Louisiana State University
LSU Digital Commons

3-28-2018

Identifying Stress Variables Linking Socioeconomic Status and Smoking

Aaron French Waters

Louisiana State University and Agricultural and Mechanical College, awater7@lsu.edu

Follow this and additional works at: https://digitalcommons.lsu.edu/gradschool_theses

Part of the Psychology Commons

IDENTIFYING STRESS VARIABLES LINKING SOCIOECONOMIC STATUS AND
SMOKING

A Thesis

Submitted to the Graduate Faculty of
Louisiana State University
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Master of Arts

in

The Department of Psychology

by
Aaron French Waters
B.S., California Lutheran University (Thousand Oaks, CA), 2014
May 2018

TABLE OF CONTENTS

ABSTRACT

Smoking is the leading cause of preventable death accounting for approximately 480,000 deaths every year (Jamal et al., 2015). Across the socioeconomic status gradient smoking prevalence differs greatly, with those of lower socioeconomic status smoking at much higher rates. Within the literature relationships have been identified between socioeconomic status, stress variables, and smoking. However, little research has explored the possibility of stress variables mediating the relationship between socioeconomic status and smoking. The goal of the current study was to identify stress variables linking socioeconomic status and smoking in order to identify variables to address in cessation programs for individuals across the socioeconomic status gradient. Stress variables examined as potential mediators between socioeconomic status and smoking included financial strain, discrimination, urban life stress, perceived stress, depression, and neighborhood perceptions. Participants ($N = 238$) were primarily female (67.6%) and African American (51.7%) adults from the Dallas metropolitan area. A majority of the sample reported being nonsmokers ($n = 164$). Participants who identified as being smokers at baseline ($n = 74$) reported smoking 9.96 ($SD = 10.79$) cigarettes per a day. Analyses revealed that financial strain and perceived neighborhood disorder were the only variables found to significantly mediate the relationship between socioeconomic status and cigarettes smoked per week. Additionally, financial strain was also found to significantly mediate the relationship between socioeconomic status and smoking status. Cessation programs targeting lower socioeconomic status groups should look to include some component to reduce financial strain and address perceived neighborhood disorder as these variables may act as barriers to successful cessation for this population.

INTRODUCTION

Overview of Smoking

Smoking is consistently found to be the leading cause of preventable death in the United States killing roughly 480,000 people in 2014 (Jamal et al., 2015) and an estimated 20 million people over the course of the last 50 years (Health & Services, 2014). Smoking is associated with a number of diseases and health problems such as cancer, stroke, coronary heart disease, rheumatoid arthritis, chronic obstructive pulmonary disease, cataracts, and diminished immune functioning (Health & Services, 2014). Lung cancer has been identified as the most common cancer in the United States and approximately 87% of lung cancer cases have been attributed to smoking (Health & Services, 2014). Additionally, second hand smoke has been found to be very detrimental to the health of exposed individuals and can increase the risk of stroke, lung cancer, coronary heart disease, and reproductive damage (Health & Services, 2014). Currently, smoking costs the United States approximately 300 billion dollars a year due to loss of productivity as well as health care expenditures (Jamal et al., 2015). The overall prevalence of smoking has declined over the course of the last twenty years due to a number of different factors including increased anti-smoking advertisement, access to cessation interventions, and taxes on cigarettes (Health & Services, 2014). However, the number of preventable deaths attributed to smoking each year is still significant, and work is needed to determine how these deaths can be prevented.

Evidence suggests that smoking disproportionately affects individuals of lower socioeconomic status. In 2014, a reported 15.2% of adults living at or above the poverty line reported current smoking, in comparison to the 26.3% of adults living below the poverty line (Jamal et al., 2015). In addition, there are extremely poor cessation rates found in low socioeconomic status smokers, with rates ranging from 2%-4% at 6-month follow-up (Fagan,

Shavers, Lawrence, Gibson, & O'Connell, 2007; Fernandez et al., 2006; Kendzor et al., 2012; Wetter et al., 2005). As an interesting note, Kotz and West (2009) found that low socioeconomic smokers are just as likely to quit as higher socioeconomic status individuals, even though they are half as likely to achieve long-term abstinence. Furthermore, a significantly greater number of individuals who are uninsured (27.9%) smoke compared to individuals with private health insurance (12.9%) (Jamal et al., 2015). Lower socioeconomic status smokers who are not able to afford private health insurance may face a greater struggle in accessing cessation treatment, which may further add to this disparity. As the overall national average of smokers has dropped over the last thirty years (Health & Services, 2014), there has been growing research interest in the disparity among smokers attributable to socioeconomic status and the development of interventions targeted for socioeconomically disadvantaged populations.

The Socioeconomic Status-Health Gradient

Socioeconomic status has been found to play an influential direct and indirect role in a number of major adverse health behaviors and outcomes (Adler et al., 1994; Adler & Ostrove, 1999; Gallo & Matthews, 2003; Matthews, Gallo, & Taylor, 2010). A review of the literature prior to the 1990's, conducted by Adler et al. (1994), revealed a trend in research focusing on associations between poverty and health. It was thought that those living below the poverty line experienced significantly worse health outcomes, while those living above the poverty line experienced more positive health outcomes regardless if they were of middle or high socioeconomic status (Adler & Ostrove, 1999). Above a certain level of poverty the effects of socioeconomic status on health were thought to plateau. Adler et al. (1994) and colleagues identified a graded association by which socioeconomic status affects health outcomes, and they named it the socioeconomic status-health gradient. It was proposed that across all levels of

socioeconomic status, there are significant differences in health behaviors and outcomes. Adler et al. (1994) examined the association between socioeconomic status and disease prevalence and concluded that as socioeconomic status increases, certain diseases decrease, such as osteoarthritis, chronic disease, hypertension, and cervical cancer. Furthermore, Adler et al. (1994) found that as socioeconomic status increases, morbidity and mortality decrease. Adler et al. (1994) also identified adverse health behaviors (such as cigarette smoking and lack of physical activity) that have an inverse relationship with socioeconomic status. Psychological characteristics that were determined to have an inverse relationship with socioeconomic status included increased depression, hostility, and psychological distress.

