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Indebtedness, Debt Stress, and Health-Related Behaviors: A Study of Alabamians' Financial Well-being and Physical Health

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ABSTRACT

In order to better understand the SES-health relationship and gain a more accurate estimation of SES on physical health, the primary objectives of this research are: (1) to test the relationship between Alabamians' indebtedness and their health-related behaviors; (2) to test the mediating effect of Alabamians' socioeconomic and sociodemographic status in the relationship of indebtedness and health-related behaviors; and, (3) to test the possible mediating effect of debt stress on indebtedness and health-related behaviors. The health lifestyle theory guides this research.

Research has advanced two views that explain the interrelationship between socioeconomic status and physical health. The first view deals with individuals' financial well-being, including indebtedness, which partially explains the health gradient of socioeconomic status. The second view looks at the gradient of physical health on daily health-related behaviors, such as smoking, binge drinking, unhealthy diet, and sedentary lifestyle. However, little has been discussed about the correlation between financial well-being and health-related behaviors. This includes the unanswered question regarding how health-related behaviors are associated with individuals' indebtedness. To answer the above questions, this research uses the Health Lifestyle Model (Cockerham 2005). To my

knowledge, this is the first attempt to provide a better picture of debt-health literature in relation to the above questions.

This research will use data from the Alabama Omnibus survey research of 2010, in which 515 Alabamians are randomly sampled from all Alabama residents. Due to the nature of the focal outcome variables, ordinal logistic regression, binary logistic regression, and ordinary least squares model will be applied to conduct statistical analyses and address proposed research questions based on the health lifestyle theory. In the context of the recent economic slowdown, the conclusions of this research may be especially beneficial to financial educators and practitioners engaging in debt education—such as credit counselors—or debt-holders themselves.

Keywords: Debt, Health-Related Behaviors, Smoking, Drinking, BMI, Debt Stress.

DEDICATION

I firstly dedicate this thesis to the Lord I worship. He comforts me and strengthens me through His words and the Holy Spirit, especially during the most difficult periods of thinking and writing. May all the glory and honor I obtained belongs to the Lord almighty.

I also dedicate this thesis to my beloved wife, Xie, Yanli, who is the most important person in my life. Without her love and support, this research would not have been possible.

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Table of Contents

Page

LIST OF TABLES

Table *Page*

LIST OF FIGURES

Figures *Page*

LIST OF ABBRIVIATIONS

AOS	Alabama Omnibus Survey
BMI	Body Mass Index
CDC	Centers for Disease Control and Prevention
expb	The exponentiation of the B coefficient (Odds Ratio)
MHF	Mental Health Foundation
NFCC	National Foundation for Credit Counseling
OLS	ordinary least squares
PTSD	posttraumatic stress disorder
SES	socioeconomic status
SRD	stress-response dampening
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

In the context of the recent economic recession, many individuals or households might experience economic impacts from underemployment, unemployment, or both. For those who use personal debt as a buffer to prevent financial crisis to go into foreclosure, file bankruptcy, or use it as a cushion to maintain a desired but unaffordable lifestyle, burdensome repayment may cause debtors to lose their financial well-being. This leads to lower living standards that affect health-related behaviors. In addition, the stress derived from indebtedness may possibly result in further mental impairment. A few research studies discuss the association and possible pathways between debt and health from a sociological framework; however, the theories that guide these studies are not strongly documented. My research furthers understanding between financial well-being and physical health, by providing an alternative view of indebtedness and debt-related-stress.

For the purposes of this research on "debt", I focus on personal "debt" level. The personal level of debt includes unsecured debt (or consumer debt, such as credit card debt and instant loan debt), secured debt (mortgage debt and car loan debt), and others (educational loans and medical debt). Individuals could use advanced credit to purchase everything and to pay them off later. Due to the credit deregulation in recent decades, it has become much easier for individuals to receive credit from creditors. Borrowing

becomes as easy as earning. As a result, numerous households suffer unsustainable economic and financial strain (Cohen 2005). Considering such widespread effects of credit consumption and indebtedness, this research will use a broadly defined "debt" (any kind of debt) and discuss its adverse impact on people's physical health status.

A problematic trend in the U.S. consumer culture is on the rise. Consumers engage in more debt-spending than the spending derived from earnings (Cohen 2005; Pressman and Scott 2009). American households no longer set aside money for future usage, but rather finance new acquisitions with their prospective income (Cohen 2005; Pressman and Scott 2009). Previous research showed many reasons to explain such unsustainable but indispensable credit consumption. First, the creditors' deregulation movement in the beginning of the 21st century resulted in flooding credits overrunning the market (Pressman and Scott 2009). Credit users can have easy access to credit with no pre-check history. Instant credits largely stimulate the consumption as a convenient tool and a catalyst; these credits can be used as a safety net for financial exigency (Cohen 2005). Second, widespread materialism and consumerism evolved as social pressures on consumers, whose endless pursuit for social status and prestige shows relentless temptation (Cohen 2005; Drentea 2000; Pressman and Scott 2009). Third, the ever-increasing interpersonal comparisons led individuals in the middle-class to drain their financial resources and to pursue lifestyles beyond which they are financially capable of paying off (Cohen 2005; Drentea 2000). Fourth, wages and incomes have been relatively unchanged over past decades, after adjustments for inflation. Plus, unchanged income inequality further deteriorates such a situation so that households competing against one another go into debt without noticing it (Pressman and Scott 2009; Scott 2005). Finally,

the lack of public financial literature also leads consumers to quickly pile up their amount of debt (Cohen 2005).

In addition to the effect of widespread contemporary consumerism and the temptations to pursue extravagant lifestyles that can bring extreme amount of debt to the consumers, statistics showed that nearly half of individuals who filed bankruptcy also reported having illness, injury, or medical conditions (Domowitz and Sartain 1999; Jacoby et al. 2001; Jacoby 2002). One-third of debtors haunted by medical bills have had medical debt over an average of $1000 not paid by insurance before filing bankruptcy (Jacoby 2002). Therefore, some researchers perceive medical debt as having the "single greatest impact of any household condition variable in raising the conditional probability of bankruptcy" (Domowitz and Sartain 1999:413).

Researchers also point out the adverse effects of job loss on individuals which impacts financial well-being and debt status. It has also been pointed out that unemployment may not only lead to easier access to credit (Autio et al. 2009) and more financial debt (Ensminger and Celentano 1988), but also worsen the household indebtedness through a further postponement of debt repayment (Bloemen and Stancanelli 2005). Furthermore, the effect of job loss could become more significant among those who did not receive any type of unemployment benefits from former employers or welfare assistance; members of these households may adopt health-risk lifestyles, such as stress-related eating and drinking (Bloemen and Stancanelli 2005; Laitinen et al. 2002; Matoba et al. 2003). However, unemployment may not financially affect victims' psychological well-being and healthy lifestyles unless their unemployment's financial support has ceased (Matoba et al. 2003).

Based on previous literature (Cohen 2005; Himmelstein et al. 2005, 2009; ICAS 2010; Linfield 2009; RealtyTrac 2010; TransUnion 2012; U.S. Census Bureau 2010), the American population, including Alabamians, are deeply in debt. The adverse influences of indebtedness on health have gradually drawn more attention from researchers in multiple health-related disciplines, such as sociology, public health, medicine, and financial counseling. Individuals who are overwhelmed by debt, may have serious health-related consequences, either physical (Drentea and Lavrakas 2000; Pollack et al. 2007) or psychological (Adams and Moore 2007; Berg et al. 2010; Bridges and Disney 2010; Drentea 2000; Fitch 2006; Fitch et al. 2007; Fitch et al. 2009; Fitch et al. 2011; Grafova 2007; Jenkins et al. 2008; Jenkins et al. 2009; Kim et al. 2003; Reading and Reynolds 2001) or both (Jessop et al. 2005; Murray 2010; Nelson et al. 2008; O'Neill et al. 2006;). Financial well-being for the sake of better physical and emotional health depends on healthy financial budget maintenance (Garman and Forgue 2010). Therefore, it has been practically suggested that households should stay within their financial budgets to maintain a level of maximum repayment obligation.

In order to test the effects of indebtedness associated with the recent economic downturn and the indispensible feature of credit consumption, the health lifestyle model is appropriate (Cockerham 2005). However, this research will expand the traditional conceptualization of socioeconomic status in the health lifestyle model and emphasize the significant role that indebtedness plays in the relationship between individuals' financial well-being and their related health behaviors. In addition, due to a great deal of evidence observed in the previous literature regarding indebtedness' major effect on psychological

stress, this research will further consider and examine the role of debt stress and its changes in debtors' daily health-related behaviors.

CHAPTER 2

LITERATURE REVIEW

2.1 Indebtedness: An Alternative Indicator

Socioeconomic Status (SES) as a widely-used societal determinant of health composes a selection of popular and informative topics in the recent health and social behavior research. Other widely used structural measurements include the traditional SES indicators, such as, household income, education, and occupation. These have been recognized as robust measures of individuals' positions on the social ladder. Since SES determines many important factors that are social and structural in nature, people develop lifestyles and behaviors in relation to their class positions (Adler et al. 1994; Kim 2003; Kim and Lyons 2008; Kim and Richardson 2012; Lyons and Yilmazer 2005; Pollack et al. 2007; Roberts et al. 1999).

2.1.1 Indicators of Financial Well-Being

Measures of economic status are important determinants of individuals' physical and mental health (Kahn and Fazio 2005). Researchers tested a selection of measures regarding financial well-being, such as income, wealth, net-worth of wealth, assets, asset/debt ratio, and/or combination of these (Castro et al. 2010; Cubbin et al. 2011; Kahn

and Fazio 2005; Pollack et al. 2007). Among all three traditional SES measures, income is the most important one in predicting people's social position. A majority of research findings on financial well-being across the health-related literature indicates the need to improve measures of SES by not only measuring income but also some other indicators of financial well-being, such as indebtedness (Cubbin et al. 2011; Drentea 2000; Drentea and Lavrakas 2000; Drentea and Reynolds 2012). In order to draw a better picture of the wide-ranging measurements of financial well-being in a health context, I review several prior research studies across different fields in the next section.

2.1.2 Diverse Conceptualizations with Consistent Predictability

Researchers reviewed a selection of previous health-related studies in which at least one of the financial indicators was included as an independent variable along with a health-related dependent variable (Pollack et al. 2007). These financial indicators of SES other than income consist of two categories: objective and subjective measures of SES.

The objective measures asked the respondents their financial situations in quantity, such as, wealth (the lifetime-collected revenue from all financial resources), assets (the accumulated cash value of all sources), net worth (the financial assets plus home equity minus debt), homeownership, and/or the combination of several of them (Pollack et al. 2007). Researchers found that more wealth and net worth lead to a decreased risk of adverse health events, like chronic medical conditions, and an increased level of longevity and self-rated health; whereas they also lead to more leisure-time for physical exercise, and are associated with decreased alcohol dependence (Pollack et al. 2007).

After a systematic review of the literature, any objective measures of financial well-being, such as wealth, assets, and homeownership, tends to have robust predictability in predicting both objective (i.e. medical conditions) and subjective (i.e. self-rated health) health status (Kahn and Fazio 2005; Pollack et al. 2007).

Nonetheless, subjective measures of financial well-being focused on financial status or levels of financial strain. These measurements include, but are not limited to, "satisfaction with personal financial situation," "perceived financial wellness," "feeling about current financial situation," "level of stress about personal finance," and "frequency of past financial hardship" (Kahn and Fazio 2005; Kim et al. 2003). Previous evidence showed that a large proportion of respondents were more likely to attribute their experienced aches and pains, sleeping disorders, or obesity to their gloomy financial insecurity (Kim et al. 2003). Empirical research conducted by Kim and colleagues (2003) indicate that perceived financial well-being is just as significant as net household income in explaining health.

There are also research studies (Kahn and Fazio 2005) in which both objective and subjective measurements of financial well-being have been added in one model to compare the predictability of both methods. The statistical strength of these methods show that the objective measurement (net worth of wealth) could be ruled out after taking household income into account, while the subjective measurement (financial strain) remained statistically significant (Kahn and Fazio 2005). Therefore, individuals' perception of their financial situation may be more important and closely related to their health status than what previous studies report. Different methodological techniques are important in uncovering these relationships.

2.1.3 Indebtedness: The Question of Reliability?

Unlike financial well-being, indebtedness may serve as a better indicator of health status (Drentea and Lavrakas 2000). Being in debt may reflect not only the objective insufficiency of monetary resources, but also a certain level of financial strain due to its stressful nature (Jacoby 2002). Adjusting for personal or outstanding household debt renders a more accurate prediction of net worth of wealth on health (Pollack et al. 2007). A selection of prior research studies documents the strong and positive correlations between indebtedness and worsened physical health or physical impairment (Adams and Moore 2007; Carney et al. 2005; Drentea and Lavrakas 2000; Jacoby 2002; Jessop et al. 2005; Kahn and Fazio 2005; Saegert et al. 2011; Shim et al. 2009). The conclusions were highly consistent, even though the conceptualization of indebtedness varied. Moreover, indebtedness alone is a more robust measure in the prediction of physical impairment than other SES-related factors (Drentea and Lavrakas 2000). After a systematic review of the health literature, I have not found any theoretical support for any of the previous arguments or conclusions.

Nevertheless, indebtedness is a strong potential contributor in understanding health inequality (Drentea and Lavrakas 2000). The reliability of considering novel objective measurements, such as financial well-being and indebtedness other than just the traditional factors of income, education, and occupation, are better at capturing the socioeconomic disadvantages related to physical health (Castro et al. 2010).

