these to the associations between more traditional OSS measures of SES and the biomarkers. I find that SSS is more strongly related to these objective health measures, an indication that subjective status “gets under the skin” early in the life course even before disease emerges.

Chapter Four

The final empirical paper will introduce a third conceptualization of socioeconomic position, relative objective rank, in order to better understand SSS and how SES in general “gets under the skin” to effect health. The debate as to whether SSS captures “true” SES better than a

combination of traditional OSS markers or simply measures rank more completely benefits from the comparison of SSS to actual objective relative standing. Secondly, including a third set of SES measures regarding the rank ordering of SSS and OSS will allow me to address whether objective socioeconomic status or relative social standing is more important for health disparities.

Data

This dissertation uses the National Longitudinal Study of Adolescent to Adult Health (Add Health) for all three papers. Add Health is a nationally representative data set that originally sampled 20,754 students ages 12 - 18 from 132 middle- and high schools across the country during the 1994-1995. The first wave of data collection includes an in-school survey, a more detailed in-home interview, a parent questionnaire and Census data based on the respondent's home address. Thus, I have a rich set of variables from the adolescence life stage, including information from parents, peers and school and neighborhood contexts. Three additional waves of data were collected to follow the original cohort as they aged: Wave II (1995 – 1996), Wave III (2001 – 2002), and Wave IV (2008 – 2009). Biomarker collection was part of Wave IV, and nearly every respondent has some objective measures of physical health available to analyze. Others studies that have examined the determinants and consequences of SSS differentials have not been able to utilize a data set as rich and representative at Add Health. Thus, I am able to paint a truly life course, multidimensional and intergenerational portrait of the determinants of SSS with widely applicable accuracy.

I draw on data from two waves of Add Health, Waves I and IV, which reflect two life course stages of interest: adolescence and young adulthood, respectively. Both waves have data on OSS markers that are specific to the life course stage. For example, in Wave I, when the respondents were adolescents, I use data on parent's income and education to reflect family OSS

at the time. In young adulthood, or Wave IV, I draw on the respondents' personal and household OSS. Because of the wide variety of socioeconomic variables measured across waves, I can select appropriate measures of OSS as the life course stage requires, making this study a true life course and intergenerational investigation, improving upon previous studies limited by cross-sectional data.

Other studies on similar topics have been limited by incomplete data available on either OSS measures and/or health outcomes. For example, other studies may have only had current income and education as OSS indicators. Add Health, as described above, not only has a variety of measures across the life course, but also has a breadth of OSS measures within each life stage, including income, education, occupation, home ownership, assets, and financial strain. Thus, I expand on the variety of OSS markers that may be related to SSS formation. Secondly, the health information that Add Health contains is also immense compared to other studies. In addition to self-rated health across all four waves, Add Health also contains information about health diagnoses, mental health and health behaviors. Most importantly, however, is the inclusion of objective biomarkers in Wave IV, including C - reactive protein, systolic blood pressure and body mass index. The availability of objective biomarkers is especially important in a young adult sample. While diseases typical to an older cohort may not yet have emerged at this young life stage, the biomarkers can capture increased inflammation, thus signaling disease risk. Thus, Add Health data provides a unique, expanded, multidimensional perspective on both the predictors and consequences of SSS disparities.

Operationalization Of Subjective Social Status

To measure SSS in this paper, I use the MacArthur Scale of Subjective Social Status, which asks respondents to place themselves on a ladder, representative of the US population as a

whole, as a proxy for their placement in the greater social hierarchy. The measure has been found to be a valid and reliable construct for gauging SSS in a number of populations and has been adopted into a number of surveys and studies (Singh- Manoux et al., 2003; Operario et al., 2004; Goldman et al., 2006; Cundiff et al., 2013). In Add Health, a picture of a ladder is provided (see Figure 1.1) and the following question is posed to respondents: “Think of this ladder as representing where people stand in the United States. At the top of the ladder (step 10) are the people who have the most money and education, and the most respected jobs. At the bottom of the ladder (step 1) are the people who have the least money and education, and the least respected jobs or no job. Where would you place yourself on this ladder? Pick the number for the step that shows where you think you stand at this time in your life, relative to other people in the United States.” The distribution of the responses to the ladder measure, presented in Figure 1.2, is normal, with a mean of 4.97 and a standard deviation of 1.75.

Contribution/ Significance

This dissertation contributes to the broad discussion of how and when social stratification pathways develop over the life course by focusing on a subjective measure of socioeconomic status in young adulthood that, while increasingly common and useful, has yet to be fully elucidated, both independently as a construct and in relation to health and context.

First, my empirical investigation of the determinants of subjective social status adds to the theoretical discussion of personal perceptions of social standing by investigating additional life course data, including objective measures of socioeconomic status of family background in adolescence and the respondents own OSS during the transition to adulthood. For now, the idea that SSS is an accumulation of many socioeconomic and psychosocial experiences across the life course is only theoretical. In this dissertation, I attempt to explain a portion of the unexplained

variance in SSS with the inclusion of more markers of OSS across the early part of the life course and psychosocial variables than are mostly unavailable in other data sets.

Secondly, this paper adds further evidence of a health gradient along socioeconomic lines, while further elucidating the process of how exactly low SES “gets under the skin” to worsen health. Others have theorized that the stress of low status is internalized which, in turn, increases physiological dysregulation (Marmot 2004). And, while OSS markers can serve as proxies for low status, there is no better way to measure how one perceives their own status than by measuring SSS. I find a relationship between low SSS and greater physiological dysregulation that strengthens Marmot’s (2004) argument about the stress of low status resulting in negative health outcomes.

Finally, while a provisional relationship between low SSS and high morbidity and mortality has been explored, the relationship between subjective SSS and objective biomarkers has yet to be thoroughly examined with a diverse, nationally representative data set. In addition, most studies have focused on later adulthood, once disease has manifested. By utilizing a nationally representative sample of young adult, I plan to demonstrate that SSS disparities in health begin early in the life course, even before typical diseases emerge.

Figure 1.1: Ladder

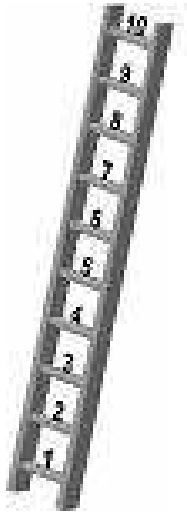
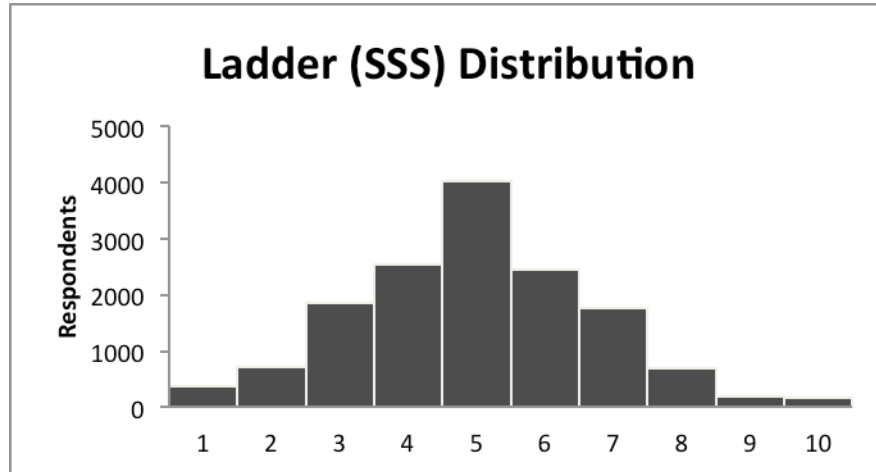


Figure 1.2: Ladder Distribution



CHAPTER 2. - SUBJECTIVE SOCIAL STATUS IN YOUNG ADULTHOOD: EXPANDING THE COGNITIVE AVERAGING FRAMEWORK

Introduction

Most sociological research today that involves socioeconomic status (SES) uses some combination of the three typical markers of objective SES: income, education, and occupation. These objective SES (OSS) markers are most often included in social surveys and reflect material resources that individuals draw on to affect their life chances. OSS is highly correlated with a number of important life outcomes, including mental and physical health (Adler and Rehkopf, 2008; Braveman et al., 2010), life expectancy (Lynch et al., 1994; Phelan et al. 2004), academic achievement (White, 1982; Sirin, 2005) and residential location (Evans and Kantrowitz 2002). However, not all social and economic disparities are related to access to absolute material resources (CITE - Wilkinson, 1997, 1999; Marmot, 2004). Researchers have therefore begun to utilize people's own assessments of their relative social status to examine social location and inequality.

Subjective social status (SSS) reflects the socio-psychological worth of one's perceptions of their status. SSS is mainly thought to encompass one's cognitive averaging of their various aspects of objective socioeconomic status (Singh-Manoux et al. 2003). SSS may also be more useful for certain populations for whom typical objective SES measures may be inappropriate or incredibly fluid, including adolescents, young adults, and the elderly (Goldman et al 2007). While some research has assessed the associations between objective SES measures, psychosocial factors, sociodemographic characteristics, and SSS, there is still much that is

unknown regarding how individuals arrive at their assessments of SSS. In this paper, I theorize that SSS is far more than a reflection of a person's current and personal OSS. Instead, SSS development is an intra- and inter-generational process that includes many dimensions of objective socioeconomic status, psychosocial resources and personal self-confidence.

This paper aims to further explore the early life course determinants of subjective social status in young adulthood within an expanded cognitive averaging framework using The National Longitudinal Study of Adolescent to Adult Health (Add Health), a nationally representative, longitudinal data set of a cohort of middle and high schools students in 1994 who were ages 24-32 in the most recent wave of data collection. Drawing on a number of socioeconomic, demographic and psychological variables, I argue for the importance of considering the psychological contexts and schemas in which the process of subjective social status development occurs.

Background

Cognitive Averaging and SSS Formation

The development of subjective social status is typically thought to occur through a process that Singh-Manoux et al. (2003) refer to as “cognitive averaging.” People tend to combine assessments of their past, current and future economic prospects, as measured by objective socioeconomic factors like education, income and occupation, in a cognitive average that represents their SSS. Singh-Manoux et al. (2003), using the Whitehall sample of middle-age British civil servants, found little to no effect of psychosocial factors contributing to SSS above and beyond OSS variables, and as such, the prevailing theories regarding what determines current adult SSS have focused primarily on OSS markers.

Relationship between Current Objective and Subjective Socioeconomic Status

The majority of work regarding the determinants of SSS has utilized a cognitive averaging framework, typically using some number of OSS variables to assess the association between SSS and current income, education and occupation (Ostrove et al., 2000; Singh-Manoux et al., 2003; Operario et al., 2004; Dunn et al., 2006; Ghaed and Gallad, 2007; Wolff et al., 2010; Andersson 2015; Nielsen et al. 2015). Each of these three elements of OSS is highly correlated with SSS. Higher household income is related to higher assessments of SSS (Ostrove et al., 2000; Operario et al., 2004; Dunn et al., 2006; Ghaed and Gallad, 2007; Cohen et al., 2008; Wolff et al., 2010; Cundiff et al., 2013; Andersson 2015; Nielsen et al. 2015). Higher educational attainment is also associated with higher SSS (Ostrove et al., 2000; Operario et al., 2004; Wright and Steptoe, 2005; Dunn et al., 2006; Goldman et al., 2006; Ghaed and Gallad, 2007; Cohen et al., 2008; Demakakos et al., 2008; Wolff et al., 2010; Andersson 2015; Nielsen et al. 2015). Aspects of one's occupation, particularly prestige, autonomy and satisfaction, have also been assessed, mostly in the UK. These studies also tend to exhibit positive relationships between SSS and occupational prestige and autonomy (Ostrove et al., 2000; Singh-Manoux et al., 2003; Singh-Manoux et al., 2005; Ghaed and Gallo, 2007; Demakakos et al., 2008; Miyakawa et al. 2012; Andersson 2015; Nielsen et al. 2015).

While each indicator of personal objective SES has been found to correlate with SSS, the relative importance of each measure has been debated in the literature. Some have found income to be a stronger predictor of SSS in comparison with education (Ostrove et al., 2000; Singh-Manoux et al., 2003; Operario et al., 2004; Dunn et al., 2006; Wolff et al., 2010), while others have shown that education is more predictive of subjective status (Dunn et al., 2006; Ghaed and Gallad, 2007; Andersson 2015; Nielsen et al. 2015). These differences may be due to the samples

examined; in the more homogenous and smaller samples, education appears to matter more (Wolff et al. 2010). In addition to these three traditional markers of OSS, a number of other objective measures of SES are associated with SSS. Several studies have investigated correlations between SSS and various measures of assets and wealth (Singh-Manoux et al., 2003; Goldman et al., 2006; Demakakos et al., 2008; Nielsen et al. 2015), family savings (Chen and Patterson 2006), and home ownership (Wolff et al. 2010; Nielsen et al. 2015).

Despite the strong focus on how personal aspects of OSS are related with SSS, some studies have expanded the idea of “cognitive averaging” to include the current OSS of other people proximate to the individual. In a sense, all previously mentioned studies involving household income indirectly evaluate the extent to which the OSS of the entire household affects individually assessed SSS (Ostrove et al., 2000; Operario et al., 2004; Dunn et al., 2006; Ghaed and Gallad, 2007; Cohen et al., 2008; Wolff et al., 2010; Cundiff et al., 2013). More overtly, others have evaluated the extent to which one’s spouse’ education and occupation relate to their own SSS (Ostrove et al., 2000; Goldman et al., 2006).

SSS across the Life Course: Inter- and Intra- Generational Processes

Nearly all of the previously discussed literature on the correlates of subjective social status has relied on cross-sectional analyses of current objective SES or psychosocial covariates of SSS. The importance of the life course concept of the “cognitive averaging process” (Singh-Manoux et al. 2003) draws not only on current SES but also future expectations and past experiences. As adolescents transition away from the family-dominated contexts of childhood and into broader social institutions, peers and adult figures besides their parents begin to play a larger role in their lives (Larson and Richards 1991). Inside this larger social context, adolescents may realize that other people come from different socioeconomic backgrounds, and they may

begin to consider their place in the social hierarchy for the first time. Just as adolescents begin to develop their sense of identity (independent of their parents) as they transition to adulthood, they also begin to develop their own sense of socioeconomic status, and thus their own SSS. While young children necessarily rely on their parents OSS as a proxy for their own OSS (Goodman et al. 2007), parental OSS continue to position adolescents in social environments, such as schools and neighborhoods (Massey and Denton, 1988; Jencks and Mayer, 1990) and extracurricular activities and peer groups (Lareau 2003). These environments provide adolescents with reference groups for SSS comparisons across the rest of the early life course (Easterlin 1973). Thus the objective social status of one's parents, both directly as a reference point and indirectly as a structural determinant of educational and peer experiences, continue to cast a long shadow on SSS perceptions, even as individuals transition into adulthood and have their own OSS markers to include in cognitive averaging processes.

Psychosocial Determinants of SSS

Research on how psychosocial factors relate to SSS has been less extensive than that on the relationship between OSS and SSS, perhaps due to Singh-Manoux et al.'s (2003:1331) declaration that the SSS development process "is not driven by psychological biases." Indeed, their study of British civil servants aged 45 - 69 failed to find any association between psychosocial variables and subjective status. It is true that the majority of psychosocial factors, though significantly associated with SSS, are typically reduced to little or no effect on SSS when OSS variables are included in the analysis. Evidence for relationships between SSS and negative affect (Adler et al., 2000; Operario et al., 2004), self-esteem (Chen and Paterson, 2006; Goodman et al., 2007; Lundberg and Kristenson, 2008), mastery (Lundberg and Kristenson 2008), trust (Lundberg and Kristenson 2008), control (Singh-Manoux et al., 2003; Lundberg and

Kristenson, 2008), optimism (Chen and Paterson 2006), perceived control (Chen and Paterson 2006), discrimination (Chen and Paterson 2006), and hostility (Chen and Paterson 2006) have all been examined, and few, if any, significantly predict SSS when accounting for objective measures. Somewhere between objective and subjective, a number of variables relating to perceptions of the quality of one's economic resources and occupation are also associated with SSS. Perceptions about one's financial situation have repeatedly been found to relate to SSS (Singh-Manoux et al., 2003; Wright and Steptoe, 2005; Miyakawa et al., 2012; Andersson 2015).

The Psychological Consequences of Unmet Expectations on Subjective Social Status

Singh-Manoux et al. (2003) theorized that SSS was derived from a process of “cognitive averaging” of not only current and past OSS markers, but also expectations of future OSS attainment. Similarly, it is reasonable to expect that individuals are simultaneously assessing the extent to which they are currently meeting past expectations of OSS attainment, which is another reason why early life, when these expectations begin to develop, may matter for SSS development. While no study has examined how failing to meet expectations is related to SSS, Hardie (2014) did find that young adults who failed to meet their occupational expectations exhibited more depressive symptoms. While this study focused on depression as the result of internalized psychological experiences such as dejection, subjective social status is likely to also be impacted by similar psychological distress. Thus, failure to meet expectations may be included in the cognitive averaging of SSS in young adulthood.

Subjective Social Status in Young Adulthood

Only one study to date has focused on the determinants of subjective social status in young adulthood. Using Add Health data, Nielsen et al. (2015) use a typical cognitive averaging framework to show that SSS in young adulthood more related to proximate measures of

objective socioeconomic status. They did find that early life variables, such as parental income in adolescence and high school GPA remained significant to SSS in young adulthood. However, key questions remain, particularly if and how psychosocial resources matter for young adult SSS and how ideas about nonmaterial status figure into the cognitive averaging process. This paper builds off of the Nielsen et al (2015) paper by testing life course models of SSS development that also investigate additional non-OSS variables that support an expanded framework of cognitive averaging.

Expanding the Concept of Cognitive Averaging

In this paper, I aim to expand the concept of “cognitive averaging” to fit the life course perspective and include not just current and personal OSS measures, but also parental OSS, which likely shapes young adults perceptions of their own status. I also will address some unexplored psychosocial variables that may be more predictive for SSS than previous attempts, especially for the young adult cohort that I examine. Finally, in addition to examining additional concepts included in the process of cognitive averaging, I will also examine some indicators of nonmaterial status that may shape the contexts in which this SSS development occurs.

Figure 1 depicts two life course mechanisms -- parental OSS and own OSS – that young adults use during the process of “cognitive averaging” to assess their own SSS (Pudrovska and Anikputa 2014). The pathway model (#1) asserts that the only reason parental OSS may matter for SSS development is by supporting the OSS attainment of the child, as the status attainment model would suggest (Blau and Duncan 1967). On the other hand, the accumulation model (#2), maintains that both parental and own OSS will independently influence SSS development. This builds off the idea that cognitive averaging includes not just current but also past OSS experiences, including those that adolescents are exposed to early in the life course before they

have their own, independent socioeconomic status. As is common with these life course mechanisms, both may be operating at once to some extent, and thus it may be difficult to empirically sort out these two mechanisms. In a nationally representative sample of Swedish men and women, childhood financial difficulties reduced SSS independently of current OSS, supporting an accumulation of risk model (Miyakawa et al. 2012). Nielsen et al. (2015) found that while parental education was not independently related to young adult SSS, parental income was positively associated with young adult SSS when adjusted for young adult SSS.

In addition to exploring these life course indicators of objective socioeconomic status, nonmaterial perceptions of status and psychosocial resources will be included in and shape the process of cognitive averaging. To my knowledge, no one has examined these types of variables using a nationally representative sample of young adults in the US. In a time of fluid objective socioeconomic status during the transition to adulthood, these psychological factors may be important for young adults. By expanding the framework of cognitive averaging to allow for additional non-OSS variables, we can better understand how material and nonmaterial conceptualizations of status interact to elucidate the process SSS development.

Hypotheses

I frame SSS in young adulthood as a multidimensional concept that develops over the life course and is influenced by parental OSS, individual-level OSS, and psychosocial characteristics of adolescence. I test the following hypotheses:

1. Current objective socioeconomic status, including educational attainment, personal and household income and occupation status, will be highly correlated with subjective social status, such that those with more money and education and more prestigious jobs have higher SSS.

2. Parental objective socioeconomic status in adolescence will exhibit a positive relationship with subjective social status in young adulthood, independent of own OSS, supporting an accumulation hypothesis.
3. Psychosocial and nonmaterial variables will also be related to subjective social status, independent of parental and individual objective socioeconomic status:
 1. Mastery, optimism and confidence in personal intelligence and attractiveness will be positively associated with SSS.
 2. Dissatisfaction with current education level, financial strain, perceptions of stress, and depressive symptoms will be negatively associated with SSS

Data And Methods

I use data from three waves of the National Longitudinal Study of Adolescent Health (Add Health). Add Health is a nationally representative, multistage stratified survey begun in adolescence, sampling students in grades 7 through 12 during the 1994-1995 school year. The sample is drawn from and clustered within 132 schools (80 high schools and the middle schools and junior high schools that feed into them). In addition to the original study, three additional waves of data collection have been conducted, following these students from adolescence through the early portion of their life course. I use data from Waves I and IV of Add Health. Dropping all respondents without the relevant variables or sample weights leaves me with a sample size of 10,895. Most missing data comes from those missing information on own assets (620), parent education (877), and occupational prestige (306).