Preceding the socioeconomic status-health gradient, a majority of researchers have looked to identify health behaviors and outcomes specific to disadvantaged communities. Some focused on dichotomizing socioeconomic status and by doing so only identified health disparities occurring in disadvantaged communities (Adler et al., 1994). The process of looking at either only disadvantaged populations or comparing them against individuals living above the poverty line created an incomplete understanding of how all levels of socioeconomic status uniquely influence health. Adler et al. (1994) identified differences in the prevalence of diseases, morbidity/mortality, health behaviors, and psychological characteristics across all levels of socioeconomic status. The identification of a gradient revealed that all levels of socioeconomic status play an important role in influencing health behaviors and outcomes. The socioeconomic status-health gradient has stimulated a wave of research focused on understanding how the entire spectrum of socioeconomic status influences health.

Conceptual Models

The era of the socioeconomic status-health gradient, identified by Adler et al. (1994), opened the door for future research to understand the connection between socioeconomic status and health across all levels of the gradient, but there were limited models to understand how exactly socioeconomic status exerted an influence on health behaviors and outcomes. Upon the identification of the socioeconomic status-health gradient, Adler and Ostrove (1999) developed a conceptual model to understanding the mechanisms by which socioeconomic status exerts an influence on health and illness. Within the conceptual model proposed by Adler and Ostrove (1999), socioeconomic status has a direct effect on environmental (external environment, social environment, available resources) and individual factors (affect and cognition) that lead to a number of behavioral, psychological, and physiological responses that influence health (See Appendix A for Figure 3 of Adler and Ostrove (1999) conceptual model). Environmental resources and constraints lead to variations in the amount of exposure to carcinogens and pathogens, while psychological influences such as affect and cognition can lead to alterations in central nervous system and endocrine responses (Adler & Ostrove, 1999). The influence exerted by these environmental and psychological processes ultimately tend to lead to increases or decreases in health and illness depending on where an individual is positioned on the socioeconomic status gradient. Lower socioeconomic status individuals endure a number of environmental factors, such as increased exposure to liquor stores marketing tobacco and alcohol, along with decreased access to proper nutrition and opportunities for physical activity (Macintyre, Maciver, & Sooman, 1993). These environmental factors can lead to poorer health behaviors, such as increased smoking and alcohol consumption. Environmental stress factors not only have an effect on health behaviors, such as smoking, but also on psychological factors

including depression, perceived stress, and stressful life events (Matthews et al., 2010). Psychological factors such as depression and perceived stress, experienced more frequently by those lower on the gradient, can also lead to poor health relevant behaviors, such as smoking, in turn leading to poorer health outcomes.

The model developed by Adler and Ostrove (1999) linking socioeconomic status and health in part influenced the development of a later model, the reserve/capacity model developed by Gallo and Matthews (2003). While Adler and Ostrove (1999) developed a model that highlighted possible pathways that socioeconomic status could have on health, Gallo and Matthews (2003) went one step further to propose the possibility of socioeconomic status having an indirect effect on health outcomes through negative emotions and cognitions. Specifically, this model is based on the premise that individuals lower on the socioeconomic status gradient experience more stressful events with the availability of less psychosocial resources that tend to elicit increased negative emotions and cognitions, in turn leading to an increase in negative health behaviors and poorer health outcomes (Gallo & Matthews, 2003). Over time, exposure to stressful events and lack of opportunities for potential gain lead to decreases in reserve resources (tangible, interpersonal, intrapersonal), which effect emotions and cognitions, hence the name the reserve capacity model (See Appendix B for Figure 4 of Gallo and Matthews (2003) conceptual model). According to Gallo and Matthews (2003), the most significant inverse relationship between negative cognitive factors and socioeconomic status are apparent in reported levels of depression, hostility, anxiety, and hopelessness, such that the lower down the gradient you go the more of an increase you see in these negative cognitive attributes. Increased levels of depression, hostility, and hopelessness have been found to be associated with increases in cardiovascular morbidity and mortality, while increased levels of anxiety have been found to

be associated with sudden cardiac death (Gallo & Matthews, 2003). The increased number of stressful events that low socioeconomic status individuals are exposed to (Dohrenwend, 1973; McLeod & Kessler, 1990), accompanied with an increased tendency to interpret ambiguous events as negative (Chen & Matthews, 2001), overtime leads to a depletion of tangible, interpersonal, or intrapersonal resources and an inability to replenish these "resource banks" (Gallo & Matthews, 2003).

These conceptual models are a foundation for understanding the relationship between the underlying mechanisms linking socioeconomic status and health behaviors. Both models, proposed by Adler and Ostrove (1999) and by Gallo and Matthews (2003), share many similarities with the major difference being that in the reserve capacity model, socioeconomic status indirectly effects negative affect and cognition through decreased potential for gain and increased loss/harm. While both models provide an excellent template linking socioeconomic status and health, more importantly there are a number of studies to support their validity in empirically supported research.