2.1.4 Indebtedness: The Question of Validity?

Since the measurements of indebtedness may pose a better assessment of individuals' financial well-being on physical health, it is possible to move beyond the traditional measures of SES and include debt to serve as a supplementary indicator (Drentea and Lavrakas 2000). However, it is still questionable if the measure of debt could have the similar statistical validity, and whether it could parallel with the traditional trio. Fortunately, the previous literature provides answers for both of the previous questions.

Previous health literature reviews several studies that measure financial strain as a predictor of any monetary shortage caused by food, clothing, and housing (Kahn and Fazio 2005; Kahn and Pearlin 2006; Lyons and Yilmazer 2005; Shah et al. 2012). These researchers explain how past indebtedness caused by the above living expenses create financial hardship for individuals of lower SES. Therefore, those who are of lower SES status are more likely to experience health related problems due to increased debt. Based on the health literature, the most effective SES measures include income, education, and occupation. However, these previous measures may not reflect some of these health issues caused by debt.

The way in which debt is measured makes a difference in SES research. Based on how SES is measured, the "debt poor" are somewhat like the poor, and somewhat like the middle-class households. They could be lumped together (Pressman and Scott 2009). The "debt poor" have excessive access and use of consumer credit in order to live like the middle-class. However, their ability to afford long-term, higher-income-based lifestyles may go hand-in-hand with a constant struggle to repay for the lavish goods and services they acquire. The "debt poor" can also refer to "households with incomes above their

poverty threshold, but whose interest payments on consumer debt rendered them poor" (Pressman and Scott 2009:423). Therefore, the "debt poor" may have more income, but carry the similar health issues caused by indebtedness just as those in the low SES income bracket. With the new estimation that takes the "debt poor" into account, researchers in this area show a higher percentage of the poverty rate for households in 2007, comparing with the statistics reported by U.S. government (Pressman and Scott 2009). The higher amount of self-reported level of income, which causes previous researchers to classify "debt poor" into middle class, does not necessarily make them financially secure (Easterlin 1995). Since an increasing share of their income may be used to pay for debt interests, the "debt poor" have relatively less income than the middle class households to make purchases on goods and services to improve health status (Pressman and Scott 2009). A good estimate of the living standard of the "debt poor" needs to consider what this group pays in interest for their consumer debt. Thus, calculating the amount of this groups' income that goes towards their interest is a better estimate of their standard of living related to SES.

Prior studies found that debt measures (debt/income ratio) are just as consistent as income in predicting health (Drentea and Lavrakas 2000). In addition, prior evidence showed only a weak association between debt measures and the traditional SES determinants (Drentea and Reynolds 2012). In other words, the measurement of debt is not redundant with other SES measures, for income, education, and occupation as these are interrelated but not fully overlapping (Adler et al. 1994).

However, although it would be both reliable and valid to consider the measurement of indebtedness to obtain a more robust conceptualization of SES (Drentea and Lavrakas

2000), fewer studies have measured indebtedness in understanding health inequality, which may be due to the lack of data (Drentea and Lavrakas 2000).

In the health lifestyle model, only the traditional measures of SES are considered to predict health-related behaviors. Bringing the debt measure into this model enables more accuracy to predicting SES on health-related behaviors. However, up until this point, there is still not enough evidence to assume the direction of the connection between debt and health-related behaviors. It is crucial to reveal the role and the importance of health-related behaviors in the SES-health literature first; and then look at any previous evidence that connects debt to physical health and health-related behaviors.

2.2 Physical Health and Health-Related Behaviors

2.2.1 Predictable Physical Health

Regardless of the consistent predictabilities of any diverse measurement of financial well-being, some research studies find out that physical impairments may cause individuals to have lower social positions; more SES-health studies indicate that SES most likely shapes physical health rather than vice versa (Adler et al. 1994; Kahn and Fazio 2005; Kim 2003; Kim and Richardson 2012; Pollack et al. 2007; Roberts et al. 1999; Scambler 2012). Based on all the literature I reviewed regarding SES and physical health, the measurements of SES (Autio et al. 2009; Cubbin et al. 2011; Drentea 2000; Drentea and Lavrakas 2000; Drentea and Reynolds 2012; Kahn and Fazio 2005; Kim and Richardson 2012; Pollack et al. 2007; Scambler 2012; Saegert et al. 2011) and the

measurements of physical health (Adler et al. 1994; Scambler 2012) may vary respectively across the different fields of studies; however, the conclusions are highly consistent showing that individuals with higher SES enjoy a better quality of life and health (Adler et al. 1994).

2.2.2 Pathways of SES-Health Gradient

Many studies further discuss the internal pathways in which a range of factors mediates the SES-health correlation (Adler et al. 1994; Scambler 2012). The attributes of these factors may show complexity and disparity when working independently or mutually on SES-health causality. These previously observed pathways include, but are not limited to, intelligence and cognitive flexibility, physical environment (exposure to hazardous materials, such as carcinogens, when living and working), social environment (interpersonal relationship and social recourses and supports), psychological development (depression, hostility, and psychological stress), and health-related behaviors (smoking, alcohol, and physical activity) (Adler et al. 1994). There is an increased number of recent research studies providing detailed examinations of these possible pathways that underlie the educational, occupational, and financial effects of health stratification (Scambler 2012). However, fewer prior studies emphasize the potential function of neglected pathways on psychological stress and health-related behaviors (Adler et al. 1994). It is important that future studies like mine have individuals' financial stress and its related health behaviors as the research focuses. In the following two sections, I will focus on previous literature pertinent to the pathway of health-related behaviors.

2.2.3 Physiological Effects of Health-Related Behaviors

Research studies related to health behaviors focus on tobacco use, alcohol consumption, dietary intake, and physical exercise, etc. There have been a series of studies across different fields indicating the negative impact of smoking, binge drinking, obesity, and sedentary characteristics on both mortality and morbidity from multiple dimensions. The prevalence of current tobacco smoking highly predicts the future burden of tobacco-related diseases (WHO 2012). The U.S. Centers of Disease Control and Prevention (2008) and the U.S. Department of Health and Human Services (2004) suggest that tobacco abuse may lead to more risks of receiving coronary heart disease, stroke, lung cancer, and many other respiratory diseases. Therefore, smokers tend to lose an average of more than 10 years of life for both men and women (CDC 2002). Likewise, alcoholism or binge drinking may cause intoxication and dehydration in the short-term and alcohol dependence, hepatic cirrhosis, cancer, and injuries in the long-term (WHO 2012). Furthermore, adopting sedentary characteristics may result in physiological disorders and physical impairments. Reports from the CDC (2012) indicate that maintaining healthy weight could keep individuals away from hypertension, dyslipidemia, type 2 diabetes, coronary heart disease, stroke, gallbladder disease, osteoarthritis, sleep apnea, respiratory problems, and some cancers.

2.2.4 Health-Related Behaviors: A SES-Health Pathway

A person's household indebtedness may reflect certain changes of living standards and lifestyles (Pressman and Scott 2009); moreover, it is possible to attribute the onset of

physical conditions to any debt-related behavioral variations. Research in several fields related to sociology has produced significant conclusions related to health behaviors. These conclusions related physical health to individuals' SES. In addition, researchers argue that health-related behaviors explain the relationship between SES and physical health (Adler et al. 1994; Scambler 2012).

Researchers provide consistent evidence regarding the existence of the connection between health-related behaviors and physical health. The most relevant research connects smoking, drinking, non-nutritional food, and sedentary activities to morbidity and mortality through the onset of cardiovascular diseases, diabetes, hypertension, and cancers, etc. (Adler et al. 1994). Researchers conducting previous social and behavioral research reveal that the health disparities are related to social class. It can also be inferred, in the health lifestyle model, that health-related behaviors may be similarly patterned based on the distribution of SES (Cockerham 2005). Researchers systematic review of the literature documents a relationship between SES and health-related behaviors (Barr 2008; Blaxter 1990; Cockerham 2005, 2007, 2010, 2010; Gorman 2006; House 2002; Marmot and Richard 2006; Marmot and Theorell 1988; Scambler 2012; Thisted 2003; Umberson 1992). For example, the socio-hierarchical distribution of smokers in the population also matches the educational and occupational gradient (Adler et al. 1994). Having sedentary activities and obesity are inversely related to SES (Cockerham 2005; 2010).

2.3 Indebtedness, Stress, and Health-Related Behaviors

In this study, I will include indebtedness as part of the SES measure. Including a measure of indebtedness will enrich the SES measures. This will enable researchers to make a better connection between health and SES. Therefore, indebtedness may also enable a better understanding of the connection between health-related behaviors and SES in the health lifestyle model. However, there are only a handful of studies in the health literature (Adams and Moore 2007; Autio et al. 2009; Berg 2010; Drentea and Lavrakas 2000; Grafova 2007; Nelson et al. 2008; Roberts et al. 1999) that discussed this latent contribution of debt measures to SES. Nevertheless, prior researchers reveal that extreme financial difficulties may lead victims of debt stress to unhealthy lifestyles, such as the consumption of non-nutritional food (Daly et al. 2002; Grafova 2007; Jacoby 2002); adopting unhealthy behaviors is a coping strategy used to relieve psychological stress derived from financial strain (Bennett et al. 2009; Jones et al. 2010; Nakao 2010; Shim et al. 2009). Emotional eating (Van Strien et al. 1986), smoking (Adams and Moore 2007; Autio et al. 2009; Berg 2010; Drentea and Lavrakas 2000; Grafova 2007; Nelson et al. 2008), and drinking (Adams and Moore 2007; Autio et al. 2009; Berg 2010; Drentea and Lavrakas 2000; Nelson et al. 2008) are coping strategies that affect physical health. The purpose of this research is to explain the connection between indebtedness and health-related behaviors.

Because psychological stress serves as a major pathway in SES-health relationships (Adler et al. 1994), it is also possible to see an association between psychological stress, debt and physical health. Previous research supports two main pathways to explain the adverse implications of indebtedness on physical health—debt stress (Adams and Moore

2007; Drentea and Lavrakas 2000; Harless and Medoff 1996; Daly et al. 2002; Jacoby 2002; Kahn and Fazio 2005; Mental Health Foundation 2009; Murray 2010; Shah et al. 2012) and access to health care (Daly et al. 2002; Jacoby 2002; Murray 2010; Saver et al. 2004). My objective in this section is to clarify the pathways between the main study variables in order to better understand how debt stress and health care access impacts physical health and health-related behaviors.

Indebtedness may influence one's ability to afford health care services. Previous evidence shows that individuals who have a high amount of medical debt because of their medical conditions will have more difficulties accessing health care (Daly et al. 2002). A reciprocal effect between medical indebtedness and physical impairment exists because of the lack of health care access. Moreover, health care access and debt stress may work together, leading to worse physical health. Researchers report that medical debtors who are uninsured might be subject to severe stress attributed to loss of savings, jobs, homes, and collectors of medical debt (Daly et al. 2002). In the debt-health literature, researchers are more likely to associate the accessibility of health care services with a large amount of medical debt, rather than any other kind of debt (Herman et al. 2011). An exception is the research by Saver and colleagues (2004). These researchers found a positive relationship between owning a home with mortgage debt and sometimes being unable to afford medications even to the point of stretching out medications. Furthermore, prior evidence shows that persons, who had little access to health care services, are more likely to smoke (Bandi et al. 2012; Fielding et al. 2012; Paek and Lim 2012), drink (Fielding et al. 2012; Paek and Lim 2012), and be obese (SangNam et al. 2012). The health care access may link medical debt to the above health-related behaviors.

When health care access is mostly associated with medical debt, research from different fields consider debt stress as a precursor to further indebtedness on health status. Some researchers indicate that stress which culminates from owing money and paying high interest rates to creditors may raise worry and further deteriorate self-rated physical health (Drentea and Lavrakas 2000). Specifically, those who are suffering anxiety disorders are at a higher risk of onset of coronary heart disease and high blood pressure, as well as signs of immune system weakness and even cancer (MHF 2009). Other researchers conducting similar research studies have similar conclusions; they also argue that stress-related deteriorations on physical health may be reflected by headaches, insomnia, upset stomach, and physical distress (Harless and Medoff 1996; Kahn and Fazio 2005), or the increased risk of having cancer, heart diseases, high blood pressure, and diabetes (Kahn and Fazio 2005; Shah et al. 2012). In the following sections, I will focus on evidence regarding the psychological stress of debt and its impact on individuals' health-related behaviors.

2.3.1 Indebtedness and Psychological Stress

As slow as the repayment process could be in terms of certain debt, such as housing mortgage or educational loans, indebtedness may exacerbate victims' health status in a lifetime and cause long-term stressfulness (Ayers et al. 2012; Kahn and Fazio 2005; Nettleton and Burrows 2000). In other words, the partial explanatory capabilities of the traditional SES indicators on physical health, or health-related behaviors, possibly worked through the stress coming from either prior or current financial strain (Kahn and

Fazio 2005). The effects of stress on health may be more severe for those who are in a lower socioeconomic status or in ethnic subgroup with a higher likelihood of exposure to potential challenges and with less availability to stress-buffering resources (Bennett et al. 2009).