My analysis begins with descriptive statistics, which are presented in Table 1 of this paper. To explore bivariate relationships between SSS and my explanatory variables, I calculated the mean SSS score for each of the covariates, which are presented in Table 2. I ran OLS models,

using the appropriate survey weights and commands in Stata 13.1, to test the multivariate relationships between the explanatory variables and SSS. In Table 3, I build three separate models that test the three hypotheses regarding the main predictors of SSS: 1) parental OSS, 2) own OSS, and 3) psychosocial/nonmaterial variables. The final model in Table 3 assess the extent to which the explanatory variables remain significant when mutually adjusted, or which measures are independently important for the cognitive averaging process of SSS development. , I introduce own OSS and own psychosocial variables in a stepwise fashion to test whether the relationships between these variables and SSS persist in the multivariate, fully adjusted models.

Measures

Dependent Variable:

Subjective Social Status: My dependent variable is a linear operationalization of subjective social status, as measured by the MacArthur Scale of Subjective Status included in Wave IV of Add Health. Respondents were shown a picture of a ladder and asked to place themselves on a rung based on how their education, income and job compared to others in the United States, ranging from 1 (lowest on ladder) to 10 (highest on ladder).

Independent Variables:

Current OSS:

Current objective socioeconomic status of the respondent comes from the in-home portion of the Wave IV interview.

Education: Respondent education was measured by asking respondents to report the highest level of education they have yet obtained. I collapse the 13 categorical responses into five substantively meaningful categories: less than high school, high school graduate, some college, college graduate, and some graduate work (or beyond).

Income: I will investigate two types of income: respondents reported their personal earnings from the past year as well as their household income. Both questions provided income categories, from which I assign the midpoint value to create linear variables, in thousands of dollars. Examining each one of them separately will contribute to the assessment of the extent to which personal OSS and related OSS matter for SSS.

Occupation: Respondents reported their current or most recent occupation. Add Health reported the 6 digit Standardized Occupational Classification codes (SOC codes) for the respondent. Using these codes, I matched each occupation with its Nakao and Treas (1994) prestige score (range 0 – 100). I choose to use a measure of prestige rather than a composite measure of the typical income and educational attainment associated with each occupation in order to capture another dimension of OSS not measured by the respondent's income and education.

Wealth: Respondents were asked to indicate their “best estimate of the total value of [their] assets and the assets of everyone who lives in [their] household and contributes to the household budget”. Wealth responses were also in ranges, from which I use the midpoints to create a linear assets measure, in thousands of dollars.

Home Ownership: I create a dummy variable of home ownership based on respondents answers to the following question: “Is your house, apartment, or residence owned or being bought by you and/or your spouse/partner?”

Financial Strain: Using six questions regarding whether in the past 12 months the respondent reported that they or their household 1) “were without phone service because [they] didn't have enough money?” 2) “didn't pay the full amount of the rent or mortgage because [they] didn't have enough money?” 3) “were evicted from [their] house or apartment for not paying the rent or mortgage?” 4) “didn't pay the full amount of a gas, electricity, or oil bill because [they] didn't

have enough money?” 5) “had the service turned off by the gas or electric company, or the oil company wouldn't deliver, because payments were not made?” 6) “worried whether food would run out before [they] would get money to buy more?”, I created three categories of financial strain: no financial strain (no indicators of strain), some financial strain (1 or 2 indicators) or much financial strain (3 or more).

Parental OSS in Adolescence Markers:

Measures of objective socioeconomic status of the respondent's family in adolescence come from Wave I.

Parental Household Income: Parental household income status is a categorical variable taken from the parental questionnaire from Wave I, where a parent or parent figure (most often the respondent's mother) reported their 1994 annual household income in thousands. Because of the large amount of missing data, I created a categorical variable that includes poor (household income below \$15,000, approximately the federal poverty line of 1994: \$14,800), near poor (\$16,000 – \$30,000: twice the federal poverty line in 1994), not poor (\$31,000 or more) or missing.

Parental Education: I use the highest reported education for either the resident mother or father in the Wave I in-home interview. If a respondent only reported the educational attainment information for one parent, that is the education level used. This categories mirror the operationalization of individuals' own education.

Psychosocial Factors:

All psychosocial variables described in this section are from Wave IV.

Mastery/Control: Add Health asked respondents the extent to which they agree with the following statements regarding mastery: “There is little I can do to change the important things

in my life”, Other people determine most of what I can and cannot do”, “There are many things that interfere with what I want to do”, “I have little control over the things that happen to me” and “There is really no way to solve the problems I have”. I create a scale of personal mastery from these questions by summing responses (which range from 1 to 5) over the five items so the scale ranges from 5 – 25, with higher values representing more mastery.

Optimism: Add Health asked respondents the extent to which they agree with the following statements regarding optimism: “I’m always optimistic about my future”, “I hardly ever expect things to go my way”, “Overall I expect more good things to happen to me than bad” and “I rarely count on good things happening to me”. I create a scale of optimism from these questions by summing responses (reverse coded when needed, which range from 1 to 5) over the four items so the scale ranges from 4 – 20, with higher values representing more optimism.

Perceived stress: Add Health includes questions to measure the Cohen Perceived Stress scale, including how often in the last 30 days the respondent felt unable to control the important things in their life, how confident they felt able to handle personal problems, how often they felt things were going their way, and how often they felt their difficulties were too hard or too many to overcome. I create a scale of perceived stress from these questions by summing responses (which range from 1 to 5) over the four items so the scale ranges from 4 – 20, with higher values representing more stress.

Depression: Add Health contains variables that can be used to create a linear scale that reflects the normative Center for Epidemiological Studies Depression (C-ESD) Scale. The CESD scale at Wave IV ranges from 0 – 27, with higher CESD scores reflecting more depressive symptoms for the respondent.

Self-Esteem: I use two variables that measure two aspects of personal confidence, perceived attractiveness and perceived intelligence. In Wave IV, respondents were asked to rate their attractiveness and intelligence relative to people their own age. I recode perceived attractiveness into four categories: not attractive, slightly attractive, moderately attractive and very attractive. Intelligence is categorized as above average, average and below average.

Add Health Picture Vocabulary: Add Health administered an abridged version of the Peabody Picture Vocabulary Test to respondents in Wave I, which was then standardized to mirror an IQ scale, with a mean of 100 and standard deviation of 15. The AHPVT is a measure of verbal ability and ranges from 13 – 146.

Satisfaction with educational attainment: In Wave IV, respondents reported that they either have received their desired amount of education or that they have not yet reached their desired educational attainment. Those who have not reached their desired educational level are coded as “1”, while those who have are coded as “0”.

Controls:

I control for age, sex, race/ethnicity (White, Black, Asian, Native American/Other and Hispanic), family structure (living with both biological parents; two-parents, step; single mother; single father; or other), and immigrant status (first, second or third+ generation) at baseline and marital status at Wave IV. I also control for respondents' living situations with a dummy variable for those who are living with their parents, as this may inflate the household income reported by respondents. I also control for Add Health Picture Vocabulary (AHPVT) score, an abridged version of the Peabody Picture Vocabulary Test from Wave I standardized to mirror an IQ scale. The AHPVT is an objective measure of verbal ability and ranges from 13 – 146.

Results

Table 2.1 shows the basic demographic make-up of the analytical sample. The mean age at Wave I was 15.41 and just less than 50% of the sample is female. The majority of the sample is White (71.03%), with large portions of Blacks (14.56%) and Hispanics (10.92%). The remainder of the sample was Asian (3.14%) or some other race, typically Native American (0.35%). Most of the respondents were 3rd or greater generation Americans (85.77%), with the rest of the sample being children of immigrants (9.95%) or immigrants themselves (4.28%). Most lived with both biological parents during Wave I (56.69%), but many also lived with one biological parent and a step-parent (17.21%). Of those living with only one parent, the majority lived with single mothers (19.70%), though some did live with a single father (3.08%). The rest (3.31%) lived in some other family arrangement, typically living with one or both grandparents. By Wave IV, over two-thirds of the sample was married.

Table 2.2 describes the distributions of the OSS variables within the analytical sample. Just under a third of respondents had a parent with at least a high school degree; about a fifth of the parents of the respondents had some college, while another fifth had a college degree. 11.76% had at least some graduate education, while the remainder had less than a high school education. The modal category of parent income was not poor (49.75%), while 12.04% of respondents had parents who were poor, and 17.65% who were near poor. About a fifth of respondents were missing parental income data, but to maintain sample size I include them as a category on the income dummy measure. The respondents themselves were slightly more educated than their parents (approximately three-fourths had at least some college). Mean personal earnings were \$35,960, but mean household income was almost twice as much, signifying that most households have multiple earners. Average occupational prestige among

respondents was 45.00 and 45.40% of respondents owned their own home in Wave IV. Approximately 16% of respondents reported less than \$5,000 in assets, and 7.70% of respondents had more than \$250,000 in assets.

Table 2.3 presents the descriptive statistics for the psychosocial variables. The mean CESD score at Wave IV was fairly low (5.03), and mastery was fairly high (mean=19.64). The mean optimism scale score was 14.95, and perceived stress was fairly low (mean = 4.6). Over 75% of the sample reported not yet reaching their desired level of educational attainment. Most reported no financial strain, though 7.30% reported high strain. Over 60% of the sample considered themselves of above average intelligence, while the majority of the sample (53.10%) considered themselves moderately attractive. Average BMI at Wave IV was 28.91 and average height was about 67 inches. Finally, the average AH PVT score in this sample was 102.92, and just over 11% of the respondents lived with their parents at Wave IV.

Table 2.4 shows the mean SSS score across the categories of key covariates. The older respondents (age 29-32 in Wave IV) had slightly higher SSS, but there are no gender differences in SSS. Blacks reported the lowest average SSS (4.72), Hispanics were slightly above that (4.98), and Whites in the middle (5.14). Asians and Native Americans/Others reported the highest mean SSS (5.50 and 5.35, respectively). 3rd+ generation immigrant respondents had slightly lower SSS than first and second-generation respondents. Those from two biological parent households had the highest SSS compared to other family structures. Those with highest parental SES (not poor, college degree or more) had the highest SSS, and those with high OSS of their own (higher personal and household income, college or more education, professional/ managerial occupation, owns home, and highest assets bracket) also had the highest SSS. SSS also has a relationship with educational dissatisfaction and financial strain, with those dissatisfied and experiencing

high strain having the lowest SSS. Finally, both measures of personal confidence were associated with SSS, as those who consider themselves of above average intelligence and very attractive had the highest SSS scores. These bivariate, unadjusted associations are in the expected directions, exhibiting preliminary support for my three hypotheses.

Table 2.5 presents the multivariate regression analysis that tests my hypotheses and the extent to which each hypothesized measure is independently and additively associated with SSS in young adulthood. Model 1 tests the associations between SSS and parental OSS. Both parental education and income are related to SSS in young adulthood. Less than HS parental education was associated with a 0.180 reduction in SSS, while those with parents reporting any level of education higher than high school had increased SSS. Those with a parent with postgraduate education had increased SSS of almost an entire ladder rung (0.909). In addition, those with “poor” or “near poor” parental incomes had lower SSS, 0.362 and 0.342 respectively, while missing parental income was statistically unrelated to SSS.

Model 2 in Table 2.5 examines the associations between respondents’ own OSS measures in young adulthood and their SSS. Education is highly and positively related to SSS, as is household income, personal income and occupational prestige score. Compared to those with HS degrees, respondents without a HS degree had 0.214 lower SSS and those with postgraduate education had 1.211 higher SSS. A \$1,000 increase in household income is associated with a 0.006 increase in SSS, and each additional \$1,000 in personal income was associated with a 0.003 unit increase in SSS. Other measures of current socioeconomic status, including measures of wealth, like owning a home and other assets, are positively associated with SSS in young adulthood, while financial strain, is negatively associated with SSS (those with the highest level of financial strain have 0.931 lower SSS than those with no financial strain).

Model 3 looks at measures of psychosocial resources in young adulthood. Perceived stress, mastery and optimism are significantly related to SSS in the expected direction, while depressive symptoms are unrelated to SSS. Those who report dissatisfaction with their current level of education have 0.533 lower SSS scores than those who are satisfied with their educational attainment.

Perceiving oneself as above average intelligent is associated with higher SSS scores, and perceived attractiveness is also positively associated with SSS in young adulthood. Those who feel like they are above average intelligence have 0.499 higher SSS, while those who think they are below average are not statistically different than those who feel there are of average intelligence. Compared to those who believe they are of average attractiveness, those who believe they are below average have 0.352 lower SSS, and those who are above average and highly above average have 0.185 and 0.320 higher SSS scores, respectively. Picture vocabulary score (AHPVT), is positively associated with SSS in model 3 ($\beta=0.005$).

The final model in Table 2.5, Model 4, includes all hypothesized variables and assessed the extent to which each should be included in the expanded cognitive averaging process as independent, additive influencers of SSS. Most remain significantly related, though the sizes of the associations are often smaller in the full model. The inclusion of own OSS indicators and psychosocial variables mediates almost all of the parental OSS relationships, including parental income at Wave I, though the highest levels of parental education, a college degree or greater, is still positively associated with young adult SSS. Similarly, respondents' education is still important in the full model, but compared to those with high school degrees, only those with college degrees or greater remain statistically different with increased SSS. Of the psychosocial variables, the association between SSS and mastery is attenuated by inclusion of the OSS

variables. Finally, in the fully adjusted model, addition in OSS variables flips the direction of the association of AHPVT score and SSS from positive to negative. Summary Table 2.6 shows how the addition of each variable (or group of variables) into the model changes the fit of the model. Each model with an additional variable added to it is statistically different from the previous model nested within it at the $p < 0.05$ level. The largest r-squared increase is due to the inclusion of own OSS variables (0.167). The next most important additional variables are perceived social stress (r-squared increases 0.027) and financial strain (r-squared increases 0.024).

Discussion and Conclusion

My study aimed to address the independent associations of three main groups of variables and SSS in young adulthood. As the models suggest, nearly all measures of own OSS, parental SSS and psychosocial resources are significantly related to SSS in young adulthood. I find the strongest support for Hypothesis 1 and argue that while other aspects of status are key to understanding SSS, current own OSS is the most important aspect. However, while this finding is congruent with others' conclusions that OSS indicators make up the largest portion of the cognitive averaging process, I find support for Hypothesis 2, that parental OSS in adolescence is also related to young adult SSS, independent of current OSS, and find evidence of both pathway and accumulation models. Finally, my results demonstrate that the cognitive averaging process in young adults includes psychosocial variables as well, supporting Hypothesis 3. These findings support an expanded understanding of the cognitive averaging process to include not just current objective socioeconomic status, but also parental socioeconomic status and additional noneconomic concepts of status, including non-cognitive psychosocial resources. I also find evidence to suggest that this cognitive averaging process is dependent on people's perceptions

and interpretations of their material resources within socially structured schemas (Sewell 2005, Hanks et al. 2011).

Of the OSS markers, education, particularly higher education, had the largest association with SSS. Those who had college degrees or more graduate education had significantly higher SSS scores, suggesting that perhaps during this relatively early life course stage, when career trajectories are just starting for some young adults, the perceived status associated with higher degree attainment is large. Those without high school degrees or with only some college education were not statistically different from those with high school degrees once other OSS measures were introduced, suggesting that income and occupational limitations possibly associated with lower educational attainments mediate the relationship between less education and SSS in young adulthood. Income, both personal and household, and occupational prestige are also positively related to young adult SSS, though to a lesser degree. In order to receive the same gains in SSS as a college degree gives, respondents would have to increase their income.

While parental measures of objective socioeconomic status in adolescence have strong bivariate associations with SSS in young adulthood, adjusting for current, own OSS mediates most of the associations. This supports a pathway model of SSS development, as shown in, as much of the association between parental OSS measures in young adulthood operates through the pathway of young adult OSS (Duncan and Blau 1963). However, there is still a relationship between high parental educational attainment and young adult SSS, independent of young adult OSS, supporting an accumulation framework where young adults from well-educated families continue to include in their personal evaluations of social status the higher subjective status associated with their advantaged background. Just as higher levels of own education are more status building than lower levels are status diminishing, this status sharing only applies to young

adults from well-educated families, as low parental education levels are not involved in the status-sharing process of cognitive averaging.

My findings on the OSS correlates of young adult SSS are similar to the results presented in Nielsen et al. (2015) from the same data set, though a few key differences exist. Namely, I find that parental education, particularly having highly educated parents, is related to young adult SSS, while parental income is unrelated, though Nielsen finds the opposite. Nielsen and colleagues' chose to measure categorical educational attainment as a linear variable, I expect the relationship between educational attainment and SSS to be nonlinear; that is, reaching certain educational milestones such as college graduation, are more cognitively meaningful in one's perception of their SSS than achieving 14 versus 13 years of education. However, separate models I ran demonstrate that even linear operationalizations of parental education, rather than parental income, are related to SSS in my full models. They also found a positive relationship between SSS and Hispanic ethnicity, which I find disappears when including measure of immigrant status. While our current OSS findings are otherwise similar, my paper makes several new contributions to our understanding of the cognitive averaging process in the development of SSS in young adults, particularly regarding psychosocial correlates and the importance of personal schemas.

I find mixed results for the psychosocial explanatory variables. First, mastery and depressive symptoms are unrelated to SSS in the fully adjusted models, which suggest these psychosocial concepts are not included in young adult cognitive averaging processes, or are mediated by current OSS, as these individuals are able to achieve higher OSS. Levels of perceived stress (adjusted for financial strain) are negatively and independently associated with SSS. Optimism is independently and positively related to SSS, suggesting that perhaps those

with more positive outlooks are slightly more likely to report higher subjective status, though this psychosocial resource does not mediate any relationship between OSS and SSS, alleviating concerns that subjective status may be too indicative of personality characteristics instead of a cognitive averaging of OSS indicators¹. Therefore, while perceived stress and optimism are independently related to SSS in young adulthood, they are simply two additional small parts including in the overall cognitive averaging process.

These psychosocial associations with SSS in young adulthood suggest that not only are people's psychological resources independently related to their internalization of status, but also these psychological processes are likely involved in the shaping the cognitive averaging of OSS. Cognitive averaging, by definition, must occur within a certain individual's unique internal understanding of the world. Others have identified this psychological context as "schema", or a learned set of ways of interacting with and understanding the world that has been shaped over time by social structures and contexts (Sewell 2005, Hanks et al. 2011). I argue that my research provides the first empirical hints of schemas playing a role in this cognitive process of SSS evaluation. The first, and I argue most important, indicator of the influence of schemas is the strong association of perceived intelligence with SSS, independent of measured verbal ability or educational attainment.

Since confidence in one's level of intelligence is mostly unrelated to ascribed intelligence or attained educational status, the development of this self-esteem indicator is likely shaped across the life course schematic developmental process. Parents and teachers, academic and non-academic experiences, may build up or break down self-esteem and confidence. Thus, despite

¹ Earlier analyses included measures of the "Big Five" personality types (Barrick and Mount 1991); however, they were dropped from further analyses due to non-significant associations with SSS in adjusted models.

perhaps among those who have not yet attained certain levels of education, income and occupational status, they believe they surely are competent enough to do so and thus ignore their low OSS in the cognitive averaging process in favor of weighing heavily their as-of-yet unattained OSS potential through perceived above average intelligence. Or, even among those with higher levels of SES, perceiving oneself to be more intelligent than others of similar educational and status attainment levels, with whom they have interacted across their early life course and thus who have shaped their personal schemas, may perceive oneself to be of a higher SSS position.²

Whereas perceived intelligence may be an element of schema that shapes perceptions regarding the weight of OSS in their cognitive averaging process, perceived attractiveness, also shaped by schemas, may be more closely tied to optimism/personal self-worth. However, since I could not include an objective measure of attractiveness³, I cannot assess the extent to which perceived attractiveness may be reflecting an actual degree of attractiveness, which previous literature has tied to status (Udry and Eckland 1984; Umberson and Hughes 1987). Nonetheless, the importance of ones' perceptions of their noneconomic indicators of status is undoubtedly an important element of the cognitive averaging process that occurs within individual schemas that should be considered in future research.

The second evidence of my results in support of cognitive averaging within a schema shaped by various social structures across the life course is self-reported financial stress. Interestingly, financial stress didn't mediate the association between income and SSS, suggesting that that at every level of income, those who are unable to pay their bills have lower subjective

² Interactions between education level and perceived intelligence, not presented here, were non-significant.