The model proposed by Adler and Ostrove (1999) is somewhat less complex so as would be expected there is more research that has been conducted using this model, or a variation of it, to identify pathways linking socioeconomic status and health. Regarding the role of psychosocial variables, Lachman and Weaver (1998) found that individuals of lower socioeconomic status tended to have lower sense of mastery and higher perceived constraints as well as poorer health. However, low socioeconomic status individuals who had a greater sense of control showed health outcomes comparable to higher socioeconomic status individuals. Dr. Gary Evans has conducted a number of studies looking at exposure to environmental toxins as an underlying mechanism linking socioeconomic status with health (Evans & Kantrowitz, 2002;

Evans & Kim, 2010). Evans and Kantrowitz (2002) identified an inverse relationship between socioeconomic status and exposure to environmental risk factors (e.g. hazardous waste, air pollutants, water quality, neighborhood conditions, ambient noise, residential crowding, educational facilities, and work environments) as well as how these environmental risk factors are harmful to overall health. Furthermore, Evans and Kim (2010) found that psychosocial variables such as poor interpersonal relationships, which are experienced at higher rates lower down on the socioeconomic status gradient, exacerbated the effects of exposure to environmental risk factors on health outcomes. Feldman and Steptoe (2004) determined that individuals living in a socioeconomically disadvantaged neighborhood experienced greater perceived neighborhood strain leading to poorer physical functioning when compared to individuals higher up the socioeconomic status gradient.

There is also research to support the reserve capacity model developed by Gallo and Matthews (2003). Gallo, Bogart, Vranceanu, and Matthews (2005) tested several pathways of the reserve capacity model among women of varying socioeconomic status. While some parts of the model were only partially supported, they did find that lower socioeconomic status women reported increased social strain and lower positive affect and perception of control. Gallo et al. (2005) also found that social strain mediated the relationship between socioeconomic status and positive affect, such that women of lower socioeconomic status experienced greater daily social strain which led to lower positive affect. Furthermore, it was determined that lower socioeconomic status women reported less social and personal resilient resources and that resilient resources did mediate the relationship between socioeconomic status and affect. Resilient resources were only partially associated with socioeconomic status and daily psychosocial experiences (Gallo et al., 2005). Matthews, Raikkonen, Gallo, and Kuller (2008)

examined associations between socioeconomic status and metabolic syndrome in a sample consisting of women and found support for the reserve capacity model. Specifically, they found that socioeconomic status directly affected the development of metabolic syndrome among lower socioeconomic status women. Furthermore, they determined that socioeconomic status indirectly affected metabolic syndrome through low reserve capacity, which was associated with increased negative emotions among lower socioeconomic status women (Matthews et al., 2008). In another study conducted by Gallo, de los Monteros, Ferent, Urbina, and Talavera (2007) similar results were found as socioeconomic status was found to have an indirect effect on metabolic syndrome through psychosocial resources which independently predicted waist circumferences, a factor associated with metabolic syndrome.

Research to support both models proposed by Adler and Ostrove (1999) and Gallo and Matthews (2003) has been well documented. A fair amount of research has also identified links between socioeconomic status and environmental/psychological factors as well as relationships between environmental/psychological factors and health related behaviors and outcomes. The identification of these correlational relationships has provided insight for how certain variables may be mediating certain relationships between socioeconomic status and health related behaviors and outcomes. For the current study we are looking to assess how stress variables may mediate the relationship between socioeconomic status and smoking, a health related behavior. There is a reasonable amount of literature that has focused on topics associated with smoking, socioeconomic status, and stress variables, yet to date little research has explored possible underlying pathways connecting all of these variables. Some prevalent stress variables seen at varying degrees across the gradient include depression, financial strain, perceived stress, discrimination, and neighborhood disorder. In the following section we review the literature as it

pertains to identified relationships between socioeconomic status and stress variables and previously identified relationships between stress variables and smoking.

Depression

Socioeconomically disadvantaged individuals tend to experience higher levels of depression and negative affect compared to their higher socioeconomic status counterparts (Bruce, Takeuchi, & Leaf, 1991; Everson, Maty, Lynch, & Kaplan, 2002). Depression has been found to predict a number of negative health outcomes from early adolescents (Keenan-Miller, Hammen, & Brennan, 2007) through adulthood (Moussavi et al., 2007). A strong relationship has been identified between depression and smoking, such that depressed individuals tend to smoke at significantly higher rates compared to non-depressed individuals (Anda et al., 1990; Fergusson, Goodwin, & Horwood, 2003). While research has identified a connection between socioeconomic status and depression and a connection between depression and smoking, it is plausible that there is a pathway connecting socioeconomic status and smoking mediated by increased levels of depression.

Financial Strain

Another stressor commonly associated with lower socioeconomic status is financial strain. Individuals who are of lower socioeconomic status experience financial strain for a number of reasons, yet it has consistently been found to lead to a number of negative health outcomes. The relationship between financial stress and smoking is circular in fashion, such that smoking can alleviate the burden of financial stress, but at the same time smoking increases the amount of financial stress as funds that could be used otherwise are spent on tobacco products. Siahpush, Borland, and Scollo (2003) determined that across all classifications of income, increased spending on smoking products was associated with financial strain. In regards to

smoking cessation, Siahpush and Carlin (2006) found that smokers with greater financial stress had poorer treatment outcomes, and that those who were ex-smokers experiencing financial strain were more likely to relapse. In studies looking at women in the working class (Graham, 1993), or who were receiving income support (Dorsett & Marsh, 1998), the most prevalent reason for not quitting or having difficulty quitting was financial stress. The literature provides evidence for a strong relationship between financial strain and smoking across the socioeconomic status gradient. However, little research has examined the pathway linking socioeconomic status and smoking mediated by financial stress across the gradient.