In terms of the association between indebtedness and the corresponding stress, there have been studies discussing the psychological effects of financial hardship at the individual level. Its adverse physical effects have not been observed, even among those who experienced extreme stressors (Kessler 1997). This may attribute to individuals' sufficient resilience to stressful events (Bleich et al. 2003). The flexibility of individuals while facing financial stressors may derive from their inherent capabilities of utilizing stress-buffers that modify the effects of stress from either their own characteristics or the environment in which they are embedded (Kessler 1997). However, research evidence showed that a higher SES diminished the likelihood of having negative life events and provided more opportunities for individuals to buffer stressful events through better social networks and social supports (Adler et al. 1994). Therefore, these potential stress-modifiers may only explain the unobserved individual disparities of physical health for those who are in the same level of the social hierarchy. There are still many gaps left regarding the structural disparity of physical health that may attribute to the hierarchical stressfulness. It is possible that the diverse experience of stressfulness between social classes may derive from the disparity of indebtedness and/or the relevant type of financial strain (Jacoby 2002).

Researchers (Adler et al. 1994) suggest two parallel sources from which psychological stress may come. The first is objective; any exposure to adverse life events

that requires long-term adjustment, such as divorce, unemployment, and medical conditions. The second is the psychological stress that may occur when individuals subjectively perceive demands an excess of their coping abilities.

Based on the report of the Mental Health Foundation (MHF) (2009), due to the recent global economic recession with increasing unemployment rates, an increasing number of people had anxiety and fears derived from financial and debt issues more than from any other concerns (Ayers et al. 2012). Specifically, unemployed individuals who remained jobless would experience depression from financial hardship right after their unemployment benefits expired (Matoba et al. 2003).

While being laid-off or unemployed can be stressful, indebtedness can be even more devastating due to its nature. Not only does it indirectly reflect debtors' income shortage caused by possible adverse life experiences, such as unemployment, underemployment, or the onset of medical conditions, but it also directly leads to individuals' psychological stress through excessive interest with the repayment of the debt. In some extreme cases, the accumulation of the amount or types of debt may have indirect correlations with suicidal ideas, in which the feeling of hopelessness explains most of the intermediate effects (Meltzer et al. 2010).

In order to draw a comprehensive picture of the psychological impact regarding credit card debt, Drentea (2000) listed several possible sources of credit card debt stress. These are:

> "(1) Credit card debt can be associated with both short-term and long-term financial difficulties. … (2) High credit card debt may lead individuals to spend their income on lesser-quality goods and services associated with their own health. … (3) … Not having enough cash on hand to pay for goods and services, paying high interest rates, and paying monthly bills adds to an individual's everyday stress. (4) Almost all credit card debt is unsecured, meaning that there is no collateral secured against the debt. As a result, aggressive tactics are used by collection agencies. … (5) Credit card debt can be viewed

> as non-normative, as compared to "normative debt" for home or education. … those in credit card debt simply don't have discipline and self control. … those in severe credit card debt are often those who have experienced a recent job loss and/or health problem. … (6) Credit card debt is also associated with an increase in bankruptcy cases." (2000:439)

Likewise, Murray (2010) also pointed out that debt—of any kind—could be stressful due to its immediate consequences to those who need to make ends meet. Moreover, debtors who are pressured to pay off their loans possibly have to squeeze their household expenditures to make room for their repayment. Debtors are always fearful of attempts made by creditors to collect overdue debts. Either the collection activities or the exaggerated interpretation about what creditors may be able to do could pose threats to debtors and cause stressfulness. Nevertheless, indebtedness may also put debtors to shame in front of their family, friends, or others. At last, debtors may have long-term worries on obtaining a mortgage or other credit in the future, due to their stigma of losing credit.

However, considering possible disparities of stressfulness in terms of different kinds of debt, some prior research studies (Kahn and Fazio 2005) have not considered any collateralized loans as being stressful, since these "normative debt" were presumed to have no long-term harm over health in the range of the life-course (Drentea and Lavrakas 2000). Studies such as these argue from the perspective that collateralized debt characterized by certain types of investments influence the health status of the borrowers. However, there was other research indicating that the stress of relying on a mortgage and the effort of maintaining it might be costly for well-being (Nettleton and Burrows 1998; Searle et al. 2009). Especially, research by Bennett and colleagues (2009) showed that, as a long-term process, not only did the disparities of stress regarding mortgage debt vary

across social classes that contribute to the socioeconomic gradient, but also the scheduled repayments may bring far-reaching effects that might exacerbate people's health status. Therefore, this research will consider the possible adverse psychological impact of any collateralized debt using the general measurement of indebtedness and debt stress that are commonly used in the literature.

2.3.2 Debt Stress and Health-related Behaviors

Although the pathways and causal relationships between debt stress and personal health remain under investigation (Murray 2010), the articles I have reviewed show a strong correlation between health-risk behaviors and high-risk credit behaviors (Adams and Moore 2007; Berg et al. 2010; Nelson et al. 2008). In other words, one of the possible consequences or causes of continually experiencing psychological stress from indebtedness is to be substance dependent. It is crucial to look at this correlation for those who are suffering from debt and intend to adopt health-risk behaviors as a coping strategy to relieve psychological strain from indebtedness (Bennett et al. 2009; Jones et al. 2010; Nakao 2010), especially when smoking and drinking may directly amplify the adverse effect of indebtedness on physical health (Murray 2010).

Since indebtedness hinders debtors' ability to make health-maximizing choices and to meet ongoing health needs (Daly et al. 2002; Jacoby 2002), debtors who are struggling to fulfill their repayment obligations may spend less on a healthy diet and more time combating stress (Murray 2010). Stress is related to overeating and/or poor nutritional intake, which may further cause obesity (Greeno and Wing 1994; Roberts et al. 1999);

indebtedness may influence body weight through stress and deteriorate physical health on multiple dimensions. However, the actual correlations between stress and health behaviors are complicated and contain a lot of implications. In the next section, I will respectively discuss in detail the connections between stress, smoking, drinking, and dietary changes.

Evidence of stress and substance abuse.

In terms of stress-related smoking, some prior studies observed a robust association between higher levels of stressful events and heavy smoking nationwide (Colby et al. 1994). When the American population is stressed, individuals engage in heavier smoking and this leads to higher levels of mortality from lung cancer.

The relationships between stress and alcoholism tend to be complex. Researchers show inconsistent conclusions in terms of how stress causes alcoholism and vice versa. Many researchers attributed the prompt alcoholic consumption among victims experiencing trauma to alcohol's anticipated stress-relieving function (Sayette 1999). Evidence shows that, since traumatic events lead to posttraumatic stress disorder (PTSD) in people, PTSD through the consumption of alcohol represents the overwhelming consequences of stressful events (Spencer and Hutchison 1999; Volpicelli et al. 1999). On the one hand, as a protective reaction, the human body responds to a stressful situation by producing glucocorticoids to counter the stressful experience. Glucocorticoids are certain hormones that could function as a catalyst to increase the pleasurable effects of alcohol. Thus, the excessive secretion of glucocorticoids due to the

traumatic experience may lead to the intoxication of alcohol, if individuals are stressed while they are drinking (Spencer and Hutchison 1999). On the other hand, although alcohol may temporarily relieve the symptoms of stress to a certain degree, and this is a vicious cycle that makes symptoms, such as PTSD, worse (Spencer and Hutchison 1999). Nevertheless, alcohol's stress-response dampening (SRD) effect is likely to be influenced by a number of other factors, including individuals' characteristic differences and situational factors, so that the effect may show different consequences under diverse environments (Sayette 1999).

Other than the endogenous mutual incentives, some psychiatrists (Brady and Sonne 1999) also interpreted stress as a major contributor of the initiation and continuation of alcohol consumption, for not only does stress play a role in the vulnerability of initial alcohol usage, but also leads to relapse during alcohol users' recovery process. Therefore, researchers suggest trainings of stress-coping and problem-solving skills as part of the treatment techniques for the alcoholics.

Evidence of stress and dietary changes.

Prior evidence showing any stress-driven changes on dietary intake are mostly derived from longitudinal studies, in which the relative long-term evolving process of dietary changes could be observed. The conclusions regarding a positive association between being stressed and gaining weight were consistent, but with some subtle differences. Researchers discovered that depressed men and women who are less than 55 years of age are likely to gain more than 3 kilograms on their body weight within three

years, compared to a non-depressed control group (DiPietro et al. 1992). Other researchers pointed out that persons experiencing higher levels of long-term stress and lower levels of life satisfaction are more likely to gain at least 10 kilograms of weight beyond the baseline within 6 years (Korkeila et al. 1998). Nevertheless, all of the predictor effects of stress remained robust after adjusting for baseline covariates and ruling out other individual and social factors. More importantly, it has been found that the mediating function of increased fat or energy intake correlates with long-term stress and weight-gain; this relationship has been largely explained (Korkeila et al. 1998).

In addition to the possibilities of changing to non-nutritional food, stress derived from negative life events may result in weight-gaining behaviors such as emotional eating, especially in men (Van Strien et al. 1986). Furthermore, stress-related eating may be associated with drinking as well, as emotional eaters are more likely to consume more alcohol at the same time while eating than the comparison group (Laitinen et al. 2002).

Summary

Through a systematic review of previous research, I listed several pathways that may explain the connection between SES and physical health. These pathways include intelligence, cognitive flexibility, physical environment, social environment, psychological development, and health-related behaviors. This research focuses on psychological and health-related behavioral variables; pathways other than these two will not be included in the discussion. More importantly, evidence shows that health-related behaviors account for about one third of SES difference in morbidity and mortality

(Bartley 2003; Scambler 2012). Thus, it is necessary to emphasize the connections of health-related behaviors with physical health and SES.

Moreover, based on the reviewed literature, indebtedness was inferred to be a reliable and valid indicator of SES as an estimation of health, along with the traditional indicators including income, education, and occupation. Two possible internal pathways have been discovered between indebtedness and physical health—debt stress and access to health care services. Since the indebtedness associated with stress, anxiety, and worries has significant implications for personal health (Murray 2010), and given the evidence of the stress-related etiologies on health-related behaviors, this research examines a possible mediation role of which the stress derived from indebtedness might be able to explain most of the relationship between indebtedness and health-related behaviors.

Although some researchers suggest a correlation between indebtedness and health-related behaviors (Adams and Moore 2007; Autio et al. 2009; Berg 2010; Drentea and Lavrakas 2000; Grafova 2007; Nelson et al. 2008; Roberts et al. 1999), none of them discussed this in terms of theory or investigated its internal pathways systematically. Therefore, I introduce the health lifestyle theory (Cockerham 2005) to illuminate these relationships.

CHAPTER 3

THEORETICAL FRAMEWORK AND HYPOTHESIS

3.1 Health Lifestyle Theory

In this research, I apply the health lifestyle theory (Cockerham 2005) to theoretically establish a positive association between indebtedness and health-related behaviors.

By using the health lifestyle model, I am able to draw a clear picture regarding the creation and reproduction of health-related behaviors in the social and individual context. In this model, I show several structural and agentic determinants that are rooted in the developmental process of health behaviors. Since Max Weber ([1922] 1978) and Pierre Bourdieu's (1984) socio-structural perceptions largely influence this theoretical model, Cockerham (2005) also perceived these derivatives of social context—these are class circumstances, age, gender, race, collectivities, and living conditions—which are major determinants that predict people's behavior with smoking, drinking, healthy diet, and physical exercise, etc. The class circumstances in this model represent individuals' social positions that are most often conceptualized with socioeconomic measures of income, education, and occupation (Cockerham 2005).

The principal innovation of this theoretical framework is to emphasize the social structure as the focal attribution in determining health-related lifestyles, instead of previous agency-biased models. Nonetheless, the fundamental principle remains congruous with Weber and Bourdieu that the higher the individuals' social status, the

more resources they are more likely to produce or consume in order to establish and to maintain a series of health-enhancing lifestyles (Cockerham 2010).

My research focus emphasizes the importance of indebtedness alongside traditional SES measures. I hypothesize a possible correlation between indebtedness and health-related behaviors, based on the established SES-health lifestyle association. Therefore, the first hypothesis of this research is:

Hypothesis 1: Individuals' indebtedness is positively associated with smoking, drinking, and obesity, after controlling for socioeconomic indicators.

3.1.1 Debtors' Sociodemographic Distribution

The health lifestyle theory has given the most fundamental sociodemographic factors that may potentially have an impact on both SES and health-related behaviors. However, my research introduces indebtedness as a supplementary measure of SES. This is important to debtors who have similar circumstances such as an impoverished social class background and lower education that leads to greater debt consumption. These individuals are also similarly positioned within the socioeconomic gradient. I found that evidence in the previous literature shows sociodemographic and socioeconomic characteristics of individuals, such as age, gender, ethnicity, income, education, and employment status, heavily shaping these individuals' financial knowledge and credit behaviors (Shim et al. 2009). In other words, indebtedness may be socially patterned (Fitch et al. 2007).

Evidence by researchers points to possible gendered indebtedness to illustrate that males are more likely to carry more debt than females. Specifically, male college students are more prone to having credit card debt than females (Wang 2011). Also, women are less likely to incur any financial hardship associated with medical debt (Wiltshire et al. 2011). In addition, divorced men have more opportunities to report financial default, compared to divorced women, even after any increases of welfare payments (Lyons and Fisher 2006).

Due to the growth in technology and globalization, there has been a leap in materialism, which encourages younger adults to pursue consumerism more than ever before. Therefore, younger generations are likely to carry and suffer from more credit card debt than their older counterparts whose probabilities of being in financial default dramatically lower with each older successive age cohort (Drentea 2000). Another report from the National Foundation for Credit Counseling (NFCC) also confirms this conclusion and indicates a greater likelihood that younger adults will carry more credit card debt from month-to-month and use overdraft protection on their checking account (NFCC 2011). Moreover, the consumption of instant loans among the younger population illustrates the same pattern (Autio et al. 2009). Any household headed by younger people has a greater risk of experiencing unsustainable home ownership than other households (Burrows 1998; Burrows and Ford 1997).