³ Controlling for interview-rated attractiveness, the closest available proxy to an objective measure of attractiveness, does not change the associations between perceived attractiveness and SSS.

status. Thus, while income levels play into one's perception of their own subjective status, financial strain provides an additional, more relative measure of material resources. The same amount of annual income may support different standards of living in various residential areas and for various family structures, which I do not explicitly test for in this analysis. These ideas about standards of living may have been shaped by schemas developed in early life, when adolescents may internalize their parent's standards of living as normative or even ideal (Easterlin 1973). Thus, even for people who may have a seemingly high household income, those who spend outside their means attempting to maintain a standard of living idealized within their schema may have lower SSS levels⁴. Conversely, those who may have relatively low incomes who feel like they have achieved great financial success may have elevated SSS.

Another social structure that may be influencing schema development and thus the cognitive averaging process may be related to racial and ethnic identity and immigrant status. While original descriptive analysis showed SSS differentials between racial/ethnic categories, most of these differences were due to OSS differentials between these groups that corresponded with SSS disparities. However, three sociodemographic characteristics of note persist as important. Blacks and Native Americans/Others had lower SSS scores than Whites, when all other measures were in the full model, suggesting that these oft discriminated-against groups may internalize society's devaluation of these racial minorities and the struggle to achieve equality while placing themselves on the status ladder⁵. Unfortunately, Add Health's indicators

⁴ Interactions between financial strain and household income levels, not presented in this paper, were insignificant.

⁵ I also tested models with interactions between OSS measures and race/ethnicity, but don't present them here due to a lack of significant racial and ethnic differences. Instead, I conclude that while racial and ethnic schemas likely shape the cognitive averaging process, I cannot provide empirical evidence of such a phenomenon.

of discrimination made it difficult to distinguish between racial discrimination and other types of discrimination, though further research should explore this phenomenon. Additionally, second generation immigrants, all things considered, have slightly higher SSS scores than third or greater generation respondents. Immigrant status could be another structure influencing schema development, as these children of immigrants may be evaluating their current OSS attainment within a schema shaped by the immigrant experience (Franzini and Fernandez-Esquer, 2006).

While this research has proposed a variety of elements, both material and schematic, associated with SSS in young adulthood, it is limited for a number of reasons, for which I will propose future research suggestion to improve. First, even though I employ a longitudinal design, I cannot examine causal relationships between parental OSS, own OSS and SSS because there may be other unobserved factors related to all three concepts⁶. Thus, I can only investigate cross-sectional associations between SSS, current OSS and other variables in young adulthood. However, I am able to control for an extensive set of variables (and more than any previous research) that may be possible confounders in the associations between OSS across the life course and SSS in young adulthood. Future research, drawing for the next wave of Add Health, can investigate how changes in OSS and psychosocial factors may relate to changes in SSS, providing a more causal story about the cognitive averaging process. Secondly, my conclusions regarding the role schemas likely play in the SSS cognitive averaging process are as of yet only theoretical. Additional research will be needed to further unravel the mystery of what exactly goes on in people's minds during the cognitive averaging process. In addition to qualitative research, which may be better suited to exploratory research regarding schemas and subjective

⁶ School fixed effect models produced similar results, suggesting that these unobserved variables at the school and neighborhood level may not be confounding the relationships described here.

social status, quantitative studies could benefit from the inclusion of better measures of personality, confidence and other things that could be related to schemas.

Figure 2.1: Conceptual Model

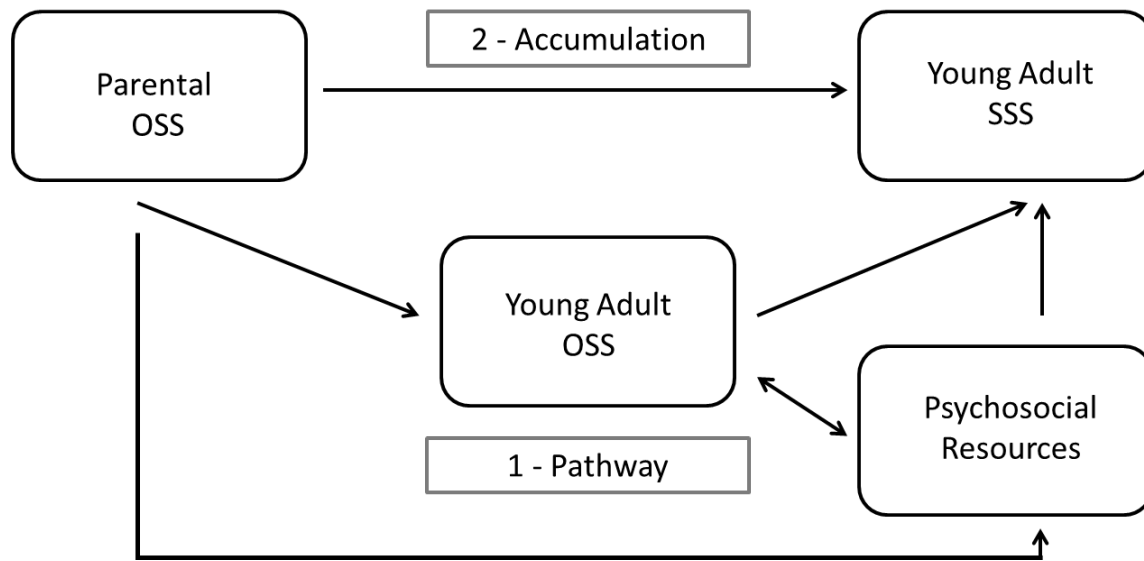


Table 2.1: Sociodemographic Variables (N = 10,895)*

		Mean/Proportion	SD
Age at Baseline		15.41	1.80
Female		49.74%	
Race/Ethnicity			
	White	71.03%	
	Black	14.56%	
	Asian	3.14%	
	NA/Other	0.35%	
	Hispanic	10.92%	
Immigrant Status			
	1st Generation	4.28%	
	2nd Generation	9.95%	
	3 rd + Generation	85.77%	
Family Structure			
	Two parent, bio	56.69%	
	Two parent, step	17.21%	
	Single Mom	19.70%	
	Single Dad	3.08%	
	Other	3.31%	
Ever Married by Wave IV		66.95%	

*Values are weighted

Table 2.2: Objective Socioeconomic Status Variables (N = 10,895)*

		Mean/Proportion	SD	Range
Parent Education				
	Less than HS	11.45%		
	HS Degree	31.68%		
	Some College	22.03%		
	College	23.08%		
	Graduate +	11.76%		
Parent Income				
	Poor	12.04%		
	Near poor	17.65%		
	Not Poor	49.75%		
	Missing	20.56%		
Own Education				
	Less than HS	7.59%		
	HS Degree	19.16%		
	Some College	39.98%		
	College+	25.38%		
	Graduate +	7.88%		
Own Household Income		64.88	44.59	2.5 - 200
Own Personal Income		35.96	40.01	0 - 1000
Own Occupational Prestige		45.00	13.07	16.9 – 86.01
Owens Own Home		45.40%		
Own Assets				
	< 5,000	16.95%		
	5 - 50,000	47.09%		
	50,000 - 250,000	28.26%		
	250,000+	7.70%		

*Values are weighted

Table 2.3: Psychosocial and Other Variables (N = 10,895)*

		Mean/Proportion	SD	Range
CESD Wave IV		5.03	4.04	0 - 27
Mastery Scale		19.64	2.77	5 - 25
Optimism Scale		14.95	2.42	4 - 20
Perceived Stress Scale		4.66	2.95	0 - 16
Dissatisfied with Educational Attainment		75.08%		
Financial Strain				
	No Strain	75.10%		
	Low Strain	17.60%		
	High Strain	7.30%		
Perceived Intelligence				
	Below Average	3.42%		
	Average	35.53%		
	Above Average	61.05%		
Perceived Attractiveness				
	Not Attractive	1.95%		
	Slightly Attractive	31.36%		
	Moderately Attractive	53.10%		
	Very Attractive	13.58%		
BMI Wave IV		28.91	7.38	
Height Wave IV		67.75	4.19	
AH PVT Score		102.92	13.61	
Lives with Parents, Wave IV		11.34%		

*Values are weighted

Table 2.4: Mean Subjective Socioeconomic Status, by Covariates (N = 10,895)*

		Mean Ladder	Standard Error	95% Confidence Interval	
Age					
	24-28	4.97	0.05	4.88	5.06
	28-32	5.18	0.06	5.06	5.30
Gender					
	Women	5.10	0.05	5.00	5.20
	Men	5.05	0.05	4.94	5.15
Race/Ethnicity					
	White	5.14	0.05	5.03	5.25
	Black	4.72	0.08	4.56	4.88
	Asian	5.50	0.14	5.22	5.78
	NA/Other	5.35	0.19	4.97	5.73
	Hispanic	4.98	0.08	4.83	5.14
Immigrant Status					
	1st Generation	5.32	0.10	5.12	5.52
	2nd Generation	5.28	0.08	5.13	5.43
	3 rd + Generation	5.04	0.05	4.94	5.13
Family Structure					
	Two parent, bio	5.27	0.05	5.17	5.37
	Two parent, step	4.91	0.06	4.79	5.02
	Single Mom	4.77	0.06	4.65	4.88
	Single Dad	4.68	0.13	4.43	4.94
	Other	4.77	0.18	4.41	5.13
Marital Status					
	Married	5.12	0.05	5.02	5.22
	Not married	4.98	0.06	4.87	5.09
Parent Education					
	Less than HS	4.58	0.09	4.39	4.76
	HS Degree	4.76	0.04	4.68	4.84
	Some College	5.04	0.06	4.93	5.15
	College	5.37	0.06	5.26	5.49
	Graduate +	5.88	0.10	5.68	6.07
Parent Income					
	Poor	4.56	0.08	4.41	4.70
	Near Poor	4.71	0.06	4.60	4.82
	Not Poor	5.32	0.05	5.23	5.42
	Missing	5.08	0.07	4.94	5.23
Own Education					

	Less than HS	3.99	0.08	3.83	4.16
	HS Degree	4.51	0.06	4.40	4.63
	Some College	4.86	0.04	4.79	4.93
	College+	5.71	0.05	5.62	5.80
	Graduate +	6.52	0.09	6.33	6.70
Own Income					
	Poor	4.06	0.09	3.89	4.24
	Near Poor	4.48	0.05	4.39	4.57
	Not Poor	5.42	0.04	5.34	5.51
Own Occupation Quartile					
	Bottom (1 st) Quartile	4.43	0.05	4.33	4.52
	2 nd Quartile	4.78	0.05	4.68	4.88
	3 rd Quartile	5.32	0.05	5.22	5.43
	Top (4 th) Quartile	5.81	0.06	5.69	5.92
Home Ownership					
	Does Not Own Home	4.80	0.06	4.67	4.91
	Owns Home	5.40	0.05	5.31	5.49
Own Assets					
	< 5,000	4.24	0.06	4.12	4.36
	5 - 50,000	5.00	0.04	4.92	5.09
	50,000 - 250,000	5.46	0.06	5.34	5.59
	250,000+	5.91	0.11	5.69	6.14
Education Satisfaction					
	Satisfied	5.67	0.07	5.54	5.80
	Dissatisfied	4.88	0.04	4.79	4.96
Financial Strain					
	No Strain	5.38	0.05	5.29	5.47
	Low Strain	4.35	0.05	4.26	4.45
	High Strain	3.70	0.08	3.55	3.85
Perceived Intelligence					
	Below Average	4.50	0.12	4.26	4.75
	Average	4.62	0.05	4.53	4.72
	Above Average	5.37	0.05	5.27	5.47
Perceived Attractiveness					
	Not Attractive	4.06	0.13	3.81	4.31
	Slightly Attractive	4.87	0.05	4.77	4.97
	Moderately Attractive	5.20	0.05	5.09	5.30
	Very Attractive	5.22	0.07	5.08	5.36

*Values are weighted

Table 2.5: Correlates of Subjective Social Status in Young Adulthood (n=10,895)*

	(1)	(2)	(3)	(4)
Female	-0.033 (0.049)	-0.035 (0.043)	0.076 (0.046)	0.042 (0.041)
Age	0.047** (0.015)	0.009 (0.013)	0.050*** (0.014)	0.019 (0.013)
Race/Ethnicity (ref = White)				
Black	-0.174* (0.07)	0.032 (0.059)	-0.222** (0.066)	-0.161** (0.059)
Asian	-0.053 (0.132)	-0.235* (0.108)	0.135 (0.110)	-0.147 (0.098)
Native American/Other	-0.128 (0.188)	-0.299 (0.185)	-0.269 (0.207)	-0.382* (0.182)
Hispanic	-0.091 (0.09)	-0.074 (0.075)	-0.165* (0.076)	-0.105 (0.073)
Immigrant Status (Ref = 3rd+ Gen)				
1st Generation	0.457*** (0.107)	0.210* (0.098)	0.359** (0.107)	0.124 (0.095)
2nd Generation	0.317*** (0.077)	0.177* (0.069)	0.257*** (0.073)	0.152* (0.065)
Family Structure, Wave I (Ref = Two-parent Bio)				
Two-Parent, Step	-0.256*** (0.054)	-0.052 (0.053)	-0.197*** (0.051)	-0.037 (0.053)
Single Mother	-0.147* (0.069)	-0.03 (0.054)	-0.282*** (0.055)	-0.028 (0.054)
Single Father	-0.431*** (0.127)	-0.167 (0.103)	-0.410*** (0.107)	-0.175 (0.100)
Other	-0.182 (0.173)	0.041 (0.150)	-0.161 (0.154)	0.068 (0.141)
Married, Wave IV	0.094 (0.049)	-0.046 (0.043)	0.018 (0.044)	-0.036 (0.043)
Lives with Parents, Wave IV	-0.283*** (0.083)	-0.294*** (0.084)	-0.184** (0.069)	-0.199* (0.077)
Parental Education (ref = HS)				
Less than HS	-0.180* (0.086)			0.0596 (0.0638)
Some College	0.218*** (0.055)			0.0297 (0.0470)
College Degree	0.478*** (0.058)			0.107* (0.0478)
Graduate Education	0.909*** (0.097)			0.238*** (0.0666)
Parent Income Category (ref = Not poor)				
Poor	-0.362*** (0.082)			-0.019 (0.07)
Near Poor	-0.342*** (0.063)			-0.042 (0.054)
Missing	-0.09 (0.059)			0.018 (0.051)
Own Education (ref = HS)				

Less than HS		-0.214*		-0.161
		(0.091)		(0.089)
Some College		0.153*		0.0805
		(0.059)		(0.057)
College Degree		0.571***		0.377***
		(0.067)		(0.068)
Graduate Education		1.211***		0.906***
		(0.096)		(0.094)
Wave IV Household Income (thous)		0.006***		0.006***
		(0.001)		(0.001)
Wave IV Personal Income (thous)		0.004***		0.003***
		(0.001)		(0.001)
Occupational Prestige		0.012***		0.012***
		(0.002)		(0.002)
Owens Home, Wave IV		0.149***		0.114**
		(0.044)		(0.041)
Financial Strain (re=none)				
Some Strain		-0.493***		-0.343***
		(0.055)		(0.054)
Highest Strain		-0.931***		-0.617***
		(0.079)		(0.076)
Wave IV Assets (thous)		0.001***		0.001***
		(0.001)		(0.001)
Dissatisfied with Education Attainment			-0.533***	-0.204***
			(0.047)	(0.045)
Cohen Stress Scale Wave IV			-0.118***	-0.076***
			(0.010)	(0.00868)
CESD Wave IV			(0.008)	(0.009)
			(0.009)	(0.008)
Mastery Scale Wave IV			0.025**	0.007
			(0.008)	(0.008)
Optimism Scale Wave IV			0.061***	0.028**
			(0.011)	(0.010)
Perceived Intelligence				
Below Average			0.115	0.070
			(0.139)	(0.129)
Above Average			0.499***	0.290***
			(0.045)	(0.043)
Perceived Attractiveness				
Below Average			-0.352**	-0.283*
			(0.118)	(0.116)
Above Average			0.185***	0.167***
			(0.044)	(0.039)
Highly Above Average			0.320***	0.398***
			(0.081)	(0.071)
AHPVT			0.005*	-0.006**
			(0.002)	(0.002)
Constant	4.296***	3.691***	3.036***	3.877***
	(0.226)	(0.220)	(0.410)	(0.399)
R-squared	0.084	0.278	0.204	0.329

*Values are weighted

Standard errors in parentheses, *** p<0.001, ** p<0.01, * p<0.05

Table 2.6: Summary of Building Subjective Social Status Models (n=10,895)*

	R-Squared	Change in R-Squared	F-Statistic	P-value
Parental OSS	0.084			
Model 1 + Own OSS	0.251	0.167	179.11	0.000
Model 2 + Owns Home	0.254	0.003	22.31	0.000
Model 3 + Financial Strain	0.278	0.024	81.74	0.000
Model 4 + Assets	0.280	0.002	15.98	0.000
Model 5 + Dissatisfied with Education Attainment	0.284	0.004	27.07	0.000
Model 6 + Cohen Stress Scale	0.311	0.027	198.88	0.000
Model 7 + CESD	0.312	0.001	6.04	0.015
Model 8 + Mastery	0.313	0.001	8.05	0.004
Model 9 + Optimism	0.315	0.002	19.18	0.000
Model 10 + Perceived Intelligence	0.321	0.006	24.75	0.000
Model 12 + Perceived Attractiveness	0.327	0.006	16.39	0.000
Model 11 + AHPVT	0.329	0.002	9.64	0.002

*Values are weighted

CHAPTER 3. - SUBJECTIVE SOCIAL STATUS AND PHYSIOLOGICAL DYSREGULATION IN YOUNG ADULTHOOD: MORE EVIDENCE FOR THE SOCIAL GRADIENT IN HEALTH

Introduction

There is strong relationship between socioeconomic status (SES) and health, such that those who are better off economically have better health as well (Adler and Ostrove, 1999; Adler and Rehkopf, 2008; Braveman et al., 2010). Health and socioeconomic status are linked, even in countries where health care is universal, income overall is high and absolute poverty is low (Wilkinson 1999) and within high-status groups (Marmot et al. 1991). These disparities have persisted over historical periods, despite the epidemiological transition and improvements in health care, and for any number of units of analysis, including individuals, households and countries (Adler and Newman, 2002; Braveman et al., 2005; Elo, 2009; Braveman et al., 2010). While decades of health disparities research using objective measures of SES, such as income, education and occupation, have consistently found an SES gradient in health, objective socioeconomic status is only one way to conceptualize SES. Subjective social status, or ones perception of their position in the social stratification hierarchy, is another important aspect of socioeconomic status to consider (Singh-Manoux et al. 2003).

Recently, interest in using subjective social status (SSS) as a measure of SES in health disparities research has increased, as SSS has a strong, positive relationship with health. In fact, there is emerging evidence that suggests SSS is more strongly related to morbidity than objective social status (OSS) (Adler et al., 2000; Ostrove et al., 2000; Singh-Manoux et al., 2005;

Demakakos et al., 2008). This may be either because SSS is simply a better measure of the multifaceted nature of SES than one or more OSS measures, or because SSS better reflects internalized inequality, the true driver of health disparities. While OSS generally reflects differences in access to material resources that perpetuate health disparities (Link and Phelan 1995), SSS may tap into how inequality gets under the skin through a stress process. Those who internalized inequality and perceive their status to be low may experience more stressors and feel more stressed while simultaneously being less equipped to deal with this stress, which gets under the skin to lead to diminished physiological functioning (Marmot 2004, Seeman et al. 2014).

With the widespread availability and growing collection of objective measures of health status through the collection of biomarkers of physiological regulation in data sets, research has turned to examining how SES is related to markers of immune, cardiovascular and metabolic function (Wolfe et al. 2012). To date, no one has examined the relationship between SSS and these types of biomarkers in a nationally representative sample of young adults. Using The National Longitudinal Study of Adolescent to Adult Health (Add Health), this paper examines the associations between SSS and objective health biomarkers to make contributions to the literature on subjective social status and health. First, I show evidence for an SSS-health gradient that is independent of a number of OSS measures across the early life course. Second, I explore mechanisms that reflect the stress of low status as explanations for the association between SSS and the objective measures of physiological functioning.

Background And Framework

Subjective Social Status and Health

In the past 15 years, research has solidly demonstrated that SSS is related to a number of health outcomes. Subjective status is positively correlated with self-rated health (Ostrove et al.,

2000; Operario et al., 2004; Hu et al., 2005; Singh-Manoux et al., 2005; Dunn et al., 2006; Franzini and Fernandez-Esquer, 2006; Goodman et al., 2007; Demakakos et al., 2008; Garbarski, 2010; Wolff et al., 2010; Karyonen et al., 2011; Gong et al., 2012; Miyakawa et al., 2012; Cundiff et al., 2013; Han, 2013; Nobles et al., 2013; Thompson et al., 2013) and many types of mental health (Goodman et al., 2001; Singh-Manoux et al., 2005; Franzini and Fernandez-Esquer, 2006; Collins and Goodman, 2008; Demakakos et al., 2008; Leu et al., 2008; Theodossiou et al., 2009; Friestad, 2010; Garbarski, 2010; Sakurai et al., 2010; Karyonen et al., 2011; Dennis et al., 2012; Gong et al., 2012; Miyakawa et al., 2012; Subramanyam et al., 2012; Han 2013). Higher SSS is also protective of negative health behaviors, such as smoking (Ghaed and Gallo, 2007; Reitzel et al., 2007; Manuck et al., 2010), substance abuse (Ritterman et al. 2009) and obesity (Goodman et al., 2001; Goodman et al., 2003). However, the majority of the studies of SSS and health have focused on self-rated health or mental health, with only a few investigating self-reported health risks and diseases as outcomes. Higher SSS is associated with reduced risk of self-reported diabetes (Singh-Manoux et al., 2003), insulin resistance (Subramanyam et al. 2012), respiratory illness (Singh-Manoux et al. 2003), angina (Singh-Manoux et al. 2003), self-reported hypertension and cardiovascular problems (Operario et al. 2004) and catching the common cold (Cohen et al. 2008).