Perceived Stress

Perceived stress resulting from being socioeconomically disadvantaged has been well documented and has been found to lead to a number of different negative health and behavioral outcomes (Dohrenwend, 1973; Jaffee et al., 2005; Krueger & Chang, 2008). Within a sample looking across the socioeconomic status gradient, perceived stress was found to be negatively associated with perceived health and related to a greater risk of poor health (Sheldon Cohen, Kaplan, & Salonen, 1999). Gallo et al. (2005) tested the reserve capacity model and determined that individuals of lower socioeconomic status reported increased stress exposure and fewer positive experiences compared to higher socioeconomic status individuals. While low socioeconomic status individuals may use smoking as a coping tool to deal with perceived stress of daily life, the effects of smoking may actually only exacerbate poor health outcomes (Pampel & Rogers, 2004). Furthermore, the link between perceived stress and smoking is similar to that of financial strain and smoking, such that increased stress leading to increased smoking circularly leads back to greater increases in stress due to withdrawal and dependence of nicotine (Parrott, 1999).

Discrimination

Deterioration of neighborhoods and neighborhood segregation have been found to be associated with discrimination of low socioeconomic status individuals (Williams, 1999). Furthermore, a relationship has been identified between increased levels of racial discrimination in low socioeconomic status individuals and chronic physical and mental health outcomes (Williams, 1999). Discrimination is not just exclusive to low socioeconomic status individuals as racial discrimination has been found to be associated with poorer mental health outcomes within middle class African American men (Sellers, Bonham, Neighbors, & Amell, 2009). The relationship between discrimination and smoking is of some interest as well. While the smoking rate has declined for those living at or above the poverty line, the same has not been true for lower socioeconomic status individuals (Jamal et al., 2015). Over the years smoking has been stigmatized through the use of anti-smoking advertising and tobacco demoralization strategies (Bell, Salmon, Bowers, Bell, & McCullough, 2010). The process of "demoralizing" smokers has been hypothesized to have negative consequences on the likelihood of smokers seeking healthcare cessation resources, with low socioeconomic smokers being affected the most (Bell et al., 2010). This increase in stigmatization towards smokers may be interpreted as a form of discrimination and could possibly be causing low socioeconomic status smokers to continue to smoke.

Neighborhood Disorder

Perceived, as well as objective, neighborhood disorder and decay has been found to be related to health outcomes as well as mental states, including depression and anxiety (Sooman & Macintyre, 1995). This may occur for a number of reasons, such as these environments do not offer amenities and opportunities to engage in health behaviors or that lower socioeconomic

status individuals engage in poorer health behaviors that become normative for all living in the community (Macintyre et al., 1993; Sooman & Macintyre, 1995). Low socioeconomic status neighborhoods have been found to be associated with increased tobacco advertising and marketing (Siahpush & Carlin, 2006) and have higher rates of smoking (Datta et al., 2006). Neighborhood disorder (e.g. crime, drugs, vandalism, graffiti, danger, noise, and dirt) has been found to increase levels of mistrust and fear of victimization in residents (Ross & Jang, 2000). A relationship has also been identified between disadvantaged neighborhoods and smoking, such that individuals in poorer neighborhoods smoke at higher rates, even after adjusting for individual poverty, household income, and education (Ross, 2000). Furthermore, Duncan, Jones, and Moon (1999) found that being of lower socioeconomic status (individual factor), as well as neighborhood deprivation (group factor), both played a role in the shaping of increased smoking behavior within disadvantaged neighborhoods. No research has looked to determine if residing in a disadvantaged neighborhood mediates the relationship between socioeconomic status and smoking.

The Present Study

Stress-related variables play a number of different roles in influencing health outcomes for individuals across the socioeconomic status gradient. Stress-related variables including financial strain, discrimination, depression, neighborhood disorder, and perceived stress have been linked to specific health behaviors and outcomes, such as smoking. At the same time, a number of studies have also identified associations between socioeconomic status and the stress variables. However, little research has identified how these stress variables may be mediating the relationship between socioeconomic status and smoking. While there has been a prominent increase in the amount of research focusing on socioeconomic status and health, we are just

beginning to understand the underlying mechanisms by which socioeconomic status exerts an effect on health behaviors and outcomes. Using the conceptual models proposed by Adler and Ostrove (1999) and Gallo and Matthews (2003) as a framework for understanding the underlying pathways linking socioeconomic status and health, the current study looked to determine in a purely exploratory nature which stress-related variables may mediate the relationship between socioeconomic status and smoking. The current study consisted of two specific aims, 1) to identify stress variables that mediate the relationship between socioeconomic status and smoking status (smoker vs. non-smoker), and 2) to identify stress variables that mediate the relationship between socioeconomic status and weekly cigarettes smoked per day in a subsample of participants who identified as weekly smokers. Additionally, for aim 2 we looked to identify stress variables that mediate the relationship between socioeconomic status and cigarettes smoked per day (CPD) in a subgroup of daily smokers. The goal of the current study was to explore what stress variables mediate the relationship between socioeconomic status and smoking in order to develop more effective cessation interventions that address some of the stress variables specific to individuals at certain levels of the socioeconomic status gradient.

METHODS

Participants

Power Analysis: Fritz and Mackinnon (2007) conducted a review of the six most common methods for performing a power analysis for a simple mediation. They then ran simulations to determine lower limit estimates for achieving a power of 0.8 in regards to specific effect sizes. To be conservative the present study used sample size cut-offs associated with medium effects. A sample size between 78 (percentile bootstrap method) and 71 (bias-corrected bootstrap method) participants was found to achieve a power of 0.8 and a standardized regression coefficient of 0.39, signifying a medium size effect comparable to a Cohen's *d* medium effect. For the current study the bias-corrected bootstrap method was implemented to generate confidence intervals for indirect effects in our mediation analyses.