In terms of racial differences, African Americans have considerably fewer financial resources than do Whites, especially in the difference of net worth of household wealth (financial assets plus home equity minus debt) (Kahn and Fazio 2005). In addition, this magnitude of difference is much greater than the racial differences in income (Kahn and

Fazio 2005). Hispanic and African-American students are more likely to have debt than students of other races (Wang 2011). Meanwhile, Hispanics tend to have a larger debt-to-asset ratio than other races (Knutson et al. 2011). Moreover, individuals of ethnic subgroups are more likely to have unsteady homeownership than "Whites" due to overwhelmed housing mortgages (Burrows 1998; Burrows and Ford 1997).

With regard to younger people who are marginalized within the labor market (i.e. unable to work, handicapped, under practical training, homemakers), they are more likely to have a higher frequency of using instant loans (Autio et al. 2009). Younger people who are unemployed, wage earners, and students also report using instant loans many times (Autio et al. 2009). Moreover, homeowners who have not been employed have a lower chance of decreasing the outstanding balance on the mortgage payments than those who are employed (Burrows 1998; Burrows and Ford 1997). Single parents and people with low income tend to use instant loans and other consumer credit to a greater extent than others (Autio et al. 2009). Nevertheless, households with dependent children, single households, and divorced individuals are more likely to experience unsteady homeownership (Burrows 1998; Burrows and Ford 1997). Based on the above evidence of the sociodemographic features of indebtedness, I propose my second research hypothesis:

Hypothesis 2: The associations between indebtedness and smoking, drinking, and being obese will remain significant in the predicted direction, after controlling for the sociodemographic variables.

3.1.2 Self-control

Self-control is considered one of the common personality characteristics that possibly relates to incurring credit card debt (Berg et al. 2010). A lack of self-control is positively associated with both a higher level of credit card debt and more health-risk behaviors (Adams and Moore 2007; Grafova 2007). Prior researchers, therefore, propose self-control as a plausible candidate of the pathways between health-related behaviors and debt (Adams and Moore 2007; Berg et al. 2010; Grafova 2007). However, I did not find any statistical support for the above conclusions in previous studies. Therefore, this research will consider the effect of self-control as another possible factor (Grafova 2007). I will also include this measure in my statistical analyses.

3.1.3 Accessing Health Care Services

Once again, I stated that the literature review provides evidence in support of pathways associating with access to health care services, indebtedness and physical health. This research will consider the possible mediating effects of accessing health care services in order to gain a more accurate and reliable prediction of the focal correlation.

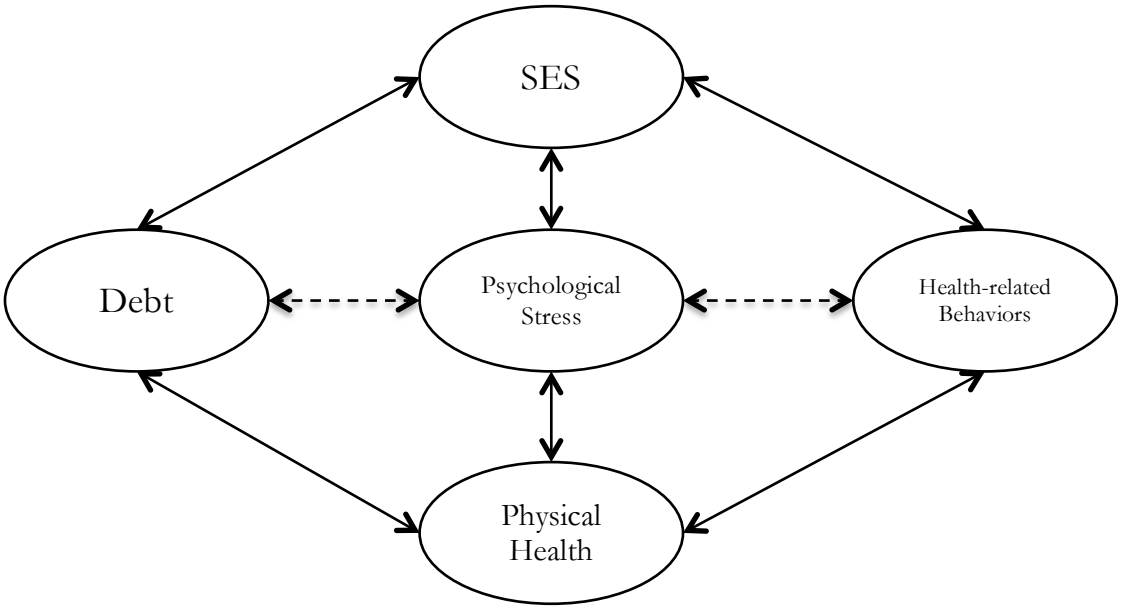
Thus, my research will take both self-control and access to health care services into account as covariates that emphasize the effect of debt stress. In addition, since the sociodemographic features of indebtedness will also be taken into account, I propose the third hypothesis of this research as follows:

Hypothesis 3: The association between indebtedness, smoking, drinking, and being obese will remain significant, after further controlling for the effects of self-control and accessing health care services.

3.2 Proposed Mediation Model

Based on the literature reviewed between indebtedness and physical health, debt stress may play an important role between indebtedness and health-related behaviors. This mediation can be assumed because 1) this research considers indebtedness as a supplementary indicator of socioeconomic status; 2) individuals' daily lifestyles are shaped within a health context; 3) according to my analysis of the health lifestyle theory, indebtedness may coordinate with the traditional SES indicators and determine the occurrence of health-risk behaviors; 4) the reviewed literature provides the evidence of the explanatory function of debt stress in terms of the health gradient; and 5) the mechanisms of intensive stress may trigger smoking, drinking, and obesity, or vice versa (Figure 1).

Figure 1: Hypothesized Relationship Between Indebtedness and Health-Related Behaviors (The Research Model).



Since it has been suggested that mental health may play an important role in the relationship between socioeconomic status and physical health (Adler et al. 1994; Nelson et al. 2008), I will examine the correlation between debtors' psychological stress and indebtedness, as well as the possible adverse effect of debt stress on debtors' health-related behaviors. My review of previous studies indicates that this principle of debt stress may also affect the possible relationship between indebtedness and health-related behaviors. Therefore, I propose the fourth hypothesis of this research regarding the possible mediating role of debt stress:

Hypothesis 4: The psychological stress of indebtedness may mediate the relationship between indebtedness and health-related behaviors after controlling for all other study variables.

CHAPTER 4

DATA AND ANALYTIC PLAN

4.1 The Alabama Omnibus Survey data (AOS)

This is secondary-data-analysis research that utilizes data from the Alabama Omnibus Survey (AOS). The AOS is a statewide social survey that asks Alabama residents questions regarding health conditions, household finances, homelessness, social networking, food environment, payments, and basic demographics. The Survey Research Unit of the University of Alabama at Birmingham (UAB) conducted this survey. The final sample included 515 completed respondents. These respondents were derived from a total of 21,434 telephone attempts in different regions of Alabama.

In order to test its representativeness, this sample is compared with the U.S. and state census. The comparisons show that the AOS oversampled females by 19.8 percent compared to the U.S. census data (53.4%), and by 20.7 percent compared to the Alabama state census (51.5%) (U.S. Census Bureau, 2010). It also contains proportionally more people age 60+ (56.5%) than the U.S. census (27.2%) and the Alabama census data (19.7%); more so, a fraction of people under 44-years-old (16.7%) are less represented here than in other surveys (U.S. census—45.6%; Alabama census—32.7%) (U.S. Census Bureau 2010).

The oversampling is mostly due to the likelihood that females and the elderly are easier to reach. In order to compensate for this oversampling, the AOS data is weighted.

This is provided by the Survey Research Unit of UAB. Sample data for surveys are often weighted to allow for estimates that would have been obtained if the entire sampling frame had been surveyed. Since the comparisons of descriptive statistics have been conducted between AOS and the national and state census, post-stratification weights were created. The basic weights for each variable are calculated as a reciprocal of the probability of selection based on the census data. Next, the adjustment of factors brings the weighted totals up to the presumed non-institutionalized population of Alabama. The final weight is the product of the basic weight and the adjustment factors. These weights are imputed into SPSS, which adjusted the response data based on the weights. The final report, which contains 53.5 percent female and 27.1 percent elderly aged 60+, is now consistent with 2010 Census data.

4.2 Analyses Procedures

First, I will report descriptive statistics—mean, standard deviations, and range of all study variables—of all variables in the analysis, followed by a zero order correlation matrix. Next, I will conduct a series of regression analyses. Because the smoking variable scale is a categorical measurement, an ordinal logistic regression model will be applied. Because drinking status is measured as a nominal variable, the prediction of the drinking variable will apply a binary logistic regression model. The Body Mass Index is a continuous variable. This research will apply the ordinary least squares model to predict its relationships to the outcome variables.

In terms of each regression model mentioned above, the dependent variables will be predicted by only indebtedness after controlling for socioeconomic factors, in order to test the first hypothesis. Then, the control variables including the sociodemographic variables, self-control, and the accessibility of health care services will be progressively added into the regression model to test hypothesis two and three. In the end, the debt stress index (Debt Stress Index—integration of anxiety, stress, pay-off concerns (Drentea & Lavrakas, 2000)) will be added to examine its mediating effects.

4.3 Measures

4.3.1 Dependent Variable

Smoking: In the Alabama Omnibus Survey, the smoking status measurement is "Do you now smoke cigarettes every day, some days, or not at all?" and measured from "Not at all" (coded as 0), "Some days" (coded as 1), to "Every day" (coded as 2).

Drinking: The drinking status measurement is "During the past 30 days, have you had at least one drink of any alcoholic beverage such as beer, wine, a malt beverage or liquor?" with answer "Yes" (coded as 1) and "No" (coded as 0).

BMI: In this research, I use Body Mass Index (BMI), as a continuous variable, to examine obesity. The Body Mass Index is calculated from both weight and height based on following formula:

$$BMI = \frac{Weight\ (lb) * 703}{Height^2\ (inch^2)}$$

4.3.2 Independent Variable

Debtor: The question regarding the identity of being a debtor is asked by "Do you have any debts including credit cards, store credit, a mortgage or home equity loan, a car loan or educational, any other loan?" "Yes" is coded as 1 and "No" is coded as 0.

Debt/Income Ratio: Beyond the amount of debt as the measurement of indebtedness, using the debt/income ratio (Drentea and Lavrakas 2000; Dwyer 2011; Lyons and Yilmazer 2005) is more reasonable and intuitive especially in the context of financial strain. This is because a certain amount of debt may not pose any threat to a person who has sufficient monetary resources insofar as he/she maintains a lifestyle or level of health that is sufficient to repay debt (Kahn and Fazio 2005).

The original question asked regarding the amount of debt is "Right now, approximately what is the total amount you (and your [spouse/partner]) owe on all of your debts, such as credit cards and mortgage loans, after your most recent payments? Would you say…less than $1,000, $1,000 to less than $5,000, $5,000 to less than $10,000, $10, 000 to less than $25,000, $25,000 to less than $50,000, $50,000 to less than $100,000, $100,000 less than $250,000, or $250,000 or more". In order to treat the amount of debt as a continuous variable, this research will recode each category in the original scale to the mid-point.

Income is measured by asking "Is your annual household income from all sources—less than $5,000, less than $10,000 ($5,000 to $9,999), less than $15,000 ($10,000 to $14,999), less than $20,000 ($15,000 to $19,999), less than $25,000 ($20,000 to $24,999), less than $30,000 ($25,000 to $29,999), less than $35,000 ($30,000 to $34,999), less than $50,000 ($35,000 to $49,999), less than $75,000 ($50,000 to $74,999), less than $150,000 ($75,000 to $149,999), or $150,000 or more ($150,000 +). Income was recoded to mid-point and is treated as a continuous variable.

Dividing the amount of debt by income creates debt/income ratio. The scale of debt/income ratio ranges from 0 to 30. Respondents who do not carry debt score zero on debt/income ratio. Respondents who have debt/income ratios lower than 1 are having their amount of debt lower than their income. On the other hand, those who have debt/income ratio higher than 1 are having their amount of debt larger than their income. This research assumes that a higher debt/income ratio will lead respondents to suffer more psychological stress.

Debt Stress Index: Three correlated questions were asked regarding debt combined into the debt stress index. Questions have corresponding wordings as "overall, how often do you worry about the total amount you (and your spouse/partner) owe in overall debt?", "how much stress does the total debt you are carrying cause you (or your spouse/partner)", and "how concerned are you that you (and your spouse/partner) never will be able to pay off these debts?" Likert scales from "not at all" (coded as 0) to "all the time" (coded as 4) measured these three questions. Therefore, the combined scale of the debt stress index ranged from 0 to 12 with the higher number representing more intensity

of debt stress. The reliability test that is conducted to examine the feasibility of combining these three questions indicated an alpha value .91.

4.3.3 Covariates

Income: (see above)

Education: The highest grade or year of school the respondents completed measured respondents' educational achievement. Respondents could choose from "Grades 1 through 8" (Elementary), "Grades 9 through 11" (Some high school), "Grade 12 or GED" (High school graduate), "College 1 year to 3 years" (Some college or tech school), or "College 4 years or more" (College graduate). In the data analysis, I re-code "Grades 1 through 8" and "Grades 9 through 11" into one category to represent those who did not finish their high school. Each of these categories is dummy coded. For example, "Grades 1 through 8" (Elementary) is coded as 1 when "Others" is coded as 0. "Grade 12 or GED" (High school graduate) is the reference group.