Equally uncommon are studies that have assessed the relationship between SSS and biomarkers, or objective measures of health, particularly those using nationally representative data. SSS has been shown to have a negative relationship with cholesterol (Demakakos et al. 2008), β -AR responsiveness, which is linked to cardiovascular disease, (Euteneuer et al. 2012), cortisol response to awakening (Wright and Steptoe 2005) and metabolic syndrome and all its components, including blood pressure, waist circumference, serum triglycerides and HDL

cholesterol (Manuck et al. 2010). Demakakos et al (2008) found mixed results using biomarkers data in a sample of British adults over the age of 52; SSS was negatively associated with diabetes (either reported or indicated by measured elevated hemoglobin) and HDL cholesterol in women but not related to abdominal obesity and CRP after adjusting for OSS. However, Chen and Paterson (2006) found no significant relationship among a small group of high school students from one metropolitan area between SSS and BMI, cortisol, systolic and diastolic blood pressure, and heart rate, while Cornman et al. (2015) found no association between SSS and summary indicators of physiological functioning, in US and Japanese men and women. Using a sample of older adults across the US, Seeman et al (2014) also found no relationship between SSS and allostatic load, though they found other measures of perceived inequality to be positively associated with allostatic load. Ghaed and Gallo (2007) found that lower SSS was actually associated with lower diastolic blood pressure in a very small (N=92) sample of employed women without cardiovascular disease. Much of the conflicting results may arise from the fact that all but one of these studies have relied on small, non-representative samples of specific populations, demonstrating a need for a larger, representative study to provide a more valid, representative analysis of the relationship between SSS and objective health outcomes, particularly in a young adult cohort for whom disease has yet to emerge.

In general, most of the above studies also included adjustments for OSS measures such as income, education and occupation and examined the extent to which SSS continued to matter for health above and beyond OSS. Often, controlling for OSS either had no effect on the relationship between SSS and the health outcome, or only partially attenuated the association (Goodman et al., 2003; Operario et al., 2004; Hu et al., 2005; Ghaed and Gallo, 2007; Reitzel et al., 2007; Cohen et al., 2008; Manuck et al., 2010; Karyonen et al., 2011; Euteneuer et al., 2012; Subramanyam et

al., 2012; Nobles et al., 2013). In several instances, the authors concluded that SSS was a better predictor overall of the health outcome than OSS (Singh-Manoux et al., 2005; Wright and Steptoe, 2005; Goodman et al., 2007; Sakurai et al., 2010; Dennis et al., 2012). Despite these findings, the question of why SSS has a stronger association with health outcomes than OSS remains.

Exploring Mechanisms of SSS, and Health across the Early Life Course

Despite the strong correlation between SSS and all the previously described health outcomes, why SSS matters for health, and through what mechanisms, is less clear. SSS may be more predictive of health disparities than OSS for a number of reasons. First, SSS may simply be a better measure of “true” SES. No one marker of OSS can capture the multifaceted nature of SES (Elo 2009). While the inclusion of several OSS markers across the life course may begin to reflect SES better, they typically only measure quantity of income, education, and/or occupation, while differences in quality of these OSS markers, such as an Ivy League college degree versus one from a non-elite public school, go described. Therefore, SSS, through a process of cognitive averaging, may combine objective and psychological factors from across the life course (past, present and future), to paint a more accurate portrait of true SES (Singh-Manoux 2003, which is why it predicts health disparities with more nuance than OSS. For similar reasons, SSS may be a better reflection of social status for certain populations for whom traditional OSS markers are not appropriate. The groups for whom SSS may have more utility include the elderly (Hu et al. 2005), adolescents (Goodman et al. 2007), prison populations (Friestad 2010) and immigrants (Leu et al., 2008; Gong et al., 2012). I argue that the same may be true for young adults whose OSS may be more fluid, especially in this recent cohort for whom the transition to adulthood has lengthened.

However, the strength of relationship between SSS and health may be uniquely due to the inequality and the resulting stress of low status that may impact health that SSS reflects (Marmot 2004, Seeman et al. 2014). Experiments on primates have demonstrated that simply occupying a lower place in the social hierarchy increases the stress hormone cortisol, increases blood pressure, reduces immune function and even changes gene expression (Sapolsky 1993; Tung et al. 2012). In humans, lower social status has been linked to reduced gray matter in brain in the region that is involved in regulating reactions, both behavioral and biological, to psychosocial stress (Gianaros et al. 2007). Seeman et al (2014) also found that other ways of conceptualizing perceived inequality beyond SSS were associated with increased allostatic load. If perceptions of social status and social comparisons matter for internalizing the stress of low status as described above, subjective social status is an ideal measure for health disparities research. Respondents have to evaluate where they fit in to the social hierarchy, and despite whether this is their “true” status or not, it reflects how they perceive their place in the social world. This perception of status may be what matters for physiological and behavior stress responses, which are structured by socioeconomic position (Kristenson et al. 2004). Thus by reporting ones SSS, respondents are also reporting a reflection of internalized inequality by which they are aware of and thus influenced by this concept of their relative position. The consequences of internalized inequality on health are important to consider, as the chronic stress of low status could directly impact the body physiologically (Seeman et al. 2014) and indirectly impacts health through stress-related health behaviors (e.g., smoking, diet, lack of exercise). Therefore, I examine some mechanisms I hypothesize are connected to internalized inequality and thus increased physiological dysfunction.

In order for SSS to get under the skin, it would have to be related to people's abilities, real and perceived, to internalize and handle stress. Thus, increased exposure to discrimination, feelings of loss of control and increased constraints, and well as increased depression and hopelessness would activate a stress response in the body, and these processes would be more common among those who perceive their status to be lower. The empirical evidence connecting SSS, psychosocial and health behavior mechanisms and health outcomes is limited. Psychosocial vulnerability, a factor variable including depression, neuroticism, optimism and marital satisfaction, (Cundiff et al. 2013) and perceived stress (Senn et al. 2014) have been demonstrated to mediate the relationship between SSS and self-rated health. While they did not find an association between SSS and allostatic load in a sample of older adults in the US, Seeman et al. (2014) did find associations between perceived constraints, inequality and lifetime discrimination, which they argued were other ways low status could get under the skin to affect health. In addition, while the found general perceived control, or mastery, was unrelated to allostatic load, perceived control of work, finances and others were all negatively associated with allostatic load (Seeman et al. 2014). In a small, non-representative study of middle age adults, health behaviors like smoking, physical activity, did not mediate the relationship between SSS and objective health measures (Manuck et al. 2010). However, among young adults, objective measures of health may be more closely related to health behaviors during this life stage, especially in a cohort at the forefront of the obesity epidemic.

In addition to explicitly investigating mechanisms that may underlie the relationship between SSS and health disparities, this paper is unique in its investigation in a number of other ways, including its life course approach, the use of nationally representative data including objectively measured health biomarkers, and the focus on a cohort of young adults. As my

conceptual model (see Figure 1) shows, I draw on OSS measures in adolescence and young adulthood, as well as SSS in young adulthood, to explore how SSS is related to health in young adulthood independently of life course objective SES measures, rather than just current OSS. In addition, my focus on young adults elucidates this SSS – health disparity in a population for whom disease is limited. By examining objective biomarkers of physiological functioning, I identify growing health disparities in health risk before disease emerges. In addition, SSS may be more important for young adults compared to older populations, especially in a cohort for whom the transition to adulthood is lengthening and OSS indicators may be more fluid. Therefore, I test the following research hypotheses:

Hypotheses

1. Subjective social status will be negatively associated with objective measures of immune, cardiovascular and metabolic function in young adulthood, such that those who have higher SSS will have lower CRP, lower blood pressure, and lower BMI.
2. SSS will remain negatively correlated with objective measures of immune, cardiovascular and metabolic function, independent of own OSS and parental OSS.
3. Psychosocial mechanisms and health behavior mechanisms will mediate the relationship between SSS and the biomarkers after adjusting for OSS.
 - a. Psychosocial variables related to stress, including mastery, discrimination, perceived social stress and depression, will mediate the relationship between SSS and physical health biomarkers.
 - b. Health behavior variables, including body mass index, smoking and physical inactivity, will mediate of the relationship between SSS and physical health biomarkers.

Data, Measures And Methods

Data

This paper utilizes data from the National Longitudinal Study of Adolescent to Adult Health (Add Health). Add Health is a nationally representative data set that originally sampled 20,754 students ages 12 - 18 from 132 middle- and high schools across the country during the 1994-1995 school year. The first wave of data collection includes an in-school survey, a more detailed in-home interview, and a parent questionnaire. Three additional waves of data were collected to follow the original cohort as they aged: Wave II (1995 – 1996), Wave III (2001 – 2002), and Wave IV (2008 – 2009). Biomarker collection was part of Wave IV, and nearly every respondent has some objective measures of physical health available to analyze.

I draw on data from two waves of Add Health, Waves I and IV, which reflect two life course stages of interest: adolescence and young adulthood, respectively. Both waves have data on OSS markers that are specific to the life course stage. For example, in Wave I, when the respondents were adolescents, I use data on parent's income and education to reflect family OSS at the time. In young adulthood, or Wave IV, I draw on the respondents' personal and household OSS. Because of the wide variety of socioeconomic variables measured across waves, I can select appropriate measures of OSS as the life course stage requires, making this study a true life course and intergenerational investigation, improving upon previous studies limited by cross-sectional data.

Dependent variables:

I use three biomarkers that measure of various aspects of psychological stress. Each represents a physiological function that is involved the body's stress response, and all three are highly correlated with later life disease and mortality risk (Finch 2010).

C-reactive protein: CRP at Wave IV measures immune function, whereas higher levels of CRP indicate high levels of inflammation in the body, often due to stress, and are associated with higher disease risk. Some high levels of measures CRP may be due to acute infections, so I drop all CRP values above 40, and any CRP values between 10 and 40 that were recorded in respondents who also reported at least two symptoms of acute colds or illness at time of measurement. To adjust for skewing, I create a linear variable of the logged value of the original CRP measure + 1 ($\log\text{CRP}$).

Blood pressure: Blood pressure measures cardiovascular function, whereas higher levels of blood pressure indicate greater risk for cardiovascular disease and heart attacks. Add Health measured both systolic and diastolic linear blood pressure in Wave IV. For this paper, I use a linear measure of systolic blood pressure (SBP), as it has more variation than diastolic and increases in SBP are often more closely tied to aging and cardiovascular disease (Franklin et al. 1997; Tin, Beavers and Lip 2002).

Body Mass Index: The indicator of metabolic function that I use is body mass index (BMI). Based on the measured height and weight of the Add Health respondents reported at wave IV, I can calculate BMI as weight in kilograms divided by height in meters squared, resulting in a linear measure of BMI.

Independent variables:

Subjective Social Status: To measure SSS in this paper, I use the MacArthur Scale of Subjective Social Status, which asks respondents to place themselves on a ladder, representative of the US population as a whole, as a proxy for their placement in the greater social hierarchy. The measure has been found to be a valid and reliable construct for gauging SSS in a number of populations and has been adopted into a number of surveys and studies (Singh- Manoux et al., 2003;

Operario et al., 2004; Goldman et al., 2006; Cundiff et al., 2013). In Add Health, a picture of a ladder is provided and the following question is posed to respondents: “Think of this ladder as representing where people stand in the United States. At the top of the ladder (step 10) are the people who have the most money and education, and the most respected jobs. At the bottom of the ladder (step 1) are the people who have the least money and education, and the least respected jobs or no job. Where would you place yourself on this ladder? Pick the number for the step that shows where you think you stand at this time in your life, relative to other people in the United States.”

Parental OSS in Adolescence: Parental household income status is a categorical variable taken from the parental questionnaire from Wave I, where a parent or parent figure (most often the respondent’s mother) reported their 1994 annual household income in thousands. Because of the large amount of missing data for parental income, I created a categorical variable that includes poor (household income below \$15,000, approximately the federal poverty line of 1994: \$14,800), near poor (\$16,000 – \$30,000: twice the federal poverty line in 1994), not poor (\$31,000 or more) or missing. Parental education is reported by the adolescent respondent in Wave I for their residential mother and/or father, and the highest education reported for either parent is used to create a categorical variable: less than high school, high school graduate, some college, a college degree, or any postgraduate education.

Respondent OSS in Young Adulthood: Respondents reported their household’s earnings for the year prior to Wave IV data collection, choosing from categorical ranges of possible incomes. To create a linear variable, I assign the midpoint of each income range as the respondent’s household income. Respondent education mirrors the parental education categories. I also

include a measure of respondent's occupational prestige created by matching Nakao and Treas (1994) occupational prestige scores to the occupational information provided by Add Health.

Control variables:

Socio-demographic: I control for age, sex, race/ethnicity (White, Black, Asian, Native American/Other and Hispanic), family structure (living with both biological parents; two-parents, step; single mother; single father; or other), and immigrant status (first, second and third+ generation) at baseline as well as current marital status at Wave IV.

Mechanism Variables:

Perceived Stress: To measure perceived stress, I use four questions in Wave IV that combine to reflect the Cohen Scale of Perceived Stress (Cohen et al 1983). Respondents were asked in the last 30 days how often they felt “unable to control the important things thing [their] life”, “confident in [their] ability to handle personal problems”, “that things were going [their] way” and “that difficulties were piling up so high that [they] could not overcome them”. The second and third question were reversed coded, and the four responses were summed, so that a score of 0 means no perceived stress, and the highest value of 16 describes the highest level of stress.

Discrimination: I include a measure that asks the respondent the extent to which in their day-to-day life they feel they have “been treated with less respect or less courtesy than other people”, which is the only discrimination measure available in Add Health. Responses to this question were “never”, “rarely”, “sometimes” and “often”.

Depression: I include a linear measure of depression from young adulthood in Wave IV which utilizes a 9-question version of the CESD scale, in which respondents report the extent to which they “were bothered by things that usually don't bother [them]”, “couldn't shake of the blues”, “[didn't] feel just as good as other people”, “had trouble keeping [their] mind on what [they]

were doing, “felt depressed”, “felt too tired to do things”, “[didn’t] enjoy life, “felt sad” and “felt like people disliked [them]” during the past 7 days. Those with higher CESD scores have more depressive symptoms.

Perceived Control: Add Health asked respondents at Wave IV the extent to which they agree with the following statements regarding perceived control, or mastery: “There is little I can do to change the important things in my life”, “Other people determine most of what I can and cannot do”, “There are many things that interfere with what I want to do”, “I have little control over the things that happen to me” and “There is really no way to solve the problems I have”. I create a scale of personal mastery from these questions, with higher values representing more perceived control.

Health behaviors: To test for the mediating mechanisms of health behaviors, I include a dichotomous variable indicating daily smoking and a dichotomous variable indicating lack of physical activity (no bouts of physical exercise per week). In addition, in the cardiovascular and immune function models, I also introduce body mass index as a mechanism, since obesity is a predictor of elevated CRP and SBP.

Methods

To create my analytical sample from the 14,800 Add Health respondents who participated in both Waves I and IV, I first exclude anyone missing the main independent variable, the control variables, mechanism variables and/or sampling weights, leaving me with a sample size of 13,270. The main source of missing data, excluding the biomarkers, is parental education (877) and respondent occupational prestige (306). I then create three separate analytical samples for each dependent variable biomarker, further excluding people who additionally are missing the relevant biomarker. Dropping all respondents without the relevant

variables or sample weights leaves me with a CRP sample size of 10,587, SBP sample size of 11,874 and BMI sample size of 12,097.

I first conduct a descriptive analysis of the variables in my analytic sample using the largest biomarker subsample (the BMI subsample). I then examine mean biomarker statistics by ladder scores and by various OSS covariates, which provide support for Hypothesis 1. I then build OLS models for each of the three objective health outcome measures. First, because own and parental OSS are highly related to own SSS, I test for the association between own OSS and parental OSS and the biomarkers before independently assessing the bivariate relationship between SSS and the biomarkers (adjusted for controls). Then, to assess whether this SSS relationship with the health outcomes persists, independent of OSS, I mutually adjust for SSS and the life course OSS measures. These steps will confirm Hypotheses 2, which posit that the relationship between SSS and objective health measures in young adulthood persists independent of OSS measures. The final part of my analysis introduces possible mechanisms variables that could mediate the relationship between SSS and health in young adulthood to test Hypothesis 3. I first test how the psychosocial mechanisms mediate the relationships between SSS and health and then add in the health behavior mechanism models into the final fully adjusted model.

Results

Table 3.1 presents the descriptive statistics of the variables used in this paper. Table 1a shows the basic demographic makeup of the largest biomarker sample (the BMI subsample). The mean age at Wave I was 15.41 and just less than 50% of the sample is female. The majority of the sample is White (71.03%), with large portions of Blacks and Hispanics. The remainder of the sample was Asian or some other race, typically Native American. Most of the respondents were 3rd + generation (85.60%), with the rest of the sample being children of immigrants or immigrants.

themselves. Most lived with both biological parents during Wave I (57.13%), but many also lived with one biological parent and a stepparent. Of those living with only one parent, the majority lived with single mothers, though some did live with a single father. The rest lived in some other family arrangement, typically living with one or both grandparents.

Table 3.2 describes the distributions of the OSS variables within the BMI analytical sample. Just over a third of respondents had a parent with at least a college degree, whereas another third had a college degree. 21.88% of the parents of the respondents had some college, while the remainder (11.72%) had less than a high school education. The modal category of parent income was not poor, while 11.92% of respondents had parents who were poor, and 17.84% who had household incomes between 100% and 200% of the poverty line. About a fifth of respondents were missing parental income data, but to maintain sample size I include a missing category in my dummy income variable. The respondents themselves were slightly more educated than their parents (approximately three-fourths had at least some college). Average occupational prestige among respondents was 44.84.

Table 3.3 presents the descriptive data for some of the psychosocial and health behavior mechanism variables to be used in my analysis. Mean CESD scores at Wave IV were slightly above 5, and mastery was fairly high (mean=19.62). Perceived stress was fairly low (mean = 4.68). Nearly 25% of the sample is a daily smoker (24.10%), and 13.71% of the sample did not report any exercise in the past 7 days. Over three-quarters reported either no discrimination, or only feeling discriminated against rarely.

Figure 3.2 presents the mean values for the three biomarkers (logCRP, systolic blood pressure, body mass index) by ladder scores. There is an inverse relationship between SSS and each of the health outcomes. The relationship is nearly linear, except for a slight increase among

those who report the highest SSS (ladder=10). Tables 3.5, 3.6 and 3.7 presents the mean values for the three biomarkers (logCRP, systolic blood pressure, and body mass index) by some covariates included in this study. In general, Asians have the best health; Whites have slightly higher measures of physiological dysregulation; and Blacks and Hispanics have the highest. Age has a slight association with health, with older young adults having somewhat worse health. Women have higher CRP and BMI than men (as expected), and men have higher SBP. In general, OSS measures have an inverse relationship with my health measures, such that more education, income and occupational prestige for respondents and their parents is related to decreased inflammation, lower blood pressure, and lower BMI. While the differences between those with less than high school, high school and some college are small, there is a huge protective effect on health for graduating from college (or having a parent who graduated from college).

Table 3.8 presents the stepwise-adjusted models predicting CRP, controlling for age, sex, race/ethnicity, family structure and immigrant status at baseline and marital status at Wave IV. The first model shows the relationship between personal and parental OSS measures and CRP. Education is significantly related to CRP, with those receiving a college degree have 0.216 lower CRP, and any amount of graduate education is associated with a protective effect, a 0.225 reduction in CRP. Parental OSS is also important, as having a parent with any education beyond high school is associated with lower CRP, and growing up in a poor income household in adolescence is associated with increased CRP. Model 2 confirms a relationship between SSS and CRP, as each unit increase in SSS is associated with a .052 unit decrease in CRP. Model 3 includes both OSS and SSS, and shows that mutually adjusting for all SES measures partially attenuates some of the associations, but that both OSS and SSS remain independently significantly associated with CRP. Model 4 builds off of Model 3 by adding the proposed

psychosocial mechanisms. Interestingly, perceived stress has a negative association with CRP, and adjusting for the proposed mechanisms actually strengthens the associations between SSS and CRP. Model 5 includes the health behavior mechanisms, which completely mediates the relationship between SSS and CRP, though SSS remains associated with CRP. However, two early life indicators of OSS remain significantly associated with CRP in the final fully adjusted model; having a parent with some college and having a graduate degree are both negatively associated with CRP.