Recruitment: Participants were recruited in the Dallas metropolitan area through print advertisement in local newspapers (e.g. Dallas Morning News), advertising circulars (e.g. Greensheet), and flyers on University of Texas (UT) Southwestern campus. Participants completed a telephone screener and if eligible were invited for an initial visit. A telephone number was included on all advertisements so that interested participants could call to find out more information and if interested could be screened to see if they were eligible.

Criteria for eligibility: In order for a participant to be eligible they must have 1) earned a score ≥ 45 on the REALM indicating $> 6^{th}$ grade English literacy level, 2) have been ≥ 18 years of age, and 3) possessed a valid home address and a functioning home telephone number.

Criteria for exclusion: Individuals were excluded from the study if they: 1) earned a score < 45 on the REALM indicating $\leq 6^{th}$ grade English literacy level, 2) were < 18 years of age, or 3) did not possess a valid home address and a functioning home telephone number. If participants

came in for their initial visit and were excluded (score lower than 45 on the REALM) they were compensated with a $20 gift card and a $2 parking token (if needed).

Sample characteristics: Participants ($N = 238$) were adults from the Dallas metropolitan area. The sample was primarily female (67.6%) and African American (51.7%). A majority of the sample reported being non-smokers ($n = 164$). Participants who identified as being current smokers at baseline ($n = 74$) reported smoking 9.96 ($SD = 10.79$) cigarettes per a day. In order for a participant to be considered a weekly smoker in the analyses conducted for aim 2 they must have reported smoking at least one day over the course of the data collection week. For a participant to be considered a daily smoker in the analyses conducted for aim 2 they must have reported smoking at least one cigarette each day over the course of the data collection week. On average participants who were weekly smokers ($n = 73$) reported smoking 49.23 ($SD = 41.67$) cigarettes per week and participants who were daily smokers ($n = 51$) reported smoking 8.66 ($SD = 6.09$) per day. Overall participants reported an average of 13.75 ($SD = 2.42$) years of education completed and a majority reported at least part time employment ($n = 57.1$). Reported family income ranged from less than $5,000 (24.4%) to $100,00 or greater (7.6%) a year.

Study Procedure

Funding: The archival data set that the current study is drawing from was supported primarily by American Cancer Society grant MRSGT-10-104-01-CPHPS (to Darla E. Kendzor, PhD) as well as additional funding from American Cancer Society grant MRSGT-12-114-01-CPPB (to Michael S. Businelle, PhD) and MD Anderson Cancer Center Support Grant (CA016672). Data collection was conducted at the UT Southwestern campus and was overseen by Darla E. Kendzor, PhD and Michael S. Businelle, PhD.

Screener: Participants contacted by the researchers completed the screener questionnaire. The screener questionnaire included date of birth, English language competency (i.e., ability to read, speak, and understand English), and contact information (i.e., name, phone number, home address). If potential participants were deemed eligible they were invited to the initial visit at the UT Southwestern campus.

Initial visit: First, details of the study were reviewed with participants and consent was obtained. Participants who had any questions were allowed to discuss them with the researcher in a private room prior to deciding if they wanted to participate. If eligible (≥ 45 on the REALM), participants were then asked to complete study questionnaires on a laptop on the 7th and 8th floor of the UT Southwestern School of Health Professions building. Height, weight, and expired carbon monoxide were all measured. Participants were then given a smart phone and an accelerometer and were instructed on how to use both devices. For the purpose of our study we only observed data collected from the smart phones and the QDS questionnaires completed at the initial visit, but not the accelerometer. The initial visit took approximately two hours to complete and participants were provided with food and beverages as well as breaks when needed. Upon completion of the initial visit eligible participants then received a $50 gift card and a $2 parking token if needed.

Ecological momentary assessment (EMA) procedure: Smart phones were distributed at the initial visit and returned several days later at the final visit. Participants were taught how to use the smartphone at the initial visit. EMA methodology followed the works of Shiffman and colleagues (Shiffman et al., 1997; Shiffman, Paty, Gnys, Kassel, & Hickcox, 1996). Participants were asked to record the number of cigarettes smoked every day on the smart phone.

Final visit: Participants returned to the UT Southwestern School of Health Professions for their final visit to return their smart phone, complete several questions pertaining to their EMA participation experience, and collect their final compensation. Depending on how many of the EMA assessments participants completed they had an opportunity to earn up to $80 for EMA assessments and returning the smart phone. Participants could earn a $40 gift card for completing 50%-64% of the assessments, $60 gift card for completing %65-79% of the assessments, and an $80 gift card for completing %80 or more of the assessments. If a participant completed less than 20% of assessments they were compensated with a $20 gift card. All participants were also given a $2 parking token if needed.

Compensation: Participants could earn $50 for the initial visit in gift cards, up to $80 in gift cards for completion of EMA assessments (random and daily diary, at least 80%) and the return of phone and accelerometer. Up to $130 could be earned in total. Participants who came in for the initial visit, but were not eligible received a $20 gift card and a $2 parking token if needed (Information regarding the study procedure and participant recruitment was obtained from the University of Texas Southwestern Medical Center (UTSW) Institutional Review Board (IRB) protocol #STU 042012-054). Additionally, an action on exemption approval request was approved by the Louisiana State University (LSU) IRB, protocol #E10482 (See Appendix I for IRB Approval).