Occupation: Occupational status of respondents included "Employed for wages", "Self-employed", "Out of work for more than 1 year", "Out of work for less than 1 year", "A Homemaker", "A Student", "Retired", and "Unable to work". All the occupational categories were coded into a series of dummy variables, in which each respective occupation = 1 when the rest of occupations = 0. "Employed for wages" is the reference group in the regression analysis.

Self-control (self-awareness): Relatively weaker self-control of one's expenditure of credits may directly lead to overspending by which the borrowers may fall into a vicious cycle to pay higher interest on their credit in the long-term. This may marginalize their financial position in the credit market and mark the beginning of their overindebtedness (Autio et al. 2009). Therefore, this research uses self-awareness to represent respondents' level of self-control. The original question in the AOS is "I think sometimes I buy too much stuff". The scale of measurement ranged from "Never" (coded as 0), "Rarely" (coded as 1), "Sometimes" (coded as 2), to "Always" (coded as 3). Self-control was treated as a categorical variable.

Lack of Health care access: The corresponding question worded "Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicare" in which 0 = Yes and 1 = No.

It is worthy to note that, I consider the factor of accessing health care services as a minor pathway between indebtedness and physical health (See 2.4.1). However, it alone cannot fully explain the SES-health gradient (Adler et al. 1994). I will, then, control its possible effects to improve the interpretability of debt stress.

Age: Respondents' age is continuously measured by directly reporting their actual years of living.

Race: In terms of the racial categories, the AOS contained "White", "Black or African American", "Asian", "Native Hawaiian or Other Pacific Islander", and "American Indian

or Alaska Native", and "Other". I further categorized all the variables into one dummy variable—minority, in which Black and other minority groups are coded as 1, and White is coded as 0.

Marital Status: Original question asked the respondent if s/he is "Married", "Divorced", "Widowed", "Separated", "Never married", or "A member of an unmarried couple". I combine "Married" and "A member of an unmarried couple" into one category, and "Divorced", "Widowed", and "Separated" into one category. All the categories are dummy coded, in which, for example, "Married/Cohabiters" = 1 when "Others" = 0 and "Divorced/Widowed/Separated" = 1 when "Others" = 0, and "Never Married" = 1 when "Others" = 0. In the regression analyses, "Married/Cohabiters" is the reference group.

Number of children in the household: This is a continuous variable. The question is measured as, "How many children less than 18 years of age living in your household". Providing childcare is one of the frequent areas of expenditure covered by instant loans among young people (Autio et al. 2009), researchers mentioned the possible effect of having independent children (or the number of independent children) on the increment of financial strain within households (Lyons and Yilmazer 2005), especially young couples, such as student parents (Gerrard and Roberts 2007). Therefore, this research will consider these groups' over-indebtedness as well.

CHAPTER 5

RESULTS

5.1 Descriptives

Descriptive statistics, including mean, standard deviation, range, minimum, and maximum, are reported in Table 1. By taking out the respondents aged less than 18 years and those who did not report their age, the age of AOS respondents ranges from 21 to 92 with an average of 50.15. In order to better interpret the changes of dependent variables on the scale of age, I center the variable of age by its minimum value (21) and received a range of 0 to 71 with a mean of 29.15. In addition, AOS contains 53.45 percent (n = 275) females. White people comprise 66.40 percent (n = 341) of the sample; Blacks or African Americans comprise 29.09 percent (n = 149); other ethnicities occupy 4.51 percent (n = 23). After the recombination between Blacks and other ethnicities, AOS contains 33.60 percent (n = 172) of minorities. The majority of participants in AOS (53.58%, n = 273) are married or cohabitated together. 17.90 percent (n = 91) of the participants are single; and 28.53 percent (n = 145) of them are divorced, widowed, or separated. Most of the sampled Alabamians (62.9%, n = 309) report no child under 18-year-old in their households. The statewide average of the number of child is .68 in AOS.

Based on the reports of CDC (2012) regarding the smoking status of American population, the average percentage of nationwide adults who are currently smoking

Table 1. Descriptive Statistics, AOS 2010 ($N = 515$).

	Mean / %	*SD*	*Range*	*Minimum*	*Maximum*
Health-Related Behaviors					
Smoking	.45	.793	2	0	2
Not at All	74.52%	--	--	--	--
Some Days	6.46%	--	--	--	--
Every Day	19.03%	--	--	--	--
Drinking	36.88%	.48	1	0	1
BMI	28.73	6.66	48	13	61
Debt					
Debtor	62.65%	.48	1	0	1
Debt/Income Ratio	1.81	4.17	30	0	30
Debt Stress Index	2.63	3.28	12	0	12
Socioeconomics					
Household Income	50088.07	44516.03	172500	2500	175000
Education					
< High School	13.42%	.34	1	0	1
High School	28.70%	.45	1	0	1
Some College	29.07%	.45	1	0	1
≥ College	28.81%	.45	1	0	1
Employment					
Employed	40.15%	.49	1	0	1
Out of Work	11.58%	.32	1	0	1
Retired	22.67%	.42	1	0	1
Unable to Work	12.97%	.34	1	0	1
Others	12.63%	.33	1	0	1
Sociodemographics					
Age (Centered)	29.15	16.23	71	0	71
Female	53.45%	.50	1	0	1
Minority	33.60%	.47	1	0	1
Marriage					
Married/Cohabiters	53.58%	.50	1	0	1
Single	17.90%	.38	1	0	1
Not Together[†]	28.53%	.45	1	0	1
Children under 18	.68	1.05	5	0	5
Controls					
Lack of Health Care	14.14%	.35	1	0	1
Self-control	1.13	.88	3	0	3

Percentages are reported in place of mean, for dichotomous variables.
Note: some groups do not total 100 due to rounding errors.
[†] Divorced, Widowed, and Separated.

cigarettes is 21.20. The corresponding percentage in the state of Alabama is as high as 24.30, which is ranked 42nd among the states (CDC 2012). The data captured by the AOS comprises even higher percentages. 25.49 percent (n = 131) of respondents admit to smoke cigarettes some day or every day, and 52.39 percent (n = 269) of respondents said that they smoked at least 100 cigarettes in their entire life. Furthermore, AOS data shows that the percentage of sampled Alabamians (36.88%, n = 190) whose consumption of alcohol in last 30 days is not as high as the national average (54.60%) (CDC 2013). The average score of the body mass index (BMI) of the AOS participants is 28.73. It represents that the sampled Alabamians in AOS are mostly overweight according to the criterion given by the CDC (CDC 2010).

Most of the AOS respondents have debt problems. 62.65 percent (n = 317) of them are debtors. The average score of debt/income ratio (1.81) also shows most Alabamian debtors carry a relatively high amount of debt that exceeds their annual household income. However, due to the mean score of debt stress index is 2.63, which is lower than the median (6) of the scale, sampled Alabamians are not very much concerned or stressed regarding their debt status.

AOS measures adult socioeconomic status through household income, education, and employment. Household income reflects the annual income received by sampled Alabamians. Respondents are asked to choose from several ranges of income. In order to provide more variance for the dependent variables, I recalculate these ranges of income by the mid-points and treat the variable of income as a continuous measure. The mean value of household income is $50088.07 with a standard deviation of $44516.03. Furthermore, sampled Alabamians are asked regarding their highest grades and years of

school completed. 13.42 percent (n = 69) of the respondents have not finished their high school; 28.70 percent (n = 147) have graduated from high school; 29.07 percent (n = 149) have attended college; 28.81 (n = 147) percent have finished college or had more years of education beyond college. In terms of sampled Alabamians' employment status, 40.15 percent (n = 205) of them are either employed or self-employed with wages. 11.58 percent (n = 59) of them are out of work and 12.97 percent (n = 66) are unable to work. 22.67 percent (n = 116) are retired. Moreover, homemakers and students comprise 12.63 percent (n = 65) of the population.

5.2 Regressions

In this section, I will describe the statistical output of three regression models (Table 3, 4, & 5) and the conclusions of four hypotheses on smoking, drinking, and BMI. However, according to Allison (1999) and Hoffmann (2004), it is necessary to test the zero-order correlations on the independent variables to avoid the potential problem with multicollinearity. Any high correlations between two independent variables may bias the standard errors and regression coefficients (Hoffmann 2004). All the regression and zero-order correlations analyses are conducted using SPSS 21.

According to the statistical output of zero-order correlations (Table 2), there is almost no strong linear association between two independent variables with Pearson coefficient (R^2) that exceeds the tolerable range; the directions of correlations also match what were hypothesized by theoretical model. According to Allison (1999) and Hoffmann (2004), a

Table 2. Bivariate Correlations, AOS 2010 ($N = 515$)

	Name	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1.	Smoking	1.000							
2.	Drinking	.079	1.000						
3.	BMI	-.105*	.015	1.000					
4.	Debtor	-.014	.014	.125**	1.000				
5.	Debt/Income Ratio	.139**	-.051	.005	.362**	1.000			
6.	Debt Stress Index	.094*	-.056	.106*	.622**	.456**	1.000		
7.	Household Income	-.182**	.124*	-.082	.211**	-.169**	.041	1.000	
8.	< High School	.110*	-.031	.012	-.068	.237**	.096*	-.267**	1.000
9.	High School Graduate	.004	-.061	.064	-.218**	-.173**	-.168**	-.257**	-.250**
10.	Some College	.026	-.058	.037	.092*	.023	-.041	.007	-.252**
11.	≥ College	-.114*	.142**	-.110*	.177**	-.035	.136**	-.430**	-.250**
12.	Employed	-.007	.284**	.101*	.246**	.001	.080	.225**	-.081
13.	Out of Work	.150**	-.025	.013	.036	.071	.140**	-.082	-.067
14.	Retired	-.124**	-.107*	-.147**	-.177**	-.147**	-.236**	-.037	.007
15.	Unable to Work	.094*	-.116**	.032	-.085	.156**	.084	-.264**	.191**
16.	Others (Homemakers and Students)	-.071	-.143**	-.010	-.090*	-.048	-.045	.064	-.019
17.	Age (Centered by Minus 21)	-.237**	-.162**	-.124**	-.249**	-.194**	-.210**	-.003	.091*
18.	Female	-.107*	-.125**	.021	-.054	-.101*	.070	-.110*	-.062
19.	Minority	-.007	.001	.099*	.060	.138**	.083	-.194**	.049
20.	Married/Cohabiters	-.061	.048	.040	.164**	.111*	.080	.404**	-.039
21.	Single	.016	.004	.008	-.046	-.033	.050	-.174**	-.057
22.	Divorced/Widowed/Separated	.055	-.057	-.051	-.143**	-.094*	-.131**	-.303**	.091**
23.	Children under 18	-.074	.017	.147**	.179**	.139**	.194**	.132**	.131**
24.	Access to Health Care	.174**	-.086	.049	.082	.133**	.158**	-.240**	.095*
25.	Less Self-control	.008	-.032	-.004	.056	.060	.084	.040	.053

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed test)

Table 2 continued. Bivariate Correlations, AOS 2010 ($N = 515$)

Name	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*
1. Smoking								
2. Drinking								
3. BMI								
4. Debtor								
5. Debt/Income Ratio								
6. Debt Stress Index								
7. Household Income								
8. < High School								
9. High School Graduate	1.000							
10. Some College	-.406**	1.000						
11. ≥ College	-.404**	-.407**	1.000					
12. Employed	-.148**	.042	.167**	1.000				
13. Out of Work	.037	.023	-.009	-.296**	1.000			
14. Retired	.038	-.032	-.011	-.443**	-.196**	1.000		
15. Unable to Work	.034	-.034	-.144**	-.316**	-.140**	-.209**	1.000	
16. Others (Homemakers and Students)	.101**	-.009	-.077	-.311**	-.138**	-.206**	-.147**	1.000
17. Age (Centered by Minus 21)	.049	-.085	-.034	-.366**	-.173**	.652**	.068	-.176**
18. Female	.045	.023	-.021	-.142**	.094*	-.039	.038	.130**
19. Minority	-.027	-.009	-.001	.005	.073	-.097*	.089*	-.044
20. Married/Cohabiters	-.088*	.030	.087*	.192**	.011	-.080	-.162**	-.030
21. Single	.058	.005	-.021	-.040	.026	-.163**	.034	.202**
22. Divorced/Widowed/Separated	.048	-.037	-.079	-.179**	-.034	.226**	.151**	-.137**
23. Children under 18	-.027	.056	-.129**	-.027	.201**	-.121**	.034	-.037
24. Access to Health Care	-.107	.082	-.046	.144**	.017	-.297**	-.113*	.245**
25. Less Self-control	-.118**	.007	.071	.095*	.027	-.078	-.165**	.099*

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed test)

Table 2 continued. Bivariate Correlations, AOS 2010 ($N = 515$)

Name	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*
1. Smoking									
2. Drinking									
3. BMI									
4. Debtor									
5. Debt/Income Ratio									
6. Debt Stress Index									
7. Household Income									
8. < High School									
9. High School Graduate									
10. Some College									
11. ≥ College									
12. Employed									
13. Out of Work									
14. Retired									
15. Unable to Work									
16. Others (Homemakers and Students)									
17. Age (Centered by Minus 21)	1.000								
18. Female	-.004	1.000							
19. Minority	-.178**	.099*	1.000						
20. Married/Cohabiters	-.066	-.039	-.179**	1.000					
21. Single	-.350**	-.007	.194**	-.502**	1.000				
22. Divorced/Widowed/Separated	.361**	.049	.033	-.679**	-.295**	1.000			
23. Children under 18	-.113*	.095*	.036	-.071	-.038	.111*	1.000		
24. Access to Health Care	-.394**	.132**	.091*	.201**	.005	-.229**	.079	1.000	
25. Less Self-control	-.190**	.012	.042	.033	.068	-.095*	.012	.114*	1.000

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed test)

correlation may be problematic if its R^2 is above the absolute value of .60. Therefore, the correlations between being a debtor and debt stress index (R^2 = .622), between age and retirement (R^2 = .652), and between married/cohabiters and divorced/widowed/separated (R^2 = -.679) may cause statistical biases in regression models. However, I consider that these high correlations are normal. First of all, it is theoretically not a problem to have the high correlation between debtor and debt stress index due to their different purposes of measurement. On the one hand, the variable of debtor is used to objectively identify if the respondents are in debt or not. The debt stress index, on the other hand, subjectively measures the psychological impact of indebtedness within the debtors. It is expected to see that debtors are more likely to feel financial stress than non-debtors. Second of all, it is understandable to perceive a strong association between age and retirement, as older individuals are more likely to be retired. It is also reasonable that married or cohabitated persons are less likely to be divorced, widowed, or separated at the same time.