Tables 3.9 and 3.10 present the same models as Table 3.8 for the outcome measures of SBP and BMI, respectively, and demonstrate the same general pattern of independent OSS and SSS associations remain true with SBP and BMI. In the SBP models, presented in Table 3.9, occupational prestige remains highly significantly associated with blood pressure in all models, such that those with higher prestige had lower SBP as well. The psychosocial mechanisms on their own do not attenuate the SSS relationships with SBP, but the inclusion of the health behavior mechanisms do. In the SBP Model 5, BMI and inactivity are also positively associated with SBP, while two psychosocial mechanisms, reports of rarely experiencing discrimination and having higher levels of mastery, are both positively correlated with SBP. Table 3.10 demonstrates that measures of OSS and SSS are also significantly related to body mass index, and that none of the included mechanisms explain away the SSS association to BMI. Thus, because the inclusion of BMI in the other models was often the key mediating factor, it seems likely that BMI is a crucial mechanism for the other SSS – health associations.

Discussion and Conclusion

My results provide additional evidence for a social gradient in health, namely between subjective social status and objective indicators of health in a nationally representative sample of

American young adults. The descriptive statistics presented in Figure 3.2 and the bivariate relationships presented in Tables 3.8 – 3.10 show a strong relationship between SSS and objective measures of physiological functioning, confirming Hypothesis 1. As SSS increases, there is an associated decrease in measures of immune, cardiovascular and metabolic dysfunction, such that those with higher perceptions of their own status have a decreased risk for disease. This is almost a perfect step-wise association, with the exception of those reporting the highest level of SSS, or a 10 on the ladder scale. This is an interesting finding that should motivate further research, as those reporting 10's on the ladder scale may be unique in a number of ways that do not directly relate to improved health outcomes.

Furthermore, this association between SSS and health was not simply due to the correlation between OSS and SSS. My multivariate models demonstrate that the OSS and SSS measures both have strong, independent associations with measure of physiological functioning in young adulthood, confirming Hypothesis 2. Both parental and current OSS are related to the biomarker outcomes, and these relationships persist when the models are adjusted for SSS as well. While OSS and SSS are correlated and independently associated with the biomarker measures, SSS does not attenuate the relationship between OSS and young adult health risk. The independent correlations between both objective and subjective measures of status suggests that even early in the life course, before disease emerges, both objective and subjective socioeconomic status begins to “get under the skin” and relate to measure of immune, cardiovascular and metabolic functioning.

Understanding why these separate and independent relationships persist is still unclear. The results that introduce the psychosocial mechanisms fail to mediate the SSS – health associations, and several work in unexpected directions, actually strengthening the association.

Thus the mechanism analyses do little to provide evidence that one's perceptions of their own status are related to their health through an internalized inequality stress process, particularly that psychosocial experiences that I hypothesized would be related internalized status do not mediate this relationship. Instead, the most important aspect connecting SSS and health in this cohort is being overweight or obese, as these young adults were impacted significantly by the obesity epidemic. The inclusion of BMI in the models attenuates the relationship between SSS and both measures of immune and cardiovascular function similarly, suggesting that poor diets and lack of exercise may be coping methods associated with the internalized stress of low status of SSS. The relationship between SSS and BMI is quite strong, and remains unexplained by OSS indicators or other mechanisms. Therefore, understanding how SSS and BMI are connected, thus putting young adults at higher risk of having increased inflammation or blood pressure, will be key to further unraveling this puzzle.

While health behavior indicators such as obesity and physical inactivity were the most significant mediators underlying the relationship between SSS and health, there is some evidence that perceived stress and discrimination may also be important for understanding how the social “gets under the skin” to affect physiological dysregulation through a stress process. However, these results are not robust enough to completely mediate the relationship between SSS and health and thus support a “stress of low status” hypothesis for health in young adults. These null findings may simply be due to the types of stress variables include in the models. The social stress measures included assess perceptions of stress in the past 30 days, rather than the deep-seated stress of coming to terms through a cognitive averaging process that one is of “low status” – or internalized inequality.

This paper is limited in that I can only test a cross-sectional relationship between SSS in young adulthood and concurrent health measures, and thus cannot make any causal conclusions. Future waves of Add Health will continue to gather biomarker data and information about OSS and SSS, which will allow future research to build change models that can hint more directly at a causal relationship between SSS and health early in the life course. However, even though my findings are cross-sectional, they still contribute further evidence of a health gradient emerging in young adulthood related to both subjective and objective indicators of socioeconomic status, before disease emerges, which should motivate further research on SSS, both in the early life course and in relation to objective markers of physiological functioning, as well as the mechanisms that underlie these relationships.

Figure 3.1: Conceptual Model

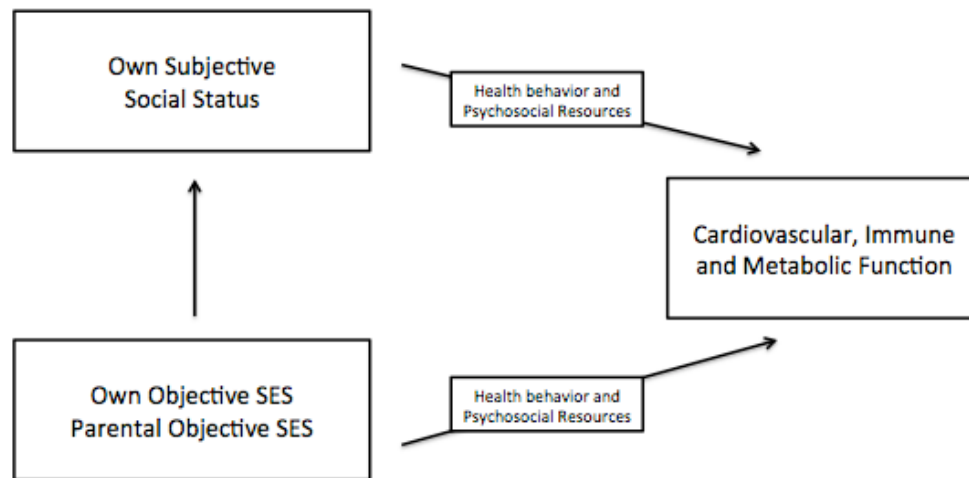
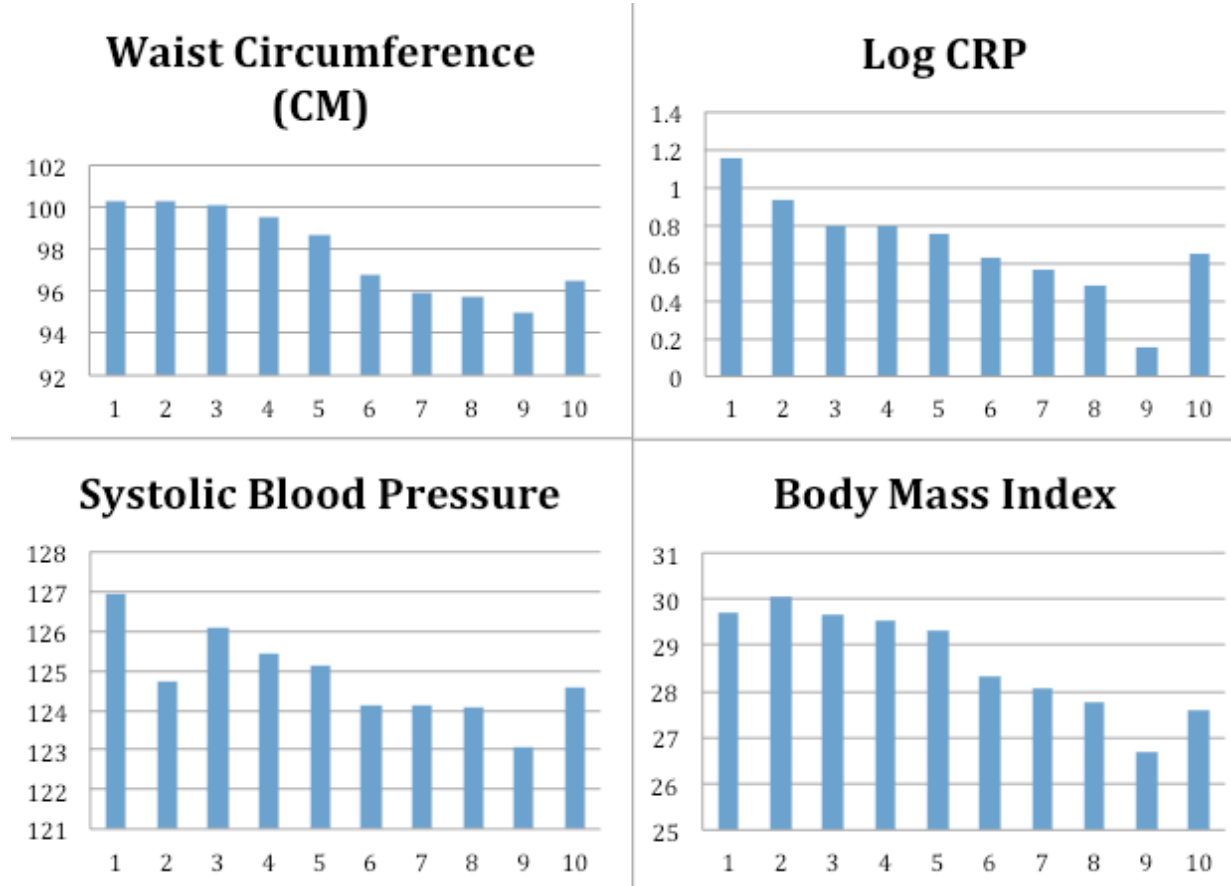


Figure 3.2: Mean Biomarker Values, by Ladder Score*



*Values are weighted

Table 3.1: Sociodemographic Variables (N = 13,148)*

		Mean/Proportion	SD	Range
Age at Baseline		15.41	1.82	12- 18
Female		49.99%		
Race/Ethnicity				
	White	71.03%		
	Black	14.26%		
	Asian	3.23%		
	NA/Other	0.33%		
	Hispanic	11.17%		
Immigrant Status				
	1st Generation	4.30%		
	2nd Generation	10.09%		
	3 rd + Generation	85.68%		
Family Structure				
	Two parent, bio	57.13%		
	Two parent, step	17.05%		
	Single Mom	19.63%		
	Single Dad	2.95%		
	Other	3.24%		
Ever Married by Wave IV		50.31%		

*Values are weighted

Table 3.2: Objective and Subjective Socioeconomic Status Variables (N = 13,148)*

		Mean/Proportion	SD	Range
Parent Education				
	Less than HS	11.72%		
	HS Degree	31.75%		
	Some College	21.88%		
	College	23.04%		
	Graduate	11.62%		
Parent Income				
	Poor	11.92%		
	Near poor	17.84%		
	Not Poor	49.46%		
	Missing	20.78%		
Own Education				
	Less than HS	7.46%		
	HS Degree	19.15%		
	Some College	40.26%		
	College+	25.33%		
	Graduate	7.79%		
Own Household Income		65.15	44.78	2.5 - 200
Own Occupational Prestige		44.84	13.00	16.9 - 86.01
Own Subjective Social Status		5.05	1.70	1 – 10

Table 3.3: Other Variables, Mechanisms and Baseline Health (N = 13,148)*

		Mean/Proportion	SD	Range
<i>Psychosocial Resources</i>				
CESD Wave IV		5.04	4.02	0 - 27
Perceived Scale		19.62	2.76	5 - 25
Perceived Stress Scale		4.68	2.95	0 - 16
Discrimination				
	None	30.12%		
	Rarely	46.40%		
	Sometimes	19.83%		
	Often	3.64%		
<i>Health Behaviors</i>				
Daily Smoker		24.10%		
Physically Inactive		13.71%		
Wave IV BMI		28.90	7.45	14.4 – 97.4

*Values are weighted

Table 3.4: Objective Health Measures (N's vary by biomarker)*

	Mean	SD	Range
C-Reactive Protein	3.78	5.20	0.082 – 39.83
Systolic Blood Pressure	124.84	13.55	77 – 222.5
Body Mass Index	28.90	7.45	14.4 – 97.4

*Values are weighted

Table 3.5: Mean logCRP, by Covariates (N = 10,587)

	Mean	SD
Race/Ethnicity		
White	0.52	0.31
Black	0.57	0.45
Asian	0.39	0.41
NA/Other	0.50	0.33
Hispanic	0.55	0.34
Age Category		
24 - 28	0.52	0.33
29 - 32	0.53	0.36
Gender		
Male	0.46	0.29
Female	0.59	0.38
Own Occupational Prestige		
Bottom quartile	0.52	0.33
2nd Quartile	0.54	0.34
3rd Quartile	0.53	0.35
Top Quartile	0.50	0.35
Own Income		
Poor	0.55	0.35
Near Poor	0.54	0.34
Not Poor	0.52	0.34
Own Education		
Less than HS	0.56	0.33
HS Degree	0.55	0.34
Some College	0.54	0.34
College Degree	0.48	0.35
Graduate School	0.49	0.35
Parent Income		
Poor	0.58	0.34
Near Poor	0.54	0.35
Not Poor	0.51	0.33
Missing	0.53	0.36
Parent Education		
Less than HS	0.57	0.36
HS Degree	0.56	0.34
Some College	0.51	0.34
College Degree	0.50	0.34
Graduate School	0.46	0.34

*Values are weighted

Table 3.6: Mean Systolic Blood Pressure, by covariates (N = 11,874)*

	Mean	SD
Race/Ethnicity		
White	124.75	11.96
Black	126.00	17.35
Asian	123.16	20.35
NA/Other	120.80	14.69
Hispanic	124.56	16.08
Age Category		
24 - 28	124.25	12.63
29 - 32	125.46	14.48
Gender		
Male	129.83	12.01
Female	119.85	13.15
Own Occupational Prestige		
Bottom quartile	125.98	13.47
2nd Quartile	125.57	13.64
3rd Quartile	124.68	13.50
Top Quartile	123.03	13.35
Own Income		
Poor	125.09	14.17
Near Poor	125.09	13.43
Not Poor	124.73	13.47
Own Education		
Less than HS	125.64	12.49
HS Degree	127.08	13.18
Some College	124.87	13.89
College Degree	123.57	13.90
Graduate	122.62	13.13
Parent Income		
Poor	125.77	14.20
Near Poor	125.36	13.80
Not Poor	124.83	13.30
Missing	123.91	13.40
Parent Education		
Less than HS	124.65	13.83
HS Degree	125.75	13.13
Some College	124.88	13.67
College Degree	124.13	13.46
Graduate	123.88	14.10

Table 3.7: Mean Body Mass Index, by Covariates (N = 12,097)*

	Mean	SD
Race/Ethnicity		
White	28.43	6.50
Black	30.88	10.10
Asian	26.75	8.35
NA/Other	27.35	6.64
Hispanic	30.04	8.69
Age Category		
24 - 28	28.56	7.04
29 - 32	29.25	7.84
Gender		
Male	28.95	6.55
Female	28.85	8.34
Own Occupational Prestige		
Bottom quartile	29.19	7.40
2nd Quartile	29.83	7.74
3rd Quartile	28.43	7.37
Top Quartile	27.94	7.01
Own Income		
Poor	29.32	8.07
Near Poor	29.17	7.27
Not Poor	28.75	7.38
Own Education		
Less than HS	29.14	6.94
HS Degree	29.80	7.21
Some College	29.75	8.08
College Degree	27.35	6.45
Graduate	27.05	6.88
Parent Income		
Poor	30.10	7.51
Near Poor	29.66	7.80
Not Poor	28.28	6.93
Missing	28.99	8.16
Parent Education		
Less than HS	30.04	8.08
HS Degree	29.72	7.32
Some College	29.08	7.61
College Degree	27.83	6.85
Graduate	27.28	7.23

Table 3.8: Relationship between Objective and Subjective SES and logCRP (N=10,587)

	(1)	(2)	(3)	(4)	(5)
Own Education (ref = HS)					
Less than HS	-0.0248		-0.0327	-0.0224	0.0124
	(0.0809)		(0.0809)	(0.0812)	(0.0702)
Some College	-0.0459		-0.0410	-0.0490	-0.0752
	(0.0433)		(0.0431)	(0.0432)	(0.0434)
College Degree	-0.216***		-0.197***	-0.209***	-0.0921
	(0.0517)		(0.0524)	(0.0518)	(0.0483)
Graduate School	-0.225**		-0.189**	-0.202**	-0.0482
	(0.0704)		(0.0722)	(0.0717)	(0.0622)
Wave IV Household Income (thous)	-0.000		-0.000	-0.000	0.000
	(0.000)		(0.000)	(0.000)	(0.000)
Occupational Prestige	0.001		0.001	0.001	0.001
	(0.001)		(0.001)	(0.001)	(0.001)
Parent Education (ref = HS)					
Less than HS	-0.00578		-0.00565	-0.00595	-0.0442
	(0.0539)		(0.0539)	(0.0543)	(0.0479)
Some College	-0.125**		-0.125**	-0.126**	-0.101**
	(0.0410)		(0.0410)	(0.0408)	(0.0359)
College Degree	-0.127**		-0.125**	-0.126**	-0.0356
	(0.0442)		(0.0443)	(0.0443)	(0.0382)
Graduate School	-0.190***		-0.182**	-0.182**	-0.102*
	(0.0562)		(0.0561)	(0.0560)	(0.0487)
Parent Income (ref = not poor)					
Poor	0.118*		0.117	0.116	0.0741
	(0.0595)		(0.0592)	(0.0594)	(0.0529)
Near Poor	0.0519		0.0504	0.0531	0.0360
	(0.0455)		(0.0454)	(0.0453)	(0.0391)
Missing	0.0158		0.0161	0.0198	0.0206
	(0.0445)		(0.0445)	(0.0440)	(0.0379)
Subjective Social Status		-0.051***	-0.028**	-0.034**	-0.0135
		(0.00944)	(0.0107)	(0.0109)	(0.00946)
Discrimination (ref = none)					
Rarely				0.0380	0.0296
				(0.0373)	(0.0346)
Sometimes				0.0293	0.0184
				(0.0506)	(0.0424)
Often				0.0856	0.0588
				(0.0832)	(0.0753)
Perceived Stress Scale				-0.0155*	-0.00287
				(0.00729)	(0.00731)
Mastery Scale				0.0134	0.00882
				(0.00719)	(0.00612)
Depression Scale				0.00695	0.00179
				(0.00564)	(0.00490)
BMI					0.0785***
					(0.00211)

Smoker					0.0631
					(0.0354)
Inactive					0.154***
					(0.0434)
Constant	0.163	0.239	0.253	0.0355	-2.068***
	(0.167)	(0.161)	(0.173)	(0.224)	(0.205)
R-squared	0.059	0.051	0.060	0.062	0.264

All models are weighted and adjusted for age, sex, race, ethnicity, Wave I family structure and Wave IV marital status.

*** p<0.001, ** p<0.01, * p<0.05

Table 3.9: Relationship between Objective and Subjective SES and SBP (N=11,874)

	(1)	(2)	(3)	(4)	(5)
Own Education (ref = HS)					
Less than HS	-1.305		-1.361	-1.190	-0.819
	(1.034)		(1.026)	(0.995)	(0.945)
Some College	-0.641		-0.601	-0.746	-0.776
	(0.459)		(0.461)	(0.463)	(0.477)
College Degree	-0.846		-0.695	-0.893	0.105
	(0.587)		(0.592)	(0.592)	(0.583)
Graduate School	-0.942		-0.666	-0.874	0.280
	(0.676)		(0.667)	(0.667)	(0.679)
Wave IV Household Income (thous)	-0.007		-0.005	-0.006	-0.003
	(0.004)		(0.004)	(0.004)	(0.003)
Occupational Prestige	-0.038**		-0.035*	-0.038*	-0.039**
	(0.015)		(0.015)	(0.015)	(0.015)
Parent Education (ref = HS)					
Less than HS	-0.375		-0.372	-0.338	-0.332
	(0.492)		(0.493)	(0.496)	(0.495)
Some College	-0.454		-0.448	-0.495	-0.248
	(0.458)		(0.458)	(0.458)	(0.450)
College Degree	-1.294**		-1.269**	-1.297**	-0.660
	(0.456)		(0.454)	(0.454)	(0.444)
Graduate School	-1.032		-0.966	-0.983	-0.212
	(0.546)		(0.546)	(0.547)	(0.542)
Parent Income (ref = not poor)					
Poor	0.479		0.474	0.480	0.195
	(0.636)		(0.635)	(0.637)	(0.605)
Near Poor	0.204		0.187	0.181	0.0268
	(0.497)		(0.497)	(0.493)	(0.479)
Missing	-1.055**		-1.052**	-1.005*	-1.044**
	(0.398)		(0.401)	(0.397)	(0.391)
Subjective Social Status		-0.402***	-0.212*	-0.270**	-0.154
		(0.098)	(0.102)	(0.103)	(0.097)
Discrimination (ref = none)					
Rarely				0.979**	0.923*
				(0.364)	(0.354)
Sometimes				0.883*	0.627
				(0.443)	(0.441)
Often				1.786*	1.221
				(0.863)	(0.800)
Perceived Stress Scale				-0.059	0.008
				(0.072)	(0.068)
Mastery Scale				0.214**	0.178**
				(0.068)	(0.064)
Depression Scale				-0.025	-0.037
				(0.055)	(0.052)
BMI					0.559***

					(0.023)
Smoker					0.669
					(0.413)
Inactive					1.259**
					(0.422)
Constant	127.9***	126.7***	128.6***	124.4***	109.6***
	(1.751)	(1.672)	(1.745)	(2.559)	(2.378)
R-squared	0.154	0.149	0.154	0.157	0.242

All models are weighted and adjusted for age, sex, race, ethnicity, Wave I family structure and Wave IV marital status.