Measures and Materials

All participants completed stress-related questionnaires at the initial visit using the QDS program, a locked and password-protected program, on one of the study laptops at the UT Southwestern campus. See EMA procedure for more information on the collection of reported cigarettes smoked between the initial and final visit.

Socioeconomic Status Indicator

Education, occupation, and income are all well established traditional indicators of socioeconomic status and each display distinct information (Matthews & Gallo, 2011). For this study we used years of education as the primary indicator of socioeconomic status. Using years of education as an indicator of socioeconomic status has advantages such that individuals do not need to be currently working, it is less likely to be inaccurately reported, and occurs prior to the onset of health problems limiting the likelihood of reverse causation (Matthews & Gallo, 2011). Limitations of using other indicators such as occupation and income include that individuals currently not in the work force are excluded when using occupation and when using income there is more of a possibility of under or over-reporting (Matthews & Gallo, 2011). There are also some limitations of using education as a socioeconomic status indicator including fewer categories and typically the quality of the education is not documented, which can vary (Matthews & Gallo, 2011). However, a clear socioeconomic status gradient has been identified between education attainment and health factors, including smoking, when compared to occupational status and income as alternative indicators (Winkleby, Jatulis, Frank, & Fortmann, 1992). Education attainment has also been found to greatly influence smoking cessation with lower education levels having the worst cessation outcomes (Wetter et al., 2005). Additionally, past research that has tested the reserve capacity model has used education as a primary indicator of socioeconomic status (Gallo et al., 2007; Matthews et al., 2008).

Stress Measures

Financial Strain Questionnaire (Pearlin, Menaghan, Lieberman, & Mullan, 1981). The Financial Strain Questionnaire is a 9-item self-report questionnaire with a rating scale from one to three. Scores range from 9 to 27 with higher scores indicating greater financial strain. Pearlin

et al. (1981) reported confidence in the reliability and validity of the Financial Strain Questionnaire upon conducting a confirmatory factor analysis (CFA). Since no Cronbach's alpha could be found in past literature for the Financial Strain Questionnaire we calculated the internal consistency of this measure to determine if it was a reliable measure. (See Appendix C for the Financial Strain Questionnaire).

Detroit Area Study Assessment of Day-to-Day Discrimination (John D. and Katherine T. MacArthur Foundation, 2008). The Detroit Area Study Assessment of Day-to-Day Discrimination questionnaire is a 10-item self-report measure of day-to-day discrimination with a rating scale from one to six. Scores range from 9 to 54 with higher scores indicating higher frequency of discriminatory events (e.g., treated with less respect, threatened or harassed, people act as if they are afraid of you). The final item assesses the main reason for the discrimination experienced and can be skipped if the individual reports no discriminatory events. The Detroit Area Study Assessment of Day-to-Day Discrimination questionnaire has been found to have good reliability with a reported Cronbach's alpha coefficient of 0.80 as well as great validity as it is positively correlated with negative affect ($r = 0.37$, $p < 0.01$), social conflict ($r = 0.30$, $p < 0.05$), and perceived stress ($r = 0.39$, $p < 0.05$) (See Appendix D for the Detroit Area Study Assessment of Day-to-Day Discrimination questionnaire).

Urban Life Stress Scale (Jaffee et al., 2005). The Urban Life Stress Scale is a 21-item self-report measure that assesses potential chronic stress experienced day-to-day by individuals in medium to large cities. The amount of stress is measured on a 5-point scale ranging from 1, "no stress at all", to 5 "extremely stressful – more than I can handle". Prior research has indicated that the Urban Life Stress Scale has adequate reliability and validity (Sanders-Phillips, 1995)(See Appendix E for the Urban Life Stress Scale).

Perceived Stress Scale (S. Cohen, Kamarck, & Mermelstein, 1983). The Perceived Stress Scale is a 4-item self-report questionnaire that measures perceived stress over the course of the past week. The rating scale ranges from 0, "never, to 4 "very often", with higher scores representing greater perceived stress. The Perceived Stress Scale has been found to have good reliability with a reported coefficient alpha of 0.85. Good concurrent validity has been established between the Center for Epidemiological Studies Depression measure and the Perceived Stress Scale ($r = 0.38$, $p < 0.01$) as they have overlapping operational definitions of depression and stress, but independently predict physical symptomatology (See Appendix F for the Perceived Stress Scale).

Affect Measure

Center for Epidemiological Studies Depression (Radloff, 1977): The Center for Epidemiological Studies Depression measure is a 20-item self-report measure that assesses depressive symptoms over the course of the past week. Items are rated on a 4-point scale ranging from 0, "rarely", to 3, "most of the time". Scores range from 0 to 60 and scores greater than 16 are indicative of clinically significant distress. The Center for Epidemiological Studies Depression measure has been found to have great internal consistency ranging from .85 in the general population to .90 in a patient sample. The Center for Epidemiological Studies Depression measure has also been found to have great discriminant validity correlating positively with the Symptom Checklist-90 ($r = 0.83$, $p < 0.05$) (See Appendix G for the Center for Epidemiological Studies Depression measure).

Neighborhood Perceptions Measure

Perceived Neighborhood Disorder and Decay (Ross & Mirowsky, 1999). The Perceived Neighborhood Disorder and Decay questionnaire is a 15-item self-report measure that assesses

neighborhood physical and social disorder. Items are rated on a 4-point scale ranging from, 1, "strongly disagree", to 4, "strongly agree". Higher scores represent greater disorder and decay. The Perceived Neighborhood Disorder and Decay questionnaire has been found to have excellent validity and reliability with a reported coefficient alpha of 0.921 (See Appendix H for the Perceived Neighborhood Disorder and Decay questionnaire).