Furthermore, in Table 2, the relatively small coefficients between debt variables and traditional SES indicators verify previous findings by showing a weak association between debt measures and the traditional SES determinants (Drentea and Reynolds 2012). This helps to lay the foundation of which debt measure is the possible supplementary indicator of SES (*See 2.1.4*).

5.2.1 Smoking

As smoking is measured as a categorical variable, I apply an ordinal logistic regression model to examine its relevant hypotheses. SPSS originally provides the

coefficients for the predicting variables as in ordered log-odds. In order to make the coefficients more interpretable, I further calculate these ordered log-odds as into proportional odds ratios. The statistics of the ordinal logistic regression model are displayed in Table 3.

Hypothesis 1

The first hypothesis predicts a positive association between respondents' indebtedness and their smoking status, after controlling for the traditional socioeconomic indicators (i.e. income, education, and employment). This hypothesis is not supported by the output in model 1 and model 2. In model 1 of Table 3, the results show that there is no significant difference between the debtors and the others in terms of their smoking status. However, in model 1, for the respondents with a one-unit increase in debt/income ratio, the odds of them to be every-day smokers versus the odds of them to be some-day smoker and non-smoker are 1.073 times greater ($b = .071$, $p < 0.01$). In model 2, with all of the socioeconomic variables held constant, the differences of smoking status among respondents with different debt/income ratios become not significant. In other words, the intervention of SES indicators completely mediates the correlation between indebtedness and smoking (Baron and Kenny 1986).

In model 2, the statistics show that sampled respondents with higher household income are less likely to smoke ($expb = .999$, $b = -.000$, $p < .05$). For people who are out of work, the odds of them being every-day smoker versus the odds of them being some-day smoker and non-smoker are 2.014 times greater ($b = .700$, $p < .05$). Furthermore, a

Table 3. Odds Ratios of Ordinal Logistic Model: Health-related Behavior (Smoking Status) Regressed on Debtor, Debt/Income Ratio, Socioeconomics, Sociodemographics, Control Factors, and Debt Stress Index, AOS 2010, (N = 515).

	Model 1	Model 2	Model 3	Model 4	Model 5
Debt					
Debtor	.810	.963	1.183	1.077	.773
	(.232)	(.282)	(.337)	(.343)	(.411)
Debt/Income Ratio	1.073**	1.027	.989	.992	.975
	(.025)	(.027)	(.031)	(.031)	(.033)
Debt Stress Index					1.089
					(.055)
Socioeconomics					
Household Income		.999*	.999†	.999	.999
		(.000)	(.000)	(.000)	(.000)
Education (reference = High School Graduated)					
< High School		1.555	2.331*	2.313†	2.280†
		(.373)	(.425)	(.442)	(.444)
Some College		.885	.975	.948	1.000
		(.321)	(.376)	(.381)	(.383)
≥ College (=0)		.761	.871	.870	.840
		(.349)	(.403)	(.409)	(.413)
Employment (reference = Employed with Wages and self-employed)					
Out of Work		2.014*	3.224**	3.008**	2.765*
		(.332)	(.393)	(.399)	(.400)
Retired		.352**	3.679*	3.951*	4.331*
		(.385)	(.604)	(.609)	(.617)
Unable to Work		1.019	3.621**	3.425**	3.292**
		(.351)	(.446)	(.450)	(.454)
Others		.469	.645	.598	.576
		(.469)	(.533)	(.543)	(.545)
Sociodemographics					
Age			.900***	.898***	.894***
			(.017)	(.017)	(.018)
Female			.470**	.458**	.430**
			(.286)	(.291)	(.294)
Minority			.687	.720	.708
			(.291)	(.293)	(.293)
Marriage (reference = Married and Cohabiters)					
Single			.421*	.452†	.382*
			(.430)	(.429)	(.448)
Divorced/Widowed/Separated			1.859†	1.829	1.869
			(.373)	(.380)	(.382)
Children under 18			.686*	.698*	.690*
			(.152)	(.150)	(.150)
Controls					
Access to Health Care				1.508	1.421
				(.340)	(.342)
Self-control				.849	.828
				(.161)	(.162)
Pseudo-R^2	.022	.127	.310	.318	.324

Odds ratios; robust standard errors in parentheses.
† p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001 (two-tailed tests)

negative association is found between retirement and smoking (*expb* = .352, *b* = -1.046, *p* < .01).

Hypotheses 2-4

As any evidence of the association between smoking and debt measures is not found by the ordinal regression model, hypotheses from 2 to 4 cannot be further supported. However, in model 3, after the interventions of sociodemographic indicators (age, gender, race, marriage, children), not only does the statistic model show several significant associations, but also the *Pseudo-*R^2 leaps from .127 to .310. In the first place, sociodemographic indicators increase the predictive validity of educational variables. By their inclusion into the regression model, it is observed that respondents without high school graduation have 2.331 times greater odds than others to be in a higher category on the smoking scale (*b* = .846, *p* < .05). This is a suppression effect that the inclusion of suppressors (sociodemographic variables) increases the magnitude of the correlation between two variables (MacKinnon et al. 2000). In other words, within the respondents with exact same sociodemographic features, those educated less than high school tend to smoke more than the others. In addition, the similar suppression effect is also found on the respondents who are unable to work, as their odds of being in a higher level of smoking status are 3.621 times higher than the others (*b* = 1.287, *p* < .01). Second, in model 3, the statistics indicate that people are less likely to smoke while they are aging (*expb* = .900, *b* = -.106, *p* < .001). This is consistent with what I observed in model 2 regarding retired respondents significantly smoke less or not smoke at all. In addition,

females are also less likely to be in the higher levels of smoking status than males (*expb* = .470, b = -.754, $p < .01$). Fourth, comparing with all the others, single respondents have lower odds to smoke (*expb* = .421, b = -.865, $p < .05$), while divorced, widowed, or separated respondents are more likely to smoke (*expb* = .859, b = .620, $p < .1$). Finally, having more children under age 18 in their households leads the respondents to have higher odds to be in a lower level of smoking status (*expb* = 1.459, b = .377, $p < .05$).

In model 4 and 5, with additional focal and control variables (debt stress index, access to health care, and self-control) being added into the regression model, there are no significant associations observed. The *Pseudo-R^2s* do not have any great fluctuations either. In other words, none of these variables can explain the remaining statistic variance of this model.

5.2.2 Drinking

In the AOS, a true and false question measures respondents' drinking status to identify if they are current drinkers. Therefore, in this research, I apply a binary logistic regression model to test the possible association between drinking and the focal variables. Table 4 shows the odds ratios, standard errors, and the results of t-test corresponding to each coefficient.

Table 4. Odds Ratios of Binary Logistic Model: Health-related Behavior (Drinking Status) Regressed on Debtor, Debt/Income Ratio, Socioeconomics, Sociodemographics, Control Factors, and Debt Stress Index, AOS 2010, (N = 515).

	Model 1	Model 2	Model 3	Model 4	Model 5
Debt					
Debtor	.787	.496*	.452**	.475*	.571
	(.238)	(.277)	(.291)	(.293)	(.345)
Debt/Income Ratio	.973	1.004	.992	.997	1.006
	(.027)	(.031)	(.033)	(.032)	(.034)
Debt Stress Index					.951
					(.052)
Socioeconomics					
Household Income		1.000	1.000	1.000	1.000
		(.000)	(.000)	(.000)	(.000)
Education (reference = High School Graduated)					
< High School		.988	.941	1.196	1.218
		(.399)	(.420)	(.428)	(.430)
Some College		.871	.820	.888	.859
		(.320)	(.335)	(.340)	(.342)
≥ College		1.476	1.408	1.486	1.521
		(.328)	(.342)	(.349)	(.350)
Employment (reference = Employed with Wages and self-employed)					
Out of Work		.397**	.435*	.479†	.497†
		(.354)	(.370)	(.379)	(.382)
Retired		.409**	.777	.842	.822
		(.314)	(.430)	(.436)	(.436)
Unable to Work		.275***	.376*	.331**	.342*
		(.382)	(.411)	(.423)	(.423)
Others		.165***	.174***	.164***	.171***
		(.463)	(.498)	(.503)	(.500)
Sociodemographics					
Age			.979†	.973*	.974*
			(.012)	(.013)	(.012)
Female			.478**	.491**	.506**
			(.244)	(.274)	(.248)
Minority			1.103	1.104	1.109
			(.258)	(.260)	(.261)
Marriage (reference = Married and Cohabiters)					
Single			1.724	1.709	1.801
			(.364)	(.368)	(.372)
Divorced/Widowed/Separated			1.491	1.657	1.639
			(.320)	(.330)	(.331)
Children under 18			1.113	1.109	1.123
			(.131)	(.132)	(.133)
Controls					
Access to Health Care				.617	.633
				(.350)	(.352)
Self-control				.747*	.754*
				(.137)	(.138)
Constant	.801	1.473	2.384	1.131	1.101
Pseudo-R^2	.011	.147	.200	.219	.222

Odds ratios; robust standard errors in parentheses.
† p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001 (two-tailed tests)

Hypothesis 1

The first hypothesis predicts a significant relationship between indebtedness and drinking, after all the socioeconomic indicators are held constant. Although model 1 in Table 4 does not support this hypothesis, model 2 shows that the association between drinking and being a debtor exists through a suppression effect of SES variables. Specifically, among the respondents with similar SES features, those who identify themselves as debtors are having lower odds to be a drinker (*expb* = .496, *b* = -.701, $p < .05$). Thus, the first hypothesis is supported by model 2. In addition, a strong and negative association is found between unemployment and drinking behaviors (*expb* = .397, *b* = -.925, $p < .01$). Consistent with their less smoking, retired population is less likely to drink than the others (*expb* = .409, *b* = -.894, $p < .01$). Moreover, an explicit negative association is found between those who are unable to work and their drinking status (*expb* = .275, *b* = -1.292, $p < .001$). The similar negative relationship is also found on the respondents who are students and homemakers (*expb* = .165, *b* = -1.805, $p < .001$).

Hypothesis 2

The second hypothesis predicts that the association between indebtedness and drinking will remain significant after further controlling of socioeconomic indicators. This hypothesis is supported by model 3 in Table 4. The association between indebtedness and drinking remains highly significant regardless of the interventions of sociodemographic variables (*expb* = .452, *b* = -.793, $p < .01$). The *Pseudo-*R^2 also has a major increase from .147 to .200.

The statistics in model 3 shows that there is a significant relationship between age and drinking. For each additional year of age, the odds of the respondents to be drinkers versus the odds of them to be non-drinkers are .979 times greater (b = -.021, p < .1), given that all of the other variables in the model are held constant. Consistent with their smoking behaviors, females are significantly less likely to drink than the males (*expb* = .478, b = -.737, p < .01).

Hypothesis 3

The third hypothesis is supported by model 4 of Table 4. After adding access to health care and self-control in the regression model, the association between indebtedness and drinking status remains significant (*expb* = .475, b = -.744, p < .05). When holding all the other variables as constant, respondents who scored higher in the scale of self-control have lower odds to be drinkers (*expb* = .747, b = -.292, p < .05). However, no strong association is found between the access to health care and drinking behaviors. It cannot explain the covariance of the model.

Hypothesis 4

The fourth hypothesis predicts a possible mediating role of debt stress index in the connection between indebtedness and drinking behaviors. However, this hypothesis is not statistically supported by model 5 of Table 4. Although the intervention of debt stress index in the model weakens the association between indebtedness and drinking, the non-

significant association between debtors and drinking behaviors shows debt stress index failed to be the mediator.

5.2.3 Body Mass Index

As BMI is measured continuously, I apply an ordinary least squares (OLS) regression model in this research to examine its relevant hypotheses. Table 5 presents the SPSS output of OLS regression model. I use standardized coefficients instead of unstandardized coefficients to increase the interpretabilities among predictors and covariates. In the following part of this section, I will conduct in-depth analyses of these coefficients and explain whether the theoretical hypotheses are supported or not.

Hypothesis 1

The first hypothesis predicts a significant relationship between indebtedness and BMI, given all the SES indicators held as constant. This hypothesis is supported by the statistics in model 1 and 2 in Table 5. In model 1, being a debtor is moderately associated with having higher BMI ($B = .094$, $p < .1$). The intervention of the socioeconomic variables improves the predictive validity of "Debtor" from .094 to .131 standard deviations in the same direction, as well as the strength of the association ($p < .05$). In addition, I observe another moderate association between being retired and BMI. Comparing with other groups, retired persons tend to have .108 standard deviations lower BMI ($p < .1$).