*** p<0.001, ** p<0.01, * p<0.05

Table 3.10: Relationship between Objective and Subjective SES and BMI (N=12,097)

	(1)	(2)	(3)	(4)	(5)
Own Education (ref = HS)					
Less than HS	-0.893*		-0.941*	-0.874*	-0.727
	(0.402)		(0.402)	(0.403)	(0.405)
Some College	0.245		0.282	0.240	0.188
	(0.303)		(0.306)	(0.307)	(0.305)
College Degree	-1.519***		-1.393***	-1.451***	-1.679***
	(0.302)		(0.315)	(0.315)	(0.313)
Graduate School	-1.899***		-1.663***	-1.730***	-1.915***
	(0.371)		(0.388)	(0.396)	(0.395)
Wave IV Household Income (thous)	-0.00524*		-0.00365	-0.00426	-0.00464
	(0.00225)		(0.00228)	(0.00232)	(0.00235)
Occupational Prestige	0.00599		0.00875	0.00777	0.00607
	(0.00812)		(0.00807)	(0.00806)	(0.00806)
Parent Education (ref = HS)					
Less than HS	0.0778		0.0820	0.0933	0.0844
	(0.316)		(0.317)	(0.320)	(0.323)
Some College	-0.356		-0.352	-0.356	-0.352
	(0.238)		(0.239)	(0.238)	(0.238)
College Degree	-1.106***		-1.085***	-1.090***	-1.068***
	(0.301)		(0.300)	(0.297)	(0.297)
Graduate School	-1.186**		-1.134**	-1.115**	-1.120**
	(0.366)		(0.364)	(0.367)	(0.367)
Parent Income (ref = not poor)					
Poor	0.283		0.280	0.272	0.301
	(0.388)		(0.388)	(0.385)	(0.386)
Near Poor	0.374		0.360	0.374	0.375
	(0.280)		(0.279)	(0.277)	(0.272)
Missing	0.0231		0.0248	0.0365	0.0122
	(0.258)		(0.258)	(0.254)	(0.254)
Subjective Social Status		-0.383***	-0.180*	-0.222**	-0.244***
		(0.0602)	(0.0690)	(0.0675)	(0.0691)
Discrimination (ref = none)					
Rarely				0.144	0.167
				(0.201)	(0.198)
Sometimes				0.212	0.266
				(0.308)	(0.311)
Often				1.157	1.236*
				(0.594)	(0.587)
Perceived Stress Scale				-0.129*	-0.119*
				(0.0519)	(0.0506)
Mastery Scale				0.0701*	0.0718*
				(0.0354)	(0.0354)
Depression Scale				0.0399	0.0396
				(0.0304)	(0.0303)
Smoker					-1.287***

					(0.244)
Inactive					0.592*
					(0.294)
Constant	25.98***	26.57***	26.54***	25.64***	26.32***
	(1.015)	(0.945)	(1.026)	(1.169)	(1.156)
R-squared	0.052	0.035	0.053	0.056	0.061

All models are weighted and adjusted for age, sex, race, ethnicity, Wave I family structure and Wave IV marital status.

*** p<0.001, ** p<0.01, * p<0.05

CHAPTER 4. - RELATIVE SOCIOECONOMIC STATUS IN CONTEXT: IS PERCEIVED OR ACTUAL STATUS MORE IMPORTANT FOR YOUNG ADULT HEALTH?

Introduction

Health disparities exist along a socioeconomic gradient, within and between nearly every social context imaginable (Winkleby et al., 1992; Adler et al., 1994; Link and Phelan, 1996; Braveman et al., 2005). However, the majority of the research on the socioeconomic determinants of health has focused on how absolute levels of socioeconomic status (SES) relate to health, despite evidence that relative SES, including subjective social status (SSS), or ones perceptions of their relative position and internalized inequality, is often a better indicator of socioeconomic status than absolute objective measures for explaining health disparities (Adler et al., 2000; Ostrove et al., 2000; Singh-Manoux et al., 2003; Singh-Manoux et al., 2005; Demakakos et al., 2008).

However, while SSS, or relative subjective (RS) status, has been increasingly common in the sociology of health literature, our understanding of relative objective (RO) position in general and its association with health are both limited, due to data constraints and other empirical issues. Thus, in this chapter, I seek to better understand how relative objective SES, which measures an individual's relative place in the socioeconomic hierarchy based on objective measures of socioeconomic status, is related to relative subjective position and health outcomes.

While most other studies focusing on relative objective status have typically examined individuals' income relative to the income distribution of a given reference group and its connection to health outcomes (Eibner and Evans 2005; Dunn et al., 2006; Adjaye-Gbewonyo

and Kawachi, 2012; Daly et al., 2014), I extend this conceptualization of RO to include other indicators of SES, including education and occupation, and explore additional reference groups appropriate for a young adult cohort.

Investigating this additional operationalization of relative SES will further elucidate how relative status, both actual and perceived, relates to health outcomes in young adulthood. First, I examine the relationship between RO and RS in order to better understand how subjective evaluations of social status are formed in young adulthood. Then, I examine the associations between RO and health. Thus, this final empirical chapter of my dissertation explores the interplay between relative measures of socioeconomic status, both subjective and objective perspectives, within various contexts and how they relate to health in young adulthood. This chapter contributes to the literature on the cognitive averaging process explored in Chapter 2 as well as the growing research on how low SES “gets under the skin” to affect health as examined in Chapter 3.

Background

Three Theories of Socioeconomic Disparities in Health

There are three main theories that aim to connect how socioeconomic disparities get under the skin to influence individual level health. The first, the *absolute-SES hypothesis* of health disparities, maintains that it is level of SES, typically income or educational attainment, but not differences in SES between others that matter for health. This theory has also been referred to as the absolute-income hypothesis; however, I expand this theory to focus on more aspects of socioeconomic status, including income, education, and occupation. The evidence for this hypothesis is plentiful, as increases in SES on the national (Bloom and Canning, 2000; Wagstaff and van Doorslaer, 2000; Subramanian et al., 2002), neighborhood (Bosma et al., 2001;

Winkleby and Cubbin, 2003; Diez Roux and Mair, 2010) or individual level (Link and Phelan, 1995; Elo and Preston, 1996; Ross and Mirowsky, 1999; Cutler et al., 2008) are all associated with better health. This hypothesis is an important explanation for why SES disparities are related to health disparities, and health research should include level of SES when investigating individual level health differences. However, it is limited in that it pays no attention to the importance of overall inequality or relative position in the SES hierarchy for health.

The *income inequality hypothesis* of health disparities points to overall inequality as a source of neo-material (Smith, 1996; Lynch and Kaplan, 1997), and/or psychosocial (Wilkinson, 1999; Marmot, 2004; Subramanian and Kawachi, 2004) disadvantages that are related to overall worse population health. Though wealthier areas may have overall greater health, the level of within-context equality is inversely related to overall mortality and health. All residents of more equal contexts live longer and are healthier than those in more unequal contexts (Wagstaff and van Doorslaer, 2000; Marmot, 2004; Wilkinson, 2005; Wilkinson and Pickett, 2006; Babones, 2008). Most empirical support for the inequality hypothesis is found at the level of the country context, where levels of income inequality are linked not only to higher overall mortality but also to higher infant-mortality, higher levels of violence and homicide, and greater morbidity, among many other health outcomes (see Wilkinson and Pickett 2006 for review). However, the level of aggregation matters, as the relationship between income inequality and health tends to be stronger in larger areas (Rostila et al. 2012).

To explain the income inequality hypothesis, researchers have theorized a psychosocial model that emphasizes social capital and integration as important predictors of health (Wilkinson, 1999; Subramanian and Kawachi, 2004; Starfield, 2007; Mansyar et al., 2008). In countries with high levels of inequality, overall social ties and community bonds are weakened, as competition

and status anxiety limit trust and social integration (Wilkinson, 1999, 2005; Kawachi et al., 1997). With a weak social community, where competition for resources, distrust and discrimination are high due to income inequality, everyone suffers from a higher degree of social stress, regardless of personal SES (Subramanian and Kawachi, 2004; Mansyar et al., 2008). This stress can manifest as higher rates of violence and increased number of homicides on an aggregate level (Wilkinson and Pickett 2006). However, of interest to health researchers is the chronic activation of the sympathetic nervous system that chronic social stress on the aggregate level can cause within individuals. Over time, this chronic stress leads to physiological dysregulation of immune, cardiovascular and metabolic systems, resulting in higher allostatic load and the ensuing premature aging (McEwen and Stellar, 1993; Seeman et al., 1997). Thus everyone, rich and poor alike, suffers physically due to within-country inequality (Wilkinson, 1999, 2005; Kawachi et al., 1997).

Building on the psychosocial consequences of inequality described in the inequality hypothesis, the third theory for health disparities, the *relative-SES hypothesis*, emphasizes individual experiences of inequality. This is also referred to as the relative-income or relative-deprivation hypothesis. While not technically the same hypothesis, their theoretical similarities, particularly their focus on individuals' personal experiences with inequality, allow me to refer to them by a common term for this proposal: relative-SES hypothesis. The main distinction between the relative-SES hypothesis and the income-inequality hypothesis is the unit of investigation: individual health or population health, respectively. While the income-inequality hypothesis posits that overall inequality impacts everyone negatively, the relative-SES hypothesis argues that income inequality will impact those at the low end of the status hierarchy, or with the greatest degree of relative deprivation, the most, making their individual health worse than their better off neighborhoods and peers (Wilkinson, 1996; Wagstaff and van Doorslaer, 2000; Marmot, 2004).

This hypothesis shares the same mechanisms connecting SES to health as the income-inequality hypothesis, the stress of decreased social cohesion and increased social stress. By focusing on the individuals' experiences with stress, the literature demonstrates that low status individuals typically work in jobs with low autonomy, low sense of control, and less power, and are more likely to also experience these same negative social phenomenon outside of the work environment (Wilkinson, 1999; Marmot, 2004). Thus, they are more likely to internalize this inequality and lack of social cohesion resulting in increased feelings of stress and the resulting physiological dysregulation and poor health outcomes (Bjornstrom 2011).

Primate experiments have shown that manipulations of social ranking within groups lead to a worsening of health in those primates who lose their higher rankings, while those who moved up in the status hierarchy had better cardiovascular, reproductive, immune and neurological functioning (Sapolsky 2005). It is this third hypothesis, the relative position hypothesis, which has the least empirical support in the literature, mostly due to the lack of individual level studies that are equipped to explicitly test this hypothesis compared to the income inequality or absolute SES hypotheses (Wagstaff and van Doorslaer 2000). This paper aims to further investigate the relative-SES hypothesis with both measures of subjective and objective relative position in order to fill this gap.

Testing the Relative SES Hypothesis with Relative Objective and Subjective Status

In this paper, I will focus on testing the first and third theories presented above, as I am more interested in individual level theories of socioeconomic disparities in health, rather than the aggregate level theory of inequality (theory 2). While measures of level of absolute socioeconomic status, for testing hypothesis 1, are common in health surveys, in order to test the relative-SES hypothesis, a measure of relative SES is necessary. The empirical evidence

addressed so far in this dissertation regarding relative SES has utilized the subjective measure of position, or subjective social status, which measures one's own perceptions of their own relative ranking within their society. Most research on the determinants of SSS have relied on absolute objective (AO) measures of status, such as income, education, occupation or wealth, assuming that SSS best captures some true, absolute social status due to cognitive averaging of AO measures (Singh-Manoux 2003, 2005). However, most measures of SSS, including the one used in this dissertation, ask respondents to rank themselves compared to other residents of their country or community, inherently capturing an element of relative status as well. Thus, for the purposes of this paper, I will refer to SSS as relative-subjective (RS) status, emphasizing the ranking element from a subjective perspective. The previous chapter of this dissertation provided ample evidence, both new and existing from the literature, showing that relative subjective position is associated with health. While using RS measures to test the relative-position hypothesis is an important piece of the puzzle, objective measures of relative status deserve examination as well (Schnittker and McLeod 2005).

First, RS can be considered a longitudinal measure of relative status, as it is connected to past, present and even future expectations of socioeconomic status (Singh-Manoux et al., 2003). By focusing on relative objective measures, we can examine more recent and dynamic indicators of relative status. In addition, relative subjective measures of SES, as shown in chapter 2 of this dissertation, are related not only to objective levels of SES, but also psychosocial variables and schematic interpretations of how one's OSS is related to one's understanding of their relative position. While I hypothesize that the above two reasons will make RS more closely linked to young adult health, as it is a SES measure more closely tied to the internalization of stress, examining RO and its relationship to health will nonetheless further elucidate the relative-SES

hypothesis. While RS may be a better overall measure, the dynamic nature of RO means it may be more sensitive to policy interventions. Utilizing a relative objective measure of SES eliminates the need to adjust for psychosocial variables and can focus attention on just how ones objective relative position is associated with health outcomes.

Relative-objective (RO) status utilizes objective SES measures, generally income, to assign a rank to individuals within a given context, or reference group. Relative deprivation (RD) has been the primary indicator of RO, measuring the extent to which a person is lower in rank than their neighbors or peers. A recent review of the literature by Adjaye-Gbewonyo and Kawachi (2012) examined relative income deprivation, which measures individual experiences of relative inequality by comparing individuals' incomes with the income distribution as a whole. They identify three primary ways to operationalize relative deprivation: the Yitzhaki Index (YI), Deaton's formulation of the YI, and percentile rank. The Yitzhaki Index measures the mean difference between the income of an individual and that of those with greater incomes within a reference group (Yitzhaki 1979). While widely used as a measure of relative deprivation, one criticism of the YI is that it can only make upward comparisons. To adjust for this, Deaton's formulation divides an individual's YI by the mean income of the reference group, allowing for upward and downward comparisons (Deaton 2003). The Deaton's Formulation can range between 0 – 1, making comparisons between groups proportional. Another tool used to measure relative objective standing is percentile rank, which create categorical rankings based on income percentiles. This also allows for upward and downward comparisons, but has no indication of the magnitude of difference. For the purposes of this research, I opt to use an RO indicator that allows for upward and downward comparisons and captures magnitude of differences in order to be comparable to my measure of relative subjective status. Thus, I have chosen to utilize an

innovative conceptualization of Deaton's formulation that expands the indicators of socioeconomic status to include not just income, but also education and occupational prestige. This is particularly important for this young adult sample, who may have more fluid individual indicators of SES, and utilizing a range of SES indicators will provide a more stable indicator of relative objective status.

The Importance of Context for the Operationalization of Relative Objective Status

In addition to issues of magnitude and direction of comparison when measuring RO, the choice of reference group in which to construct an RO indicator is also an important consideration, as it reflects the contexts in which RO position is measured and conceptualized. Age, race, gender, educational attainment, neighborhood location, occupations, and any combination of these groupings have been used as reference groups (Kondo et al., 2008; Subramanyam et al., 2009; Adjaye-Gbewonyo and Kawachi, 2012; Daly et al., 2014). In order to make RO and RS measures comparable, it is important to consider all possibilities of reference groups, as I cannot be certain which subgroup(s) young adults consider when evaluating their own RS in a social comparison framework. Reference group theory suggests that people see the whole world as a larger version of their smaller, more local social world (Kelley and Evans 1995). Cherokee youth rate their relative subjective status higher than their white peers (Brown et al. 2008) due to what researchers have deemed the "social comparison enclave". Despite being asked to place themselves on a ladder of all Americans, respondents might assess their RS within groups of people similar to themselves. Thus, considering a variety of RO reference groups will make RO and RS comparisons more useful.

In addition to local and current contexts as determinants of RO status, such as peers with comparable education levels or those of the same race and gender, I argue that contexts that tap

into respondents' adolescent background are also an important context to consider, as adolescence is a particularly sensitive period. As discussed in Chapter 2, adolescence, the life course stage sandwiched between the dependence on parents during childhood and the independence of adulthood, is a sensitive period for cognitive and personal development (Erikson, 1968; Steinberg and Morris, 2001). Therefore, just as exposures in adolescence may continue to shape relative subjective social status, contexts in adolescence may also continue to matter later in the life course. For example, later in the life course, young adults may still compare their success to that of their adolescent peers from their neighborhood schools, or compare themselves to others who came from similar SES backgrounds, using parental education as a proxy for class background. Therefore, I construct RO measures from the following contexts to assess whether they are associated with RS and/or directly impact health in young adults: adolescent school groups, parent educational groups, racial/ethnic and gender groups and own education groups.

Relative Objective Status and Health

In general, most empirical evidence for the association between individual RO and health outcomes supports either a weak protective relationship or no relationship at all (Wagstaff and van Doorslaer, 2000; Adjaye-Gbewonyo and Kawachi, 2012). In a variety of US samples, increased deprivation is related to lower self-rated health (Eibner and Evans, 2005; Subramanyam et al., 2009; Bjornstrom 2011), worse mental health and higher mortality, disability and BMI (Eibner and Evans 2005), independent of absolute income levels. Pregnant women with higher relative deprivation also had slightly worse health outcomes, including lower birth weight, more preterm births and higher risk of maternal smoking (Lhila and Simon 2010). The other studies of RO and health outcomes have utilized non-US samples, and either found

similar results or no relationships (Elgar et al 2013; Elgar et al 2016; see Adjaye-Gbewonyo and Kawachi 2012 for recent review).

The weak results for the relative-income hypothesis may be due to a number of empirical limitations. First, these studies mostly rely on small homogenous samples, whereas a diverse sample with a larger level of aggregation may be better equipped to capture relative deprivation and thus also its health consequences. Second, on a similar note, smaller and homogenous samples may be limited by the availability of reference group. As discussed earlier, we know that choice of reference group is important for properly understanding relative position and likely also the relative-SES hypothesis. Third, these studies rarely utilize objective health measures, which would provide more nuanced evidence for health disparities before disease emerges. Finally, all the RD studies above only utilized income to determine relative position, though AO measures such as education and occupation significantly impact health as well.

Research Aims

I argue that in order to better differentiate between the multiple hypotheses regarding SES differentials in health, we need to better understand relative socioeconomic status, including both relative subjective (RS) and relative objective (RO) positions. This paper aims to contribute to the literature on relative position in several ways.

- 1) First, I further elucidate the cognitive averaging process in young adulthood by studying how a measure of relative objective position, in addition to a number of absolute indicators of SES, is related to subjective social status.
- 2) Second, I contribute to the literature on how relative objective position is related to health by utilizing a number of innovations. RO has yet to be examined in a cohort of young adults, nor has its association with objective measures of young adult health. In addition

to providing a nationally representative young adult sample, Add Health also includes objective measures of health through biomarker measurement that can capture physiological dysregulation before disease emerges, a key link in the process of psychosocial consequences of low rank “getting under the skin” to affect health.

- 3) Finally, in terms of reference groups, Add Health has a number of possible groupings to explore, including a life course approach not yet utilized in the literature. In addition to the diverse, nationally representative sample that will allow for racial, gender and educational level groupings, the original school-based sampling structure of Add Health will allow me to use peers, classmates, and schoolmates from adolescence as another reference group. This will allow for further investigation of the relative importance of certain reference groups when determining social rank, and how these variations on social rank matter for health outcomes.

Hypotheses

1. Relative objective position will be related to relative subjective status, even when controlling for the other factors related to relative subjective status explored in chapter 2.
2. Relative objective position will be related to immune and cardiovascular function.
3. Relative subjective position will be more strongly related to immune and cardiovascular function than relative objective position, as status is internalized to “get under the skin” to affect young adult health.

MEASURES FROM ADD HEALTH

Biomarkers

C-reactive protein: CRP is my measure of immune function and inflammation, whereas higher levels of CRP indicate high levels of inflammation in the body and are associated with higher

disease risk, particularly cardiovascular disease. To adjust for skewing, I create a linear variable of the logged value of the original CRP measure in Wave IV+ 1(logCRP). I also drop respondents with CRP levels above 40, which typically indicates an acute immune response to infection or an inflammatory disease.