Study Design

Since research identifying underlying causal pathways between socioeconomic status and health behaviors is just beginning to emerge we conducted exploratory analyses with no specific hypotheses with regards to which stress variables (environmental or psychological) we may presume to be most important. The conceptual models proposed by Adler and Ostrove (1999) and Gallo and Matthews (2003) provide a framework for the current study as these models identify possible underlying pathways linking socioeconomic status and health behaviors. However, these conceptual models should not be interpreted as absolute truths as underlying relationships linking socioeconomic status and health may be far more complex. There inclusion is purely to emphasize the possibility of there being underlying variables linking socioeconomic status and health behaviors.

The current study had two general aims, both of which were exploratory. The first aim was to identify stress-related variables that mediate the relationship between socioeconomic status and smoking status (smoker vs. non-smoker). The second aim was to identify stress-related variables that mediate the relationship between socioeconomic status and number of cigarettes smoked per week as well as per a day in a subsample of weekly and daily smokers. For both of these aims we looked at the individual indirect effect of each stress-variable to determine which variables significantly mediate this relationship. If multiple stress-variables were found to

be significant mediators we would include them all in a multiple mediator model to determine if any of them accounted for unique variance above and beyond the others.

Aim 1 Design

For aim 1 we used a cross-sectional design to identify pathways linking socioeconomic status and smoking status. Stress-related variables were looked at individually to determine which variables partially or fully mediate the relationship between socioeconomic status and smoking status. While causality cannot be determined using a cross-sectional design, this set of analyses allows for future research to have a better understanding of which stress-related variables are of greatest importance in regards to socioeconomic status and smoking status.

Aim 2 Design

For aim 2 we used a longitudinal design to identify stress-related variables linking socioeconomic status and cigarettes smoked per week as well as cigarettes smoked per day. Questionnaires measuring stress constructs were completed at the initial visit. Participants then carried their assigned smartphones for the following week and report daily how many cigarettes they smoked. For this analysis we used a subsample of participants who smoked at least one cigarette over the course of the week and a subgroup of this subsample of participants who reported smoking everyday over the course of the week.

Statistical Procedure

Prior to conducting the statistical procedures for aim 1 and aim 2 we conducted several analyses to clean the data and to determine the reliability of the measures included. Reliability information for the Financial Strain Questionnaire could not be located and for this reason we employed the Statistical Package for the Social Sciences (SPSS) version 24 to determine the reliability of this measure. We also ran a correlation matrix to determine if any basic

demographic information (gender, age, etc.) was correlated with our outcome variables and needed to be controlled for in our models.

The PROCESS Macro developed by Hayes (2015) was employed to conduct all mediation analyses through SPSS. The simple mediation model (model 4), as outlined by Hayes (2013), allowed us to identify stress variables that mediate the relationship between socioeconomic status and smoking. Model 4 uses an ordinary least squares (OLS) regression-based path analysis to identify indirect effects of an independent variable (X) on an outcome variable (Y) through a mediating variable (M) (Hayes, 2013). In the current study we were looking to assess the indirect effect of socioeconomic status (X) on smoking (Y) through chosen stress variables (M). While multiple mediators can be included in a single model, for the current study we looked at the individual indirect effect of each stress variable on smoking. Bias-corrected bootstrapped confidence intervals (5000 bootstrap samples) were implemented to determine significance of the indirect effect in all mediation analyses conducted. Bias-corrected bootstrapping is the process of repeated resampling (in the current study 5000 samples) with replacement from the original sample, which allows for the *a* path and *b* path in a mediation model to be estimated from this built sampling distribution (Hayes, 2009). Bootstrapping is being used more frequently as a more powerful way to test the indirect effect of mediating variables and has several advantages over traditional inferential tests with the most prominent being that it does not assume that the shape of the sampling distribution is normal (Hayes, 2009).

RESULTS

Measures

Reliability: The Financial Strain Questionnaire consisted of 9-items and showed excellent internal reliability ($\alpha = 0.917$). The Detroit Area Study Assessment of Day-to-Day Discrimination questionnaire consisted of 10-items and showed good internal reliability ($\alpha = 0.808$). The Urban Life Stress Scale consisted of 21-items and showed excellent internal reliability ($\alpha = 0.901$). The Perceived Stress Scale consisted of 4-items and showed questionable internal reliability ($\alpha = 0.687$). The Center for Epidemiological Studies Depression measure consisted of 20-items and showed excellent internal reliability ($\alpha = 0.918$). The Perceived Neighborhood Disorder and Decay questionnaire consisted of 15-items and showed poor internal reliability ($\alpha = 0.421$). These measures were used as predictor variables in the analyses for aim 1 and aim 2.

Aim 1

Correlations: Education, the indicator of socioeconomic status used in the current study, was negatively correlated with all hypothesized mediators including financial strain ($r = -0.457$, $p < 0.001$), discrimination ($r = -0.332$, $p < 0.001$), urban life stress ($r = -0.336$, $p < 0.001$), perceived stress ($r = -0.284$, $p < 0.001$), depression ($r = -0.291$, $p < 0.001$), and neighborhood disorder ($r = -0.315$, $p < 0.001$). Additionally, education was negatively correlated with smoking status ($r = -0.351$, $p < 0.001$). Demographic variables including age ($r = 0.182$, $p < 0.01$), race ($r = 0.250$, $p < 0.001$), and gender ($r = -0.137$, $p < 0.05$) were all significantly correlated with smoking status. Correlations among study variables for aim 1 are presented in Table 1.