Table 5. Standardized Coefficients of OLS Model: BMI Regressed on Debtor, Debt/Income Ratio, Socioeconomics, Sociodemographics, Control Factors, and Debt Stress Index, AOS 2010, (N = 515).

	Model 1	Model 2	Model 3	Model 4	Model 5
Debt					
Debtor	.094†	.131*	.100†	.098†	.029
	(.782)	(.778)	(.774)	(.780)	(.913)
Debt/Income Ratio	-.028	-.075	-.080	-.078	-.115†
	(.076)	(.083)	(.085)	(.085)	(.089)
Debt Stress Index					.139†
					(.132)
Socioeconomics					
Household Income		-.091	-.122†	-.110	-.111
		(.000)	(.000)	(.000)	(.000)
Education (reference = High School Graduated)					
< High School		.004	-.034	-.031	-.037
		(1.104)	(1.102)	(1.127)	(1.124)
Some College		.020	.008	.007	.019
		(.894)	(.883)	(.889)	(.890)
≥ College		-.101	-.084	-.081	-.092
		(.945)	(.939)	(.942)	(.941)
Employment (reference = Employed with Wages and self-employed)					
Out of Work		-.026	-.040	-.045	-.059
		(1.023)	(1.015)	(1.030)	(1.034)
Retired		-.108†	-.125†	-.117	-.110
		(.907)	(1.175)	(1.184)	(1.181)
Unable to Work		-.024	-.032	-.038	-.049
		(1.026)	(1.070)	(1.079)	(1.080)
Others		-.049	-.090	-.091	-.093†
		(1.124)	(1.156)	(1.159)	(1.154)
Sociodemographics					
Age			.115	.105	.098
			(.032)	(.032)	(.032)
Female			.060	.060	.044
			(.674)	(.677)	(.682)
Minority			.084	.090	.089
			(.695)	(.700)	(.697)
Marriage (reference = Married and Cohabiters)					
Single			-.032	-.032	-.049
			(.986)	(.987)	(.994)
Divorced/Widowed/Separated			-.051	-.053	-.048
			(.862)	(.871)	(.869)
Children under 18			.209***	.204***	.195**
			(.343)	(.344)	(.344)
Controls					
Access to Health Care				.036	.029
				(.902)	(.900)
Self-control				-.045	-.053
				(.369)	(.368)
F-statistic	1.482	1.578	2.345	2.143	2.240
adj. R^2	.003	.015	.055	.053	.060

Standardized coefficients; robust standard errors in parentheses.
† $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed tests)

Hypothesis 2

The second hypothesis is supported, as the association between indebtedness and BMI remains significant after adding sociodemographic factors in the regression model (model 3). The *adjusted* R^2 experiences a leap from .015 to .055. The standardized coefficient of "Debtor" drops .031 points, although it is still significant ($p < .05$). As the only variable stands out from sociodemographic factors, the number of children under 18 in the households shows a highly significant correlation with BMI. Respondents who have one more child in their households are more likely to have .209 standard deviations of increase on the scale of BMI ($p < .001$).

Hypothesis 3

The third hypothesis asked to control access to health care and self-control. It predicts that the association between indebtedness and BMI will remain its strength after this further control. The statistics of model 4 in Table 5 support the third hypothesis. In model 4, neither of the newly added control variables has significant correlation with BMI. The standard coefficients of debt variables and the strength of the focal relationship remain nearly unchanged in this model.

Hypothesis 4

The fourth hypothesis predicts a mediation role of debt stress index in the association between indebtedness and BMI. This hypothesis is supported by model 5 in Table 5. On

one hand, debt stress index has a moderate association with BMI ($B = .139$, $p < .1$). On the other hand, its addition explains away the variation of BMI between debtors and non-debtors. In other words, debt stress index is a mediator of the association between being in debt and debtors' BMI. In addition, I observe a suppression effect of debt stress index. Its addition increases the predictive validity of debt/income ratio. A one-unit increase of debt/income ratio will lead to .115 standard deviation decrease on respondents' BMI when all the other factors are held in constant ($p < .1$). However, the impact of debt/income ratio on BMI is in the opposite direction of the impact of being in debt on BMI. I will further discuss this discovery in the next chapter of discussion.

CHAPTER 6

DISCUSSION AND LIMITATION

6.1 Discussion

This study contributes to the relevant literature by testing the direct relationships between indebtedness and health-related behaviors, as well as the mediating effect of debt stress. Statistical results throughout all models support health lifestyle theory in general. Significant and reliable predictabilities of debt measures on health behaviors are observed in the models of drinking and BMI (hypotheses 1-3). Debt stress mediates only the association between debt and BMI (hypothesis 4). I, thereby, suggest future studies pertinent to SES and health-related behaviors to measure or to adjust indebtedness alongside the traditional SES indicators. In this section, I will make further in-depth discussions regarding the statistical results of this study.

6.1.1 Health Lifestyle Theory

Health lifestyle theory predicts that socioeconomic and sociodemographic factors may largely shape and affect individuals' health-related behaviors, including smoking, drinking, diet, and physical exercise, etc. (Cockerham 2010). For example, persons who are living in lower classes are more likely to adopt unhealthy habits like smoking and drinking; and they may have higher levels of BMI due to their unhealthy and non-nutritional diet. In addition, some sociodemographic features intensify the socioeconomic

disadvantages of minorities (Cockerham 2007). For instance, younger people may smoke and drink more than older people and ethnic minorities may have higher BMI than Whites in U.S. This research using Alabama Omnibus Survey generally supports the health lifestyle theory by the analyses of debt and socioeconomic status on smoking, drinking, and BMI.

On one hand, I observe significant variation of smoking status and BMI on different levels of household income. The directions of these relationships are what health lifestyle theory predicts. That is, those who have higher levels of household income are less likely to smoke and more likely to score better on the scale of BMI. However, all of these correlations are moderate. The observed magnitudes of the effects of household income are relatively small. Individuals' employment status also has a major correlation on their patterns of health lifestyle. People who are out of work or unable to work have higher odds to smoke. The retired persons are less likely to smoke, drink, and having lower levels of BMI. Being students or homemakers predicts better health lifestyles due to the lower odds of drinking and better scores of BMI. In addition, those who did not graduate from high school tend to have significantly higher odds of smoking.

AOS data shows that older respondents are more likely to constrain their consumption on smoking and drinking. Furthermore, females have lower odds to smoke and drink than males. Singled persons smoke less than the others; in opposite, divorced, widowed, and separated respondents have higher frequency of smoking. Having more number of children under 18 in the households predicts significantly higher levels of BMI.

On the other hand, directions of some observed relationships are inconsistent with health lifestyle theory, as well as some previous findings in the research literature. First,

unemployed persons and those who are unable to work have lower odds of drinking. In previous literature, findings are mixed regarding the relationship between unemployment and drinking. Some researchers claim that unemployment tends to decrease the consumption of alcohol (Morris et al. 1994); some researchers evidence that unemployment is likely to elevate the alcoholism (Bolton and Rodriguez 2009; Herbig et al. 2013); some other researchers indicate different patterns of effects of short-term unemployment and long-term unemployment on alcohol consumption (Khan et al. 2002). Compared with a long-term three-year-span observation used in prior research (Khan et al. 2002), the one-year measure of AOS' unemployment should be relatively considered as a short-term observation. Therefore, it is possible that unemployed Alabamians consume less alcohol.

Second, based on the health lifestyle model and previous research studies, households with a larger number of children are more likely to be on the lower levels of social ladder, and may experience insubstantial economic status more often. Therefore, the members of these households should be more likely to adopt unhealthy behaviors like smoking and drinking. However, AOS data shows a negative relationship between the number of children in the households and respondents' smoking status. Although it seems reasonable for parents to avoid smoking in front of their children, this finding should be interpreted with caution.

6.1.2 Indebtedness and Health-related Behaviors

This research is the first attempt to theoretically provide a possibility of using debt as a supplementary measure of SES to explain health inequality. Based on the health lifestyle theory, I proposed several hypotheses to predict strong associations between indebtedness and health-related behaviors. The results in Table 4 and 5 support these hypotheses and show that indebtedness significantly correlates with drinking and BMI. These correlations are consistent even after the interventions of socioeconomic and sociodemographic factors.

However, the relationship between debt and drinking is in an opposite direction as what the theoretical model implied. It is also against some previous findings that evidenced positive connections between debt measures and drinking. In this study, this suspicious correlation may attribute to the socioeconomic features of the respondents who identify themselves as debtors. Relevant statistics of Table 2 (multicollinearity) reflect these socioeconomic features through the direction of each pair of correlation. According to these statistics, debtors tend to have higher level of income, college education, and work to do. In addition, they tend to be younger and married with children. They are also in higher levels of debt/income ratio and more stressed out. Therefore, based on the analyses of these features, it is possible that some AOS debtors are middle class young couples who carry large amount of debt, such as a housing mortgage, that they need to pay off. Since the middle class people are financially more secure and more educated, they may drink alcohol moderately (Cockerham 2010). This also explains the mediation role of self-control in the association between debtor and drinking (model 4, Table 4). Middle class debtors may drink less due to their higher levels of self-control.

6.1.3 Debt Stress

The mediation role of debt stress index is only observed in the regression model of BMI. In model 5 of Table 5, adding the debt stress index into the model explains away the relationship between debtor and BMI. Therefore, I conclude that given all the other factors held in constant, the tendency of debtors having higher levels of BMI associates with debtors' psychological stress of being in debt.

In addition, I noted that adding the debt stress index strengthens the potential association between debt/income ratio and BMI to the extent that this association becomes statistically significant. However, the direction of the relationship is opposite as what the theoretical model implied. Based on the health lifestyle theory, having better BMI is one of the features of living in higher classes. Model 5 of Table 5 shows that individuals with a higher level of the debt/income ratio are more likely to be thinner and healthier. For the tendency that higher-class respondents may be granted with more credit to consume, I thereby infer that wealthier people may have higher amount of debt over their income. However, according to the statistics of Table 2, sampled respondents with higher debt/income ratio are more likely to be young minority couples with children. They tend to have lower levels of income, educational, and occupational status, and cannot afford health insurance. Most importantly, they perceive themselves in debt and admit that it is stressful. Based on this statistical evidence, I conclude that although most debtors in AOS are middle-class residents, people in lower classes are positioned higher in the scale of debt/income ratio and stressed out by indebtedness. Therefore, as the results of model 5 in Table 5 regarding debt/income ratio fail to support health lifestyle

theory and against previous findings (Drentea and Lavrakas 2000), it should be interpreted with caution.

6.2 Limitations and Future Research

Although this study discovers persistent associations between indebtedness and health-related behaviors and successfully tests the mediation role of debt stress, the designation of this research shows several theoretical and statistical limitations.

First of all, in Cockerham's (2005) Health Lifestyle Theory, both structure and agency contribute to shape individual patterns of living. However, my research uses the structural part of this theory and focuses on the financial impact toward lifestyles. Therefore, a lack of information regarding agency limits my analyses.

Also, leaving out agency may affect the measurement of debt stress. Since individuals develop lifestyles through consumption; consumption itself tends to provide short-term pleasure or leisure that may decrease the level of stress. Based on the theory of symbolic interactionism, people who have less self-control or mastery may pursue certain "status symbols" through conspicuous consumption, like luxury cars and bigger homes. They tend to buy more than what they earn; thus adopting higher levels of consumption. This is especially evident in the lifestyles of younger generations who value money, image, and fame more than former generations (Twenge et al. 2012). Although it is apparent that these "status symbols" are structurally created and influenced by culture and manipulated by people in higher classes (Bourdieu 1984), the development of information and advertising technology leads those in the lower classes to support these lifestyles to

consume more debt. Because of that, booming debt related to impulsive consumption may generate happiness in the short period, but not in the long term. The different perceptions on income, even among those with an equal level of income, may also affect financial well-being, as individuals with multitudes of needs and wants are more likely to mentally suffer the inadequacy of income to pay for their lavish lifestyles (Prawitz et al. 2006).

Second, there are several limitations in the statistical designing of measures. Because problems emerge with the use of a large amount of missing data and empty cells, I intended to apply multiple imputations to analyze the missing patterns of income and debt and to impute debt variables along with socioeconomic, sociodemographic, and some other variables by linear regression models. However, ordered logistic regression model could not compute pooled estimates (i.e. integrated coefficients from each iteration of imputation) due to varied model parameters in each iteration of imputation. Failure of applying multiple imputations and a large percentage of empty cells also result in unsatisfactory goodness of fit between model and data in the ordinal logistic regression model (Table 3). This may weaken the validity of the statistical prediction.

With regards to drinking behavior, the corresponding measurement cannot represent "binge drinking". Based on the definition made by CDC (2012), binge drinking is measured by 4 or more drinks during a single occasion for women and 5 or more drinks during a single occasion for men; and "heavy drinking" is measured by more than 1 drink per day on average for women and more than 2 drinks per day on average for men. Due to these data limitations, any observed relationship between debt and drinking behaviors should be interpreted with care.

Nonetheless, there is a potential issue rooted in the measurement of self-control. It might be plausible to say that higher levels of self-awareness will result in adjusted behaviors on excessive consumption. In other words, those who are aware of their compulsive shopping might not have enough self-control to make any behavioral change. Nevertheless, due to the positive association discovered between higher self-control and improved shopping behaviors (Baumeister 2002), the measurement of self-awareness may be less-than-representative of self-control.

In addition, since this is state-level-data, any conclusions made by this study cannot be generalized to interpret any research topics in other states even though the general economic recession and indebtedness are similar nation-wide.