Blood pressure: Blood pressure (BP) is my measure of cardiovascular function, whereas higher levels of BP indicate greater risk for cardiovascular disease. For this paper, I use a linear measure of systolic blood pressure (SBP) taken from Wave IV.

Operationalizations of Socioeconomic Status

Absolute Objective (AO) status: Current absolute objective socioeconomic status of the respondent will come from the in-home portion of the Wave IV interview.

Education: Respondent education was measured by asking respondents to report the highest level of education they have yet obtained. I collapse the 13 categories available as answers into four meaningful categories: less than high school; high school graduate; some college; and college graduate; and postgraduate education.

Income: Information on the household income of the respondent was reported in categories, capturing ranges of approximately 10 to 25 thousand dollars. To create a linear measure of household income, I use the midpoint of each income category.

Occupation: Respondent's reported their current or most recent occupation. Add Health reported the 6 digit Standardized Occupational Classification codes (SOC codes) for the respondent. Using these codes, I matched each occupation with its Nakao and Treas (1994) prestige score (range 0 – 100). I choose to use a measure of prestige rather than a composite measure of the typical income and educational attainment associated with each occupation in

order to capture another dimension of AO not measured by the respondent's income and education.

Relative subjective (RS) status: My measure of relative subjective social status, or where the respondent feels they fit into the socioeconomic hierarchy, is the ladder variable, which asks respondents in Wave IV to place themselves on a ladder representing the entire United States, which the lowest status people on the bottom (ladder = 1) and the highest status individuals on the top (ladder = 10).

Relative objective (RO) status:

As described in the background section, there are a number of ways to operationalize relative objective status. For this paper, my analysis of RO relies on one conceptualization of relative status based on three relevant linear AO measures: household income, years of education and occupational prestige scores. I first determine each respondent's relative deprivation using Deaton's formulation of the Yitzhaki Index within a particular context for each of the three measures and average them to create a relative objective status measure for each context. This innovative approach to measuring relative objective status is ideal due to its inclusion of three important indicators of socioeconomic status (versus just relying on income), which is particularly important for studying a young adult cohort, for whom any single AO measure may be stable and permanent than older adults.

Reference contexts for RO: Add Health has a large number of reference groups available. In this paper, I use four different contexts to generate RO status. I first utilize the school-based sampling structure of Add Health to use all schoolmates from their Wave I school in adolescence as an additional reference group, which is innovative for the RO literature. Thus, respondent who shared a school context in adolescence are being compared using their Wave IV income,

education and occupation. I repeat the same process using racial and gender reference groups (i.e. Black Women, Asian Men, Hispanic Women, etc.), parental education groups to compare respondents of similar SES backgrounds, and respondents' own educational groups (for own education, I can only create the RO measures using an average of income and occupational prestige) as well as for the whole sample.

Deaton's Formulation of the Yitzhaki Index:

The process of creating the overall SES DF for each context is complex, First, I create an individual DF score for every absolute objective SES measure then average the DF for each AO measures within each context to create the context specific, overall SES DF scores. In the formula below, I show income relative deprivation of person i is equal to the sum of all incomes y for which others in their reference group earn more than person i , divided by the total number of people with income higher than person i .

$$RD_i = \frac{1}{n} \sum_j (y_j - y_i) \forall y_j > y_i$$

This resulting in the Yitzhaki Index relative deprivation value, which I then divide by the mean value of the income for those of the same race and sex to create the Deaton's Formulation. I repeat this process within the Race/Sex groups for years of education then occupational prestige, resulting in three DF indicators for each individual within the Race/Sex groups. I average these for anyone with at least two of the indicators, resulting in an overall SES DF for respondents within the Race/Sex group. I then repeat this process of calculating a DF for each of the three AO measures within the other three reference groups, resulting in four total DF variables for each respondent. These original DF scores start at 0 (meaning an individual has the highest possible amount of absolute objective SES within their reference group for all indicators), and increasing DF means higher relative deprivation. However, to keep the RO measure in the same

direction as the RS measure, with increasing values related to increasing relative position, I multiply the original DFs by -1, reversing the direction. Therefore, increasing RO means higher relative position.

Control Variables:

Socio-demographic: I also control for age, sex, race/ethnicity (White, Black, Asian, Native American/Other and Hispanic), family structure (living with both biological parents; two-parents, step; single mother; single father; or other) and immigrant status (native born, second- or first-generation) at baseline (Wave I) in addition to current marital status at Wave IV, all of which are associated with health and disease risk.

Methods

To create my analytical sample, I exclude anyone missing the main independent variables, the control variables, mechanism variables and/or sampling weights. The main source of missing data comes from those missing own income (915) and occupational prestige (385). I then create two separate analytical samples for each dependent variable biomarker, only excluding people who additionally are missing the relevant biomarker. Dropping all respondents without the relevant variables or sample weights leaves me with a CRP sample size of 10,690 and BP sample size of 11,990.

I first begin with a descriptive analysis of the data, presented in Table 1 and 2 and Figure 1. I then test Hypothesis 1 by adding RO indicators to the models predicting RS assessed in Chapter 2. I then assess the relative strengths and significances of the associations between each of the two conceptualizations of relative SES (RO and RS) and the objective health outcomes, logCRP and SBP, in Figures 2 and 3 to test Hypothesis 2. To examine Hypothesis 3, which assesses whether perceived or actual relative status is more important for young adult

health, I introduce the RO Race and Sex and RS variables stepwise into fully adjusted multivariate models. I repeat the aforementioned models for both measures of RO Own Education, RO School and RO Parent Education, to examine whether there are differences in how RO context may influence the above associations.

Results

Table 1 includes the descriptive results for the variables used in this analysis. The mean age at Wave I was 15.46 years, and almost 50% of the sample is female. The majority of the sample is White (69.9%), with large portions of Blacks (15.2%) and Hispanics (11.3%). The remainder of the sample was Asian (3.3%) or some other race, typically Native American (0.3%). Most of the respondents were native-born (85.4%), with the rest of the sample being children of immigrants (10.3%) or immigrants themselves (4.4%). Most lived with both biological parents during Wave I (55.0%), but many also lived with one biological parent and a stepparent (16.6%). Of those living with only one parent, the majority lived with single mothers (19.9%), though some did live with a single father (2.9%). The rest (5.6%) lived in some other family arrangement, typically living with one or both grandparents. By Wave IV, nearly 50% of the sample was married. The average systolic blood pressure of the sample was 124.8, and the average logCRP value of the sample was 0.5. Approximately a quarter of the sample achieved a college degree, while 39.9% had some college education. 7.4% of the respondent had some education beyond a college degree. 20.2% of the respondents had just a high school degree, while the remainder (8.3%) had less than a high school education. The mean household income of respondents was \$64,510. Average occupational prestige among respondents was 44.5. The mean ladder score, of relative-subjective status, is 5.03. The mean Deaton's Formulations of

relative objective status range from 0.188 (school reference group) to 0.241 (own education reference group). See Figure 1 for the distribution of the Deaton's Formulations.

Table 2 presents the correlations between the various measures of socioeconomic status investigated in this chapter, including AO, RO and RS measures. All relationships operate in the expected direction. All RO operationalizations within the various references groups are highly correlated, with all correlation coefficients greater than 0.84. Of the AO measures, HH income was most highly correlated with the RO measures, while own education was least correlated. The least correlated measures are the level of own education and the RO constructed within own education groups. Interestingly, RO Whole was most correlated to all other measures, compared to other RO groups, suggesting that perhaps individuals are comparing themselves to their cohort as a whole, rather than specific subgroups within it. All correlation coefficients are significant at the 0.001 p-value level.

Table 3 shows how RO factors into the cognitive averaging framework discussed in Paper 1 to predict the RS ladder score. The first 4 models (Models 1 – 4) present the basic adjusted relationship between RO and RS. In general, as RO increases, RS increases as well, suggesting those who are objectively higher in the hierarchy within their reference group have higher relative subjective evaluations of themselves as well. The largest coefficient is the RO Whole association with RS ($\beta = 6.044$), while the smallest association is between Own Education and RS. This is more evidence that respondents are considering the whole cohort as their reference group when assigning themselves subjective status. In the models adjusted for AO (Models 5 – 8), these associations weaken for the RO within all reference groups, though a significant association persists. Here, RO School has the smallest association with RS ($\beta = .965$), while RO Parent Education is the largest. Thus, the RO reference group most strongly associated

with RS changes when adjusting for absolute level of objective SES. However, while their effect sizes change, they are not too different from one another, suggesting that the reference groups may not be as uniquely important as theorized. In the final adjusted models (Models 9 – 12), which include all the cognitive averaging expanded framework variables included in the final model of Paper 1, all associations between RO and RS are explained away.

Figure 2 presents the relationships between all six relative SES measures (five RO measures and RS) and logCRP, adjusted for age, sex and race/ethnicity. The RS Ladder association is the largest, as RS increases by a standard deviation, logCRP decreases by 0.026, though the coefficients of the other RO associations are generally within the 95% confidence interval of the RS coefficient. Increasing RO Whole by one standard deviation is related to a 0.018 unit decrease in log CRP, the largest association of all RO measures. Increasing RO School, RO Race and Sex and RO Parent Education are all associated with slightly smaller decreases in logCRP. The association between RO Own Education and logCRP is not statistically significant at the $p < 0.05$ level. Figure 3 presents the relationships between all relative SES measures and SBP, adjusted for age, sex and race/ethnicity. The results are similar to the CRP findings, with a one standard deviation increase in relative SES, both subjective and objective in all five contexts, is related to a decrease in SBP. For both CRP and SBP analysis, Relative Subjective status has the largest association with the biomarkers, which is further evidence that relative subjective is more strongly tied to health than RO.

Table 4a presents results for the CRP analysis, with RO School, RO Race/Gender, RO Own Education, RO Parent Education, RO Whole, and RS Ladder as predictors. In Model 1, RO Race and Sex is inversely associated with SBP, such that a one unit increase in relative deprivation compared to others in one's race and sex group is associated with a 0.143 decrease in

logCRP. While this seems like a relatively large association, a one-unit increase in RO is akin to moving from the highest theoretical amount of relative deprivation to having no relative deprivation whatsoever. Model 2 also includes relative subjective SES, such that a unit increase in relative subjective status is associated with a 0.342 reduction in logCRP, and RO Race/Sex is no longer significantly associated with logCRP. In Models 3, 7 and 9, increased relative objective status within each the Whole sample and the School and Parental Education groups are associated with decreased logCRP. However, as shown in Models 4, 8 and 10, controlling for RS, which is significantly associated with logCRP in the expected direction, explains away the association between RO and logCRP. RO Own Education is not significantly associated with logCRP in either Model 5 or 6. In all models, RS remains significantly associated with decreased logCRP.

Table 4b presents results for the SBP analysis, with RO School, RO Race/Gender, RO Own Education, RO Parent Education, RO Whole and RS Ladder as predictors. In Model 1, RO Race and Sex is inversely associated with SBP, such that increasing relative objective status from the theoretical absolute lowest to highest, compared to others in one's race and sex group, is associated with a 5.62 unit decrease in systolic blood pressure. Model 2 includes not only RO Race/Sex but also relative subjective SES, such that a one unit increase in relative objective status is associated with a 3.599 unit decrease in systolic blood pressure. Models 9 and 10, with RO Whole, follow an almost identical pattern, with both RO and RS remaining significant in the adjusted model. However, as Models 4, 6 and 8 show, adjusting for RS attenuates the significant association between RO School, RO Own Education and RO Parent Education. In all models, RS remains significantly associated with decreased SBP.

Discussion and Conclusion

This chapter, in its exploration of relative objective status in young adulthood, has contributed a number of innovative findings to the literature surrounding relative social status and objective health. By better understanding relative objective position, I supplement the findings of the first two chapters of this dissertation. First, I expand our understanding of the cognitive averaging process that goes into subjective social status development across the life course. Second, I further highlight the importance of relative position in the socioeconomic hierarchy for young adult health, as both relative objective position and relative subjective position are associated with measures of cardiovascular and immune function.

I find little evidence to support Hypothesis 1, which posited that RO status in young adulthood is associated with RS in young adulthood, independent of all the additional objective and schematic variables explored in Chapter 2 of this dissertation. In the basic models, I find that RO in all four contexts is related to RS; even adjusting for level of own socioeconomic status such as income, education and occupation, RO continues to be significantly associated with RS. However, in the fully adjusted models (replicated from Chapter 2), RS and RO in any context are no longer significantly related. Supplementary analysis shows that adjusting for financial strain is the most important factor in explaining the association between RO and RS in young adults. I conclude that this provides further evidence regarding the importance of schemas, which as discussed in Chapter 2 influence the subjective social status of young adults and are shaped by one's context. Perhaps respondents with low RO position feel compelled to "keep up with the Joneses" in contexts where they are of relatively low objective SES, which then leads to increased financial strain and decreased evaluations of their own relative and subjective social status. Further research utilizing mixed methods could elucidate if and how relative objective

status is internalized and involved in the cognitive averaging process of subjective social status formation.

Since RO is not associated with RS in the fully adjusted models, I then turn my attention to examining RO's association with young adult objective health indicators in order to better understand relative SES in general, and to test Hypothesis 2, which suggests that relative objective SES is positively associated with individual health. While RO in all five contexts was almost always associated with both blood pressure and inflammation in the expected direction in the basic adjusted models, the inclusion of RS into the models reduces or fully attenuates the association, suggesting that relative subjective status is more closely tied to health. This supports the relative SES hypothesis proposed in the background section, though I conclude that relative subjective position is more important for individual health than relative objective position

Why relative objective status would be less important for health, once relative subjective is control for, remains to be explored. This finding is similar to previous research, which has typically found a small positive association between RO and health, or no relationship at all. Though I use a more comprehensive measure of RO status than previous papers (which often rely on one measure of socioeconomic status (income) to assess relative objective status), even including three OSS variables in my RO measures cannot fully capture all the various concepts this dissertation has shown to be important for individual's relative subjective understanding. Therefore, I argue that while relative objective position can capture some of the relationship between relative position and health, as hypothesized in the relative positive hypothesis, relative subjective position is an overall better measure and thus more closely tied to health.

Even with relative objective status adjusted for, relative subjective position continues to have a stronger relationship in the expected direction with young adult CRP and SBP,

confirming Hypothesis 3 of this chapter and providing further evidence of the importance of subjective social status as discussed in the previous chapter. RS is likely the mechanism through which the stress of low status, relative and absolute, are internalized, “getting under the skin” to directly affect immune and cardiovascular function. First, the association between RO and RS is explained away by stress mechanisms, such as financial strain, thus confirming that RS is more closely tied to internalized inequality and stress. Any additional effect of RO, therefore, is not related to internalization of this stress of low status, but rather some other mechanism. I believe RS is the best way of capturing the extent to which an individual believes they are of low status, and thus hypothesize that this process can trigger a stress response in the body, which is why RS is a stronger indicator of relative position and one more relevant for health research. However, I believe further research should continue to further unpack how relative subjective status is related to relative objective status and how both “get under the skin” to influence health.

This paper’s operationalization of RO in young adulthood is unique in a number of ways, including the three SES measures and several innovative reference groups used to construct RO in young adulthood. While it was important to investigate each one separately from a theoretical standpoint, I find little evidence to support that any particular reference group is more relevant for the process of RO getting under the skin to affect health. Using the whole sample as a reference group for RO had slightly larger association with both RS and health, but the results were not statistically different than the other reference groups. This may be due to the high correlation of RO measures across contexts, as people who are doing comparatively well in one reference group are likely to be doing relatively well in the other as well. In the unadjusted models, each has similar associations with the health outcomes, but RO Whole and Race/Sex are the only two RO measures that continue to be significantly associated with SBP in the fully

adjusted models, suggesting that these two reference groups may be slightly more salient for this cohort. Nonetheless, I maintain that investigating which reference groups may be most appropriate for understanding RO should continue to be a priority for future research.

In particular, neighborhoods or a larger geographic area would be the ideal context for investigating the role of RO in affecting health. While the reference groups I utilized are theoretically possible contexts in which young adults could be comparing themselves to others, a more proximate context in which respondents interact with their neighbors on a regular basis may provide a clearer picture of the ways in which RO status influences health. However, this type of analysis requires a degree of clustering that Add Health (or other nationally representative demographic studies that collect detailed health information) does not have. While further research into possible reference groups for relative objective status is surely called for, it's quite possible that no one researcher-constructed reference group will ever perfectly reflect the reference group which carries the most meaning for any particular individual, and enforcing non-relevant reference groups can't contribute fully to our understanding of how relative status matters for health. Therefore, relative subjective social status is the ideal way to capture relative status, as it allows each respondent to pick the reference group that matters most to them, the one that has most shaped their schematic understanding of how their various socioeconomic and psychosocial resources combine in the cognitive averaging process, are internalized and therefore influence health.

Overall, it is important to remember that while relative position, both subjective and objective, matter for young adult health, the level of the socioeconomic status attainment, such as income, education, and/or occupation, have stronger and larger associations, typically, than the relative positions. Thus, the two hypothesis posited in the background section are hardly

mutually exclusive. The level of status attainment is highly related to access to resources that influence health, but how one's SES relates to those around them, or within their reference group, matters for health as well, likely through the mechanisms of internalized stress of low status. In addition, because of the cross-sectional nature of my data, I cannot make causal conclusions, nor rule out the possibility of health selection. Further investigation is needed to strength causal arguments about relative social position and health, but these results, and those in prior chapters, suggest that subjective social status is hugely important for young adults.

Overall, this paper is the first to compare three conceptualizations of socioeconomic status in a young adult population, and how each measure is uniquely associated with objective measures of health in young adulthood. Using a young adult sample, instead of the older adult cohorts most previous studies have relied on, I examine different ways through which relative socioeconomic status, both objective and subjective, are associated with objective measures of health in young adulthood that can capture physiological dysregulation before disease emerges, a key link in the process in understanding how psychosocial consequences of low rank “getting under the skin” to affect health. Overall, both objective and subjective relative socioeconomic status are related to health in young adulthood, and I conclude that subjective social status better captures the stress of relative low status.

Table 4.1: Descriptive Analysis of Variables in SBP Sample (N = 11,990)*

	Mean/Proportion	SD	Range
<i>Sociodemographic</i>			
Age at Baseline	15.46	1.84	12 - 18
Female	49.60%		
Race/Ethnicity			
White	69.91%		
Black	15.15%		
Asian	3.29%		
NA/Other	0.34%		
Hispanic	11.31%		
Immigrant Status			
1st Generation	4.43%		
2nd Generation	10.31%		
Native Born	85.39%		
Family Structure			
Two parent, bio	55.03%		
Two parent, step	16.56%		
Single Mom	19.86%		
Single Dad	2.92%		
Other	5.64%		
Ever Married by Wave IV	46.13%		
<i>Biomarkers</i>			
Systolic Blood Pressure	124.88	13.57	74 – 222.5
C-Reactive Protein [^]	0.52	0.344	0.034 – 1.611
<i>Absolute – Objective (AO)</i>			
Education			
Less than HS	8.33%		
HS Degree	20.18%		
Some College	39.86%		
College Degree	24.28%		
Graduate Education	7.36%		
Income (in thousands of dollars)	64.51	44.90	2.50 – 200.00
Occupational Prestige	44.50	12.99	16.90 - 86.01
<i>Relative - Subjective Status (RS)</i>			
Ladder	5.03	1.71	1 - 10
<i>Relative – Objective (RO)</i>			
Deaton's Form. – School	0.188	0.117	0 - 0.688
Deaton's Form. – Race and Sex	0.200	0.121	0 - 0.698
Deaton's Form. – Own Education	0.241	0.150	0 – 0.844
Deaton's Form. – Parent Education	0.196	0.117	0 - 0.683
Deaton's Form. – Whole Sample	0.202	.122	0 – 0.699

*Values are weighted

[^] From CRP Sample (N = 10,690)

Figure 4.1: Distribution of Deaton’s Formulation, by Reference Group

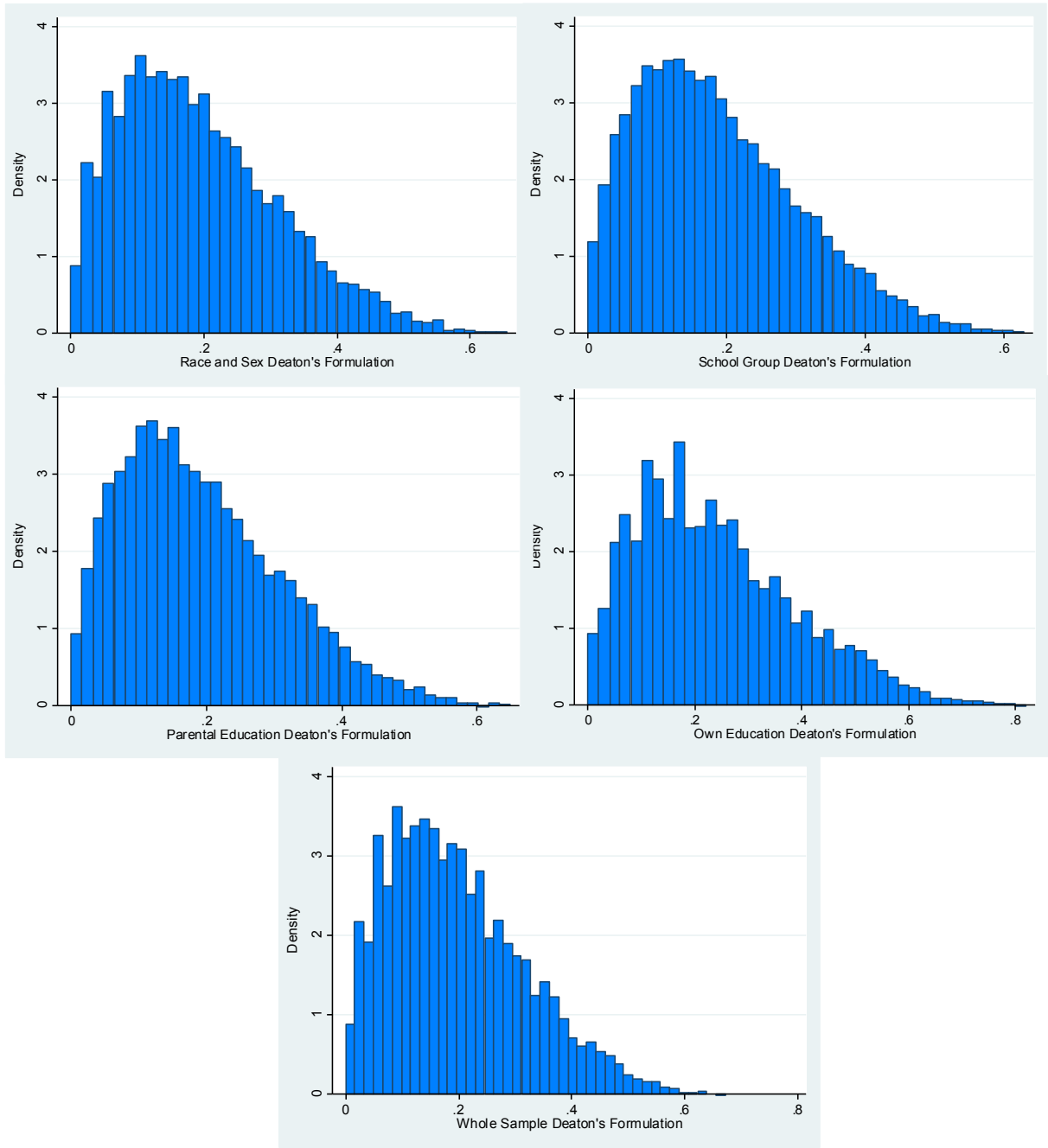


Table 4.2: Correlations between RO, RS and AO*

	Ladder (RS)	DF Whole (RO)	DF Race & Sex (RO)	DF School (RO)	DF Own Education (RO)	DF Parent Education (RO)	Own Education (AO)	HH Income (AO)
DF Whole (RO)	0.422	1						
DF Race and Sex (RO)	0.412	0.988	1					
DF School (RO)	0.380	0.956	0.950	1				
DF Own Education (RO)	0.305	0.857	0.849	0.845	1			
DF Parent Education (RO)	0.291	0.967	0.958	0.940	0.870	1		
Own Education (AO)	0.365	0.596	0.587	0.532	0.120	0.515	1	
HH Income (AO)	0.344	0.765	0.754	0.734	0.763	0.752	0.314	1
Occupational Prestige (AO)	0.316	0.657	0.650	0.521	0.527	0.627	0.503	0.275

*All correlations are significant at $p < 0.001$

Table 4.3: Bivariate Relationships between RO and RS, (N = 10,895)

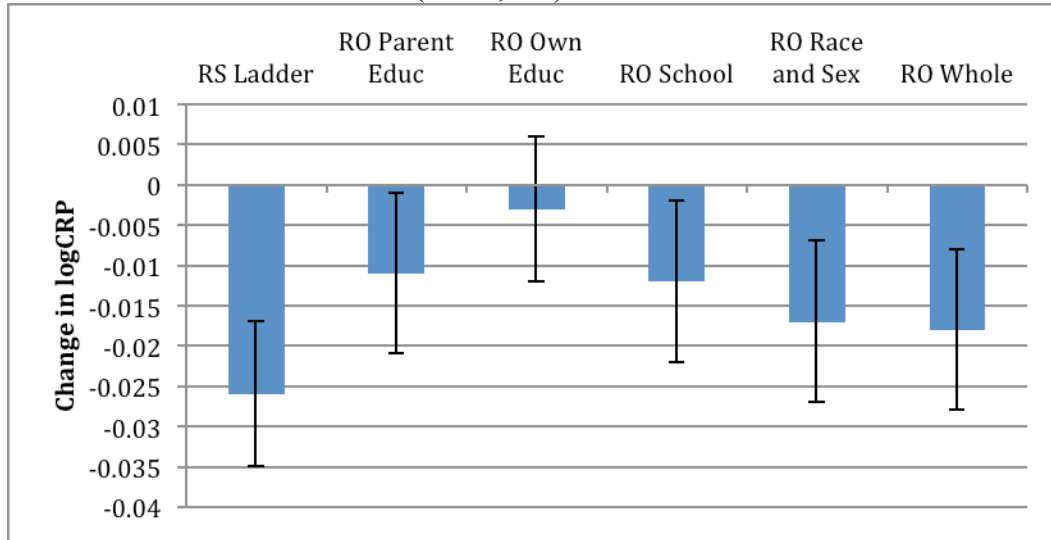
	Basic Adjusted [^]	Adjusted for AO ^{^^}	Fully Adjusted ^{^^^}
RO Race and Sex	6.005*** (0.245)	1.964*** (0.560)	0.915 (0.518)
RO School	5.635*** (0.216)	0.965* (0.393)	0.0368 (0.344)
RO Own Education	3.431*** (0.185)	1.281** (0.381)	0.585 (0.353)
RO Parent Education	5.763*** (0.236)	1.981*** (0.564)	0.933 (0.525)
RO Whole	6.044*** (0.245)	1.910*** (0.561)	0.845 (0.516)

[^] Adjusted for age, sex, race/ethnicity, family structure and marital status.

^{^^} Building off the basic adjusted models, also controls for own absolute objective SES measures such as household income, occupational prestige and educational attainment.

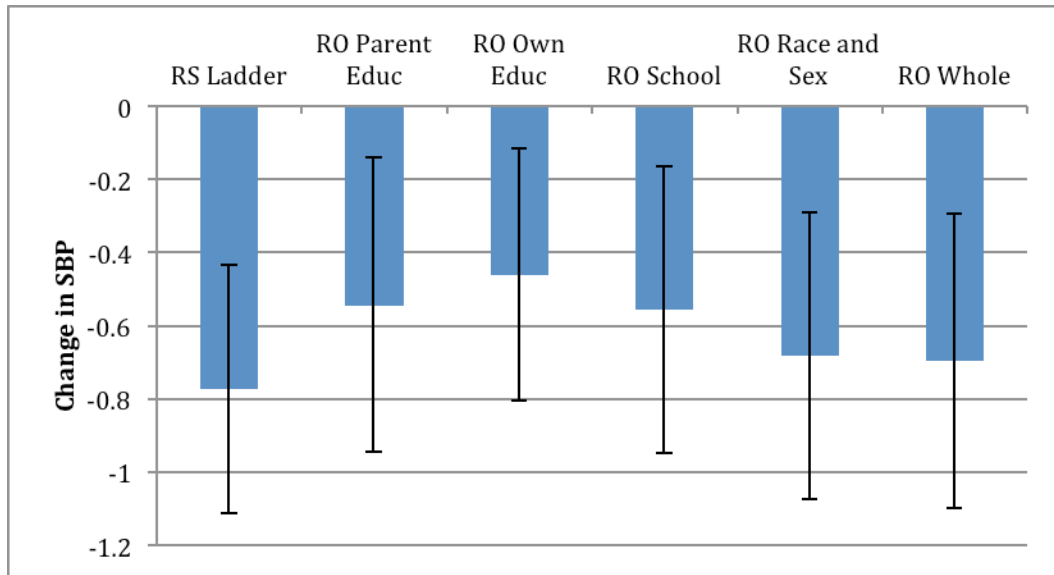
^{^^^} Building off the AO adjusted models, also controls for all covariates of subjective social status included in the full models in Chapter 2, including parental AO and psychosocial variables.

Figure 4.2: Relationship between a Standard Deviation Increase in Relative SES and logCRP, with 95% Confidence Intervals (N=11,990)*



*Values are weighted and adjusted for age, sex and race/ethnicity.

Figure 4.3: Relationship between a Standard Deviation Increase in Relative SES and SBP, 95% Confidence Intervals (N=11,817)*



*Values are weighted and adjusted for age, sex and race/ethnicity.

Table 4.4: Relationship between Relative Objective and Subjective Status and C- Reactive Protein (N = 10,690)*

	1	2	3	4	5	6
Relative Objective - DF Race and Sex	-0.143*** (0.042)	-0.065 (0.043)				
Relative Objective - DF School			-0.101* (0.043)	-0.022 (0.043)		
Relative Objective - DF Own Educ					-0.019 (0.0230)	0.033 (0.029)
Relative Subjective Ladder		-0.013*** (0.003)		-0.015*** (0.003)		-0.016*** (0.002)
Constant	0.330*** (0.043)	0.411*** (0.045)	0.348*** (0.042)	0.430*** (0.043)	0.361*** (0.042)	0.451*** (0.044)
R-squared	0.055	0.058	0.053	0.058	0.052	0.058

	7	8	9	10
Relative Objective - DF Parent Educ	-0.0919* (0.043)	-0.008 (0.044)		
Relative Objective - DF Whole			-0.146*** (0.042)	-0.068 (0.044)
Relative Subjective Ladder		-0.015*** (0.003)		-0.013*** (0.003)
Constant	0.343*** (0.043)	0.433*** (0.044)	0.329*** (0.043)	0.410*** (0.045)
R-squared	0.053	0.058	0.055	0.058

*Models are weighted and adjusted for age, sex, race/ethnicity, family structure and immigrant status at baseline (Wave I) and marital status at Wave IV.

*** p<0.001, ** p<0.01, * p<0.05

Table 4.5: Relationship between Relative Objective and Subjective Status and Systolic Blood Pressure (N = 11,990)*

	1	2	3	4	5	6
Relative Objective - DF Race and Sex	-5.620***	-3.599*				
	(1.633)	(1.721)				
Relative Objective - DF School			-4.691**	-2.566		
			(1.666)	(1.748)		
Relative Objective - DF Own Educ					-3.071**	-1.715
					(1.164)	(1.186)
Relative Subjective Ladder		-0.342**		-0.381***		-0.404***
		(0.105)		(0.105)		(0.102)
Constant	123.2***	125.2***	123.8***	125.8***	123.7***	125.9***
	(1.655)	(1.765)	(1.660)	(1.739)	(1.698)	(1.791)
R-squared	0.148	0.150	0.147	0.149	0.147	0.149

	7	8	9	10
Relative Objective - DF Parent	-4.618**	-2.444		
	(1.727)	(1.799)		
Relative Objective - DF Whole			-5.669***	-3.634*
			(1.653)	(1.744)
Relative Subjective Ladder		-0.384***		-0.343**
		(0.104)		(0.105)
Constant	123.4***	125.7***	123.1***	125.2***
	(1.683)	(1.792)	(1.656)	(1.767)
R-squared	0.147	0.149	0.148	0.150

*Models are weighted and adjusted for age, sex, race/ethnicity, family structure and immigrant status at baseline (Wave I) and marital status at Wave IV.

*** p<0.001, ** p<0.01, * p<0.05

CHAPTER 5. – CONCLUSION

Introduction

In this final chapter, I summarize the main research findings of the proceeding three empirical chapters, which all supported the goal of better understanding subjective social status and its relationship with health in young adults. After the summary of findings, I address some limitations of my work, and identify potential areas for future research to address. Finally, I end this concluding chapter with a section regarding how these research findings can be applied to inform social and health policy.

Summary of Findings

Overall, this dissertation has contributed to the social stratification, health, and life course literatures by providing new evidence for how each of the three subfields interact with and inform each other. None can be properly understood without considering the others, and thus the main aim of my dissertation was this: to examine how socioeconomic status across the life course is understood by individuals as their subjective social status, and how this understanding of social standing is internalized to impact physiological dysregulation and health. The crux of my findings rests on the importance of stress from a life course perspective: 1) financial stress as an important predictor of subjective social status, regardless of income or education level, 2) stress as the mechanism through which understanding one's low status is inherently stressful on the body, and 3) stress as described above can exist at all levels of objective socioeconomic status, both relative and absolute, which makes subjective social status all the more important to consider.

The second chapter of this dissertation set out to investigate how young adults may be considering other factors besides their current levels of income, education and occupational prestige when evaluating their own subjective social status. At this life course stage, SSS is normally distributed, with most considering themselves about average, halfway up the ladder. Both past (parental) socioeconomic status and current socioeconomic status are important for young adult SSS. Since psychosocial and quality of life variables are independently related to SSS as well, my findings expand the traditional framing of SSS development as a cognitive averaging process by suggesting that this process does not exist in a vacuum, but rather within socially constructed schemas. The importance of these other variables, particularly perceived intelligence and financial strain, does not minimize the utility of SSS as a measure of socioeconomic status. Rather, it strengthens its usefulness, especially for health research, since it allows individuals to report a subjective social status that is uniquely meaningful to them. No matter what individuals consider important to their subjective social status, the cognitive averaging process in and of itself requires and reflects each individual's internalization of status, which has important consequences for health.

No matter what individuals consider important for their subjective status, their SSS matters for their health. I find consistent evidence in Chapter 3 that increasing subjective social status is related to improved health, as measured by the objective biomarkers. While the mechanism analysis failed to yield a consistent story regarding how SSS gets under the skin to influence health, one could argue that SSS itself is a mechanism between the objective levels of income, education, and occupation individuals have and health. Again, the schematically-influenced cognitive averaging process is also an internalizing process; as individuals weigh their status indicators, influenced by their past and current social environments, SES by definition gets

under the skin, into the consciousness of individuals. In addition, while the variables I had available in Add Health to measure stress did not mediate the association between SSS and health, Chapter 2 demonstrates that stress is included in the cognitive averaging process and thus cannot be excluded as an important mechanisms connecting SSS and health.

Finally, to further understand subjective social status in young adulthood, I introduced a measure of relative objective status in Chapter 4 in order to assess the extent to which subjective social status is related to an objective measure of relative position, and which matters most for health: subjective or objective relative status. First, I find that while relative objective position is related to SSS, this association is not statistically significant when adjusting for all the various determinants of SSS I examined in Chapter 2. Thus, I conclude that subjective social status is not so much a reflection of an individual's "true" rank, but rather how each individual feels they "truly" compare to others, based on whatever indicators of status they deem most important. Furthermore, relative objective position, above and beyond relative subjective position and the levels of income, education, and occupational prestige of an individual, was associated with health in the bivariate models, but this relationship is often explained away or reduced by the inclusion of relative subjective status. Overall, I believe my measures of relative objective position, the first to be constructed as such, are a contribution to the literature on relative objective socioeconomic status, and future research into the relative-SES hypothesis should continue to utilize similar measures.

Limitations and Future Research

While this dissertation makes several important theoretical and empirical contributions to the stratification, health, and life course literatures, it was somewhat limited by the data available. This section will discuss some of those limitations, as well as suggest ways future research

should improve on this work. First, while I was able to investigate several new predictors of subjective social status, my ability to capture the future aspect of the cognitive averaging process was limited. I include a measure of whether respondents are satisfied with their current education, but this does not completely capture whether or not they planned on pursuing future education. Similarly, Add Health does not include respondents' assessments of their future earning and occupational potential, nor the extent to which they are concerned about possible downward mobility later in their lives. Therefore, while I could theorize that individuals were taking ideas about expectations about their future SES into account, I was unable to explicitly test this hypothesis. Additionally, while I do have measures of current SES and past SES (parental SES), I only have snapshots at one point in time for both: Wave IV and Wave I, respectively. I chose not to include Wave III measures of OSS because of the heterogeneity of ages and life course stages found in the cohort at that time. However, I believe that future research using Wave V will be able to use Wave IV and Wave V data regarding respondents' own OSS to capture a more dynamic measure of own OSS across the life course. In addition, Wave V will include a repeated measure of subjective social status. It will be very interesting to see the extent to which individuals change their SSS during the 8 years or so between Waves IV and V, and the extent to which changes in OSS and psychosocial variables can explain changes in SSS from young adulthood into midlife.

In addition, while findings from my analysis of the predictors of SSS in young adulthood hinted at the importance for schema in influencing the cognitive development process, statistical regressions of quantitative variables can only do so much to explain what exactly is going on in people's minds. Another way to uncover what people are considering when they place themselves on the ladder would be to simply ask them. Qualitative or mixed-methods research

using interviews and focus groups expanding on the predictors I've identified as important in this project will likely provide more nuanced explanations from respondents themselves about who they're comparing themselves to, and what markers of status they may be using in these comparisons.

While the use of biomarkers data as a measure of health risk in young adulthood has many benefits, the cross-sectional nature of the associations between all measures of respondents' own SES and objective health indicators limits my ability to make causal claims. Adjusting for parental SES background as well as other sociodemographic factors from adolescence and Wave IV strengthens the argument that subjective social status is highly important for explaining health outcomes, independent of other known predictors of health risk. However, future research, perhaps using Wave V Add Health data when available, could be better equipped to assess if changes in biomarkers across time is associated with changes in SSS and OSS as well.

Finally, I created an updated version of Deaton's formulation of relative deprivation that includes not only income, but educational attainment and occupational prestige as well, which I believe is an improved measure of relative objective SES. This improved DF measure is particularly important for understanding relative status in a young adult cohort for whom some SES indicators may be more fluid. In addition, I explored a unique reference group only available in Add Health: adolescent schoolmates. While these innovations contribute a unique set of measures to the literature, they still were not able to capture what I hypothesize may be the most important reference group for young adults: their neighbors. However, the clustering (or lack thereof) of respondents in Wave IV limited my ability to construct DF indices using neighbors, in census tracts or some other unit of neighborhood. Future research using a clustered

sample, though likely not be nationally representative but still regionally and ethnically diverse, such as the Atherosclerosis Risk in Communities Study, could better address how neighbors as a reference group would affect the association between RO and health.

Significance and Implications

Despite some limitations, this dissertation contributes many new findings to the intersections of the health, social stratification, and life course literatures that have several important implications for health and social policy and for research methodology. In this final section, I put forward some recommendations for how future policy could be better informed by my findings, and well as make the argument for future researchers to consider subjective social status as a key measure to include in health and social surveys.

Overall, my work provides additional evidence for the importance of early life socioeconomic status for both later life subjective status and health. Adolescent OSS and family background continues to influence SSS well later into respondents' lives, regardless of current social standing. Then, this SSS is associated with health, such that those with lower SSS, perhaps due to their childhood conditions, have worse health as well. Interventions to improve health disparities and other forms of inequality would be best suited to the sensitive period of adolescence. These interventions early in the life course should consider the importance of relative position in addition to absolute levels of socioeconomic status. Reducing levels of poverty for families with children would lead to population health improvements, but efforts to reduce overall socioeconomic inequality and thus improve low status individuals' relative position would confer additional health benefits.

While interventions to increase educational attainment, income, and even occupational prestige, and inequality across these measures, would benefit young adults and likely improve

the health of the entire population, my work has identified other ways of improving subjective social status. Financial strain limits SSS at all levels of income and education, so programs aimed at teaching financial literacy could decrease the likelihood of not being able to pay bills, thus decreasing the associated stress. This would improve subjective status as well as individual health. In addition, social stress and optimism are also associated with subjective social status, and by encouraging healthy social relationships and increased social integration, as well as positive outlooks, could improve SSS as well. Not only could increased social integration improve SSS, it could also buffer the stress mechanism through which SSS gets under the skin to influence health.

Additionally, I find that relative and absolute disparities in health begin early in the life course, even before typical diseases emerge. Thus, limiting policy interventions related to relative socioeconomic status to later life once morbidity and mortality differentials are high might not be as useful as intervening in early life stages, including adolescence and young adulthood. Improving the quality of life of adolescents, either subjective or objective, and setting them up for better futures will improve well-being and health well across the life course.

Finally, I believe my research has thoroughly demonstrated the utility of subjective social status as a measure of socioeconomic status. I believe it is both a better measure of SES than any single objective SES indicator, and an indicator of SES that is extremely useful for further understanding socioeconomic health disparities. In addition, getting people to report their SSS is as simple as having them place themselves on a ladder. Response rates for the SSS question are typically very high, and very meaningful. Therefore, I strongly recommend that researchers include SSS in more demographic and health studies and continue to further understand subjective social status as an empirical measurement and a theoretical concept.

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