Third, this research might be able to better clarify a theoretical map for the interrelationship among indebtedness, health behavior, and debt stress. The endogenous and exogenous pathways of each pair of correlations and their interrelationships are too complicated to examine in a cross-sectional research design such as this one. In addition, I selected literature showing a possible two-way causation and external effects, such as self-control, on every aspect of my research model (Berg et al. 2010; Bridges & Disney, 2010; Fitch 2006; Fitch et al. 2007; Fitch et al. 2009; Fitch et al. 2011; Jenkins et al. 2008; Jenkins et al. 2009). Therefore, further analyses with a longitudinal data set are needed to further test every aspect of the relationships, even though the strength of effects between indebtedness and physical health is clear.

In sum, there are two important findings of this research that may contribute to relevant literature and future studies. First, indebtedness may serve as a supplementary indicator to predict individuals' health lifestyles along with the traditional socioeconomic

measures. This research supports this conclusion through not only the significant correlations discovered between debt and drinking and between debt and BMI, but also the mediation role of debt stress. The psychological attribute of debt reflects a subjective feature, and a necessity, of measuring debt in predicting health that has not been covered by the features of traditional SES indicators. Based on this conclusion, I will recommend future researchers to consider measuring, or at least adjusting, individuals' indebtedness when evaluating their socioeconomic positions. This may help to better predict individuals' health inequalities in the SES-health context.

Second, this research generally supports the health lifestyle theory. For the relationships discovered between debt and health lifestyles after adjusting the traditional SES indicators, engaging indebtedness in the measures of class circumstances may extend the health lifestyle model. The involvement of debt may assist the health lifestyle model to profoundly explain the structural effects of forming diverse health-related behaviors throughout social classes. However, due to the several limitations discussed above of this research, future researchers should conduct more studies to further examine the relationship between debt and health-related behaviors, as well as individuals' general physical health. It is also necessary to have more in-depth research on the psychological effect of indebtedness to perceive the nature of debt and to predict more accurate health status.

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APPENDIX: IRB APPROVAL FORM

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

Institutional Review Board for Human Use

Form 4: IRB Approval Form
Identification and Certification of Research
Projects Involving Human Subjects

UAB's Institutional Review Boards for Human Use (IRBs) have an approved Federalwide Assurance with the Office for Human Research Protections (OHRP). The Assurance number is FWA00005960 and it expires on January 24, 2017. The UAB IRBs are also in compliance with 21 CFR Parts 50 and 56.

Principal Investigator:	GUO, LINGFEI
Co-Investigator(s):	
Protocol Number:	**X121005005**
Protocol Title:	*Health-risk Lifestyle, Debt, and Mental Health*

The IRB reviewed and approved the above named project on 11-9-12. The review was conducted in accordance with UAB's Assurance of Compliance approved by the Department of Health and Human Services. This Project will be subject to Annual continuing review as provided in that Assurance.

This project received EXPEDITED review.

IRB Approval Date: 11-9-12

Date IRB Approval Issued: 11-9-12

HIPAA Waiver Approved?: N/A

Marilyn Doss

Marilyn Doss, M.A.
Vice Chair of the Institutional Review
Board for Human Use (IRB)

Investigators please note:

The IRB approved consent form used in the study must contain the IRB approval date and expiration date.

IRB approval is given for one year unless otherwise noted. For projects subject to annual review research activities may not continue past the one year anniversary of the IRB approval date.

Any modifications in the study methodology, protocol and/or consent form must be submitted for review and approval to the IRB prior to implementation.

Adverse Events and/or unanticipated risks to subjects or others at UAB or other participating institutions must be reported promptly to the IRB.

470 Administration Building
701 20th Street South
205.934.3789
Fax 205.934.1301
irb@uab.edu

The University of
Alabama at Birmingham
Mailing Address:
AB 470
1530 3RD AVE S
BIRMINGHAM AL 35294-0104

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

Institutional Review Board for Human Use

PI: GUO, LINGFEI
Protocol # X121005005

UAB IRB Approval of
Waiver of Informed Consent and/or Waiver of Patient Authorization

☒ **Approval of Waiver of Informed Consent to Participate in Research.** The IRB reviewed the proposed research and granted the request for waiver of informed consent to participate in research, based on the following findings:

1. The research involves no more than minimal risk to the subjects.
2. The research cannot practicably be carried out without the waiver.
3. The waiver will not adversely affect the rights and welfare of the subjects.
4. When appropriate, the subjects will be provided with additional pertinent information after participation.

Check one:
- ☐ **and** Waiver of Authorization (below)
- ☐ **or** Waiver of Authorization (below)
- ☒ Waiver of Authorization not applicable

☐ **Approval of Waiver of Patient Authorization to Use PHI in Research.** The IRB reviewed the proposed research and granted the request for waiver of patient authorization to use PHI in research, based on the following findings:

1. The use/disclosure of PHI involves no more than minimal risk to the privacy of individuals
   i. There is an adequate plan to protect the identifiers from improper use and disclosure.
   ii. There is an adequate plan to destroy the identifiers at the earliest opportunity consistent with conduct of the research, unless there is a health or research justification for retaining the identifiers or such retention that is otherwise required by law.
   iii. There is an assurance that the PHI will not be reused or disclosed to any other person or entity, except as required by law, for authorized oversight of the research study, or for other research for which the use or disclosure of PHI would be permitted.
2. The research cannot practicably be conducted without the waiver or alteration.
3. The research cannot practicably be conducted without access to and use of the PHI.

—OR—

☐ **Full Review**
The IRB reviewed the proposed research at a **convened meeting** at which a majority of the IRB was present, including one member who is not affiliated with any entity conducting or sponsoring the research, and not related to any person who is affiliated with any of such entities. The waiver of authorization was approved by the majority of the IRB members present at the meeting.

Date of Meeting

Signature of Chair, Vice-Chair or Designee

Date

☒ **Expedited Review**
The IRB used an **expedited review procedure** because the research involves no more than minimal risk to the privacy of the individuals who are the subject of the PHI for which use or disclosure is being sought. The review and approval of the waiver of authorization were carried out by the Chair of the IRB, or by one of the Vice-Chairs of the IRB as designated by the Chair of the IRB.

11-9-12
Date of Expedited Review

Marilyn K Dan
Signature of Chair, Vice-Chair or Designee

Date 11-9-12

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Project Revision/Amendment Form

Form version: June 26, 2012

In MS Word, click in the white boxes and type your text; double-click checkboxes to check/uncheck.

- **Federal regulations require IRB approval before implementing proposed changes. See Section 14 of the IRB Guidebook for Investigators for additional information.**
- **Change means any change, in content or form, to the protocol, consent form, or any supportive materials (such as the Investigator's Brochure, questionnaires, surveys, advertisements, etc.). See Item 4 for more examples.**

MAR 14 2013

1. Today's Date	03/014/2013

2. Principal Investigator (PI)

Name (with degree)	B.A. Lingfei Guo	**Blazer ID**	lingfei
Department	Sociology	**Division (if applicable)**	N/A
Office Address	1530 3RD AVE S	**Office Phone**	(205)520-8074
E-mail	lingfei@uab.edu	**Fax Number**	N/A

Contact person who should receive copies of IRB correspondence (Optional)

Name		**E-Mail**	
Phone		**Fax Number**	
Office Address (if different from PI)			

3. UAB IRB Protocol Identification

3.a. Protocol Number	X121005005
3.b. Protocol Title	Health-risk Lifestyle, Debt, and Mental Health

3.c. Current Status of Protocol—Check ONE box at left; provide numbers and dates where applicable

- ☒ **Study has not yet begun** — **No participants, data, or specimens have been entered.**
- ☐ **In progress, open to accrual** — **Number of participants, data, or specimens entered:**
- ☐ **Enrollment temporarily suspended by sponsor**
- ☐ **Closed to accrual, but procedures continue as defined in the protocol (therapy, intervention, follow-up visits, etc.)**
  - **Date closed:**
  - **Number of participants receiving interventions:**
  - **Number of participants in long-term follow-up only:**
- ☐ **Closed to accrual, and only data analysis continues**
  - **Date closed:**
  - **Total number of participants entered:**

4. Types of Change

Check all types of change that apply, and describe the changes in Item 5.c. or 5.d. as applicable. To help avoid delay in IRB review, please ensure that you provide the required materials and/or information for each type of change checked.

- ☒ **Protocol revision (change in the IRB-approved protocol)**
  In Item 5.c., if applicable, provide sponsor's protocol version number, amendment number, update number, etc.
- ☐ **Protocol amendment (addition to the IRB-approved protocol)**
  In Item 5.c., if applicable, provide funding application document from sponsor, as well as sponsor's protocol version number, amendment number, update number, etc.
- ☒ **Add or remove personnel**
  In Item 5.c., include name, title/degree, department/division, institutional affiliation, and role(s) in research, and address whether new personnel have any conflict of interest. See "Change in Principal Investigator" in the IRB Guidebook if the principal investigator is being changed.
  - ☐ **Add graduate student(s) or postdoctoral fellow(s) working toward thesis, dissertation, or publication**
    In Item 5.c., (a) identify these individuals by name; (b) provide the working title of the thesis, dissertation, or publication; and (c) indicate whether or not the student's analysis differs in any way from the purpose of the research described in the IRB-approved HSP (e.g., a secondary analysis of data obtained under this HSP).
- ☐ **Change in source of funding; change or add funding**
  In Item 5.c., describe the change or addition in detail, include the applicable OSP proposal number(s), and provide a copy of the application as funded (or as submitted to the sponsor if pending). Note that some changes in funding may require a new IRB application.
- ☐ **Add or remove performance sites**
  In Item 5.c., identify the site and location, and describe the research-related procedures performed there. If adding site(s), attach notification of permission or IRB approval to perform research there. Also include copy of subcontract, if applicable. If this protocol includes acting as the Coordinating Center for a study, attach IRB approval from any non-UAB site added.

☐ **Add or change a genetic component or storage of samples and/or data component—this could include data submissions for Genome-Wide Association Studies (GWAS)**
To assist you in revising or preparing your submission, please see the IRB Guidebook for Investigators or call the IRB office at 934-3789.

☐ **Suspend, re-open, or permanently close protocol to accrual of individuals, data, or samples (IRB approval to remain active)**
In Item 5.c., indicate the action, provide applicable dates and reasons for action; attach supporting documentation.

☐ **Report being forwarded to IRB (e.g., DSMB, sponsor or other monitor)**
In Item 5.c., include date and source of report, summarize findings, and indicate any recommendations.

☐ **Revise or amend consent, assent form(s)**
Complete Item 5.d.

☐ **Addendum (new) consent form**
Complete Item 5.d.

☐ **Add or revise recruitment materials**
Complete Item 5.d.

☐ **Other (e.g., investigator brochure)**
Indicate the type of change in the space below, and provide details in Item 5.c. or 5.d. as applicable.
Include a copy of all affected documents, with revisions highlighted as applicable.

5. Description and Rationale

In Item 5.a. and 5.b, check Yes or No and see instructions for Yes responses.
In Item 5.c. and 5.d, describe—and explain the reason for—the change(s) noted in Item 4.

☐ Yes ☐ No **5.a. Are any of the participants enrolled as normal, healthy controls?**
If yes, describe in detail in Item 5.c. how this change will affect those participants.

☐ Yes ☐ No **5.b. Does the change affect subject participation, such as procedures, risks, costs, location of services, etc.?**
If yes, FAP-designated units complete a FAP submission and send to fap@uab.edu. Identify the FAP-designated unit in Item 5.c.
For more details on the UAB FAP, see www.uab.edu/cto.

5.c. Protocol Changes: In the space below, briefly describe—and explain the reason for—all change(s) to the protocol.

Protocol number: X121005005

The chair of principal investigator's thesis committee has been changed from Dr. Sean-Shong Hwang to Dr. Patricia Drentea. Dr. Sean-Shong Hwang will be no longer in this committee. Dr. Patricia Drentea is an associate professor of Department of Sociology. She will serve in this thesis committee as the faculty advisor of the principal investigator to guide this research. She does not have any conflict of interests with this research.

Principal investigator intend to change the title of this research from "Health-risk Lifestyles, Debt, and Mental Health" to "Indebtedness, Debt Stress Index, and Health-related Behaviors", due to the shift of research interests on focal variables. However, the data set will remain the same.

Due to the personnel change in PI's thesis committee, the principal investigator intend to extend the length of research from 05/31/2013 to 08/31/2013. Therefore, the content in item 16b of submitted Human Subjects Protocol (HSP) should be changed.

5.d. Consent and Recruitment Changes: In the space below,
(a) describe all changes to IRB-approved forms or recruitment materials and the reasons for them;
(b) describe the reasons for the addition of any materials (e.g., addendum consent, recruitment); and
(c) indicate either how and when you will reconsent enrolled participants or why reconsenting is not necessary (not applicable for recruitment materials).

Also, indicate the number of forms changed or added. For new forms, provide 1 copy. For revised documents, provide 3 copies:
- **a copy of the currently approved document (showing the IRB approval stamp, if applicable)**
- **a revised copy highlighting all proposed changes with "tracked" changes**
- **a revised copy for the IRB approval stamp.**

Signature of Principal Investigator _____ Date 03/14/2013

FOR IRB USE ONLY

☐ Received & Noted ☑ Approved Expedited* ☐ To Convened IRB

Marilyn Davis — 3-19-13

Signature (Chair, Vice-Chair, Designee) — Date

DOLA 11972

Change to Expedited Category Y / N / NA

*No change to IRB's previous determination of approval criteria at 45 CFR 46.111 or 21 CFR 56.111