Table 1. Aim 1 correlations among study variables ($N = 238$)

	1	2	3	4	5	6	7	8	9	10
1.Age	-	-	-	-	-	-	-	-	-	-
2.Race[1]	0.093	-	-	-	-	-	-	-	-	-
3.Gender[2]	0.016	0.046	-	-	-	-	-	-	-	-
4.Education	-0.281***	-0.356**	0.065	-	-	-	-	-	-	-
5.FinancialStrain	0.247***	0.203**	-0.053	-0.457***	-	-	-	-	-	-
6.Discrimination	0.191**	0.200**	-0.089	-0.332***	0.339***	-	-	-	-	-
7.UrbanLifeStress	0.166*	0.008	-0.029	-0.336***	0.544***	0.490***	-	-	-	-
8.PerceivedStress	0.071	0.001	-0.066	-0.284***	0.465***	0.350***	0.609***	-	-	-
9.Depression	0.054	0.028	-0.016	-0.291***	0.416***	0.381***	0.652***	0.724***	-	-
10.NeighborhoodDisorder	0.109	-0.006	-0.049	-0.315***	0.413***	0.356***	0.469***	0.404***	0.324***	-
11.SmokingStatus[3]	0.182**	0.250***	-0.137*	-0.351***	0.325***	0.131*	0.125	0.091	0.157*	0.211***

[1] Non-Hispanic White = 0, Hispanic/Non-White = 1
[2] Male = 0, Female = 1
[3] Non-Smoker = 0, Smoker = 1
*$p < .05$; **$p < .01$; ***$p < 0.001$

Mediations: For aim 1 the PROCESS Macro developed by Hayes (2015) was employed to conduct all mediation analyses through SPSS. We used the simple mediation model (model 4), as outlined by Hayes (2013), to conduct our cross-sectional design mediations, identifying stress variables that mediate the relationship between socioeconomic status and smoking. Model 4 uses an ordinary least squares (OLS) regression-based path analysis to identify indirect effects of an independent variable (X) on an outcome variable (Y) through a mediating variable (M) (Hayes, 2013). Specifically, we looked at the indirect effect of socioeconomic status (X) on smoking status (Y) through chosen stress variables (M).

Analyses revealed a significant indirect effect of socioeconomic status on smoking status through financial strain ($b = -0.092$, 95% CI [-0.167, -0.030]). Specifically, lower socioeconomic status predicted greater financial strain, which in turn predicted a greater probability of being a smoker. Furthermore, when covariates (age, race, and gender) were included into the model,

financial strain was still a significant mediator of this relationship ($b = -0.073$, 95% CI [-0.147, -0.013]). No other stress-related variables mediated the relationship between socioeconomic status and smoking status. Results of the mediation models for aim 1 are presented in Table 2.

Table 2. Mediation models linking SES with smoking status.

Mediator	X→M (a path)			M→Y (b path)			X→Y (c´ path/direct effect)			X→M→Y (ab path/indirect effect)		
	B	SE	95% CI	B	SE	95% CI	B	SE	95% CI	B	SE	95% CI
1.FinancialStrain	**-1.379**	**0.221**	**-1.815, -0.943**	**0.053**	**0.021**	**0.012, 0.094**	**-0.236**	**0.087**	**-0.406, -0.065**	**-0.073**	**0.034**	**-0.147, -0.013**
2.Discrimination	**-1.107**	**0.290**	**-1.678, -0.536**	-0.007	0.016	-0.037, 0.024	**-0.317**	**0.086**	**-0.486, -0.149**	0.007	0.018	-0.025, 0.047
3.UrbanLifeStress	**-1.726**	**0.327**	**-2.369, -1.082**	0.003	0.014	-0.024, 0.029	**-0.304**	**0.088**	**-0.477, -0.131**	-0.005	0.027	-0.058, 0.049
4.PerceivedStress	**-0.431**	**0.093**	**-0.614, -0.248**	-0.005	0.050	-0.103, 0.094	**-0.311**	**0.087**	**-0.483, -0.140**	0.002	0.024	-0.041, 0.054
5.Depression	**-1.471**	**0.309**	**-2.079, -0.862**	0.015	0.015	-0.014, 0.045	**-0.286**	**0.087**	**-0.457, -0.115**	-0.022	0.024	-0.072, 0.025
6.NeighborhoodDisorder	**-1.326**	**0.257**	**-1.832, -0.820**	0.034	0.019	-0.002, 0.071	**-0.277**	**0.089**	**-0.452, -0.103**	-0.046	0.028	-0.108, 0.004

Note: X = independent variable (education), M = mediator (stress variables), Y = dependent variable (smoking status; Non-Smoker = 0, Smoker = 1), B = unstandardized coefficient. Bolded values indicate statistically significant relationships ($p < .05$). Each potential mediator was evaluated separately in a model adjusted for age, race, and gender.
*Bias corrected bootstrapped confidence intervals (5000 bootstrap samples).

Aim 2

Correlations: Education, the indicator of socioeconomic status used in the current study, was negatively correlated with two of the six hypothesized mediators, financial strain ($r = -0.339$, $p < 0.01$) and perceived neighborhood disorder ($r = -0.249$, $p < 0.05$). Additionally, education was not found to be correlated with cigarettes smoked per week. Age ($r = 0.292$, $p < 0.05$) was the only demographic variable that was significantly correlated with cigarettes smoked per week. Correlations among study variables for aim 2 are presented in Table 3.

Table 3. Aim 2 correlations among study variables ($N = 73$)

	1	2	3	4	5	6	7	8	9	10
1.Age	-	-	-	-	-	-	-	-	-	-
2.Race[1]	-0.043	-	-	-	-	-	-	-	-	-
3.Gender[2]	0.063	-0.204	-	-	-	-	-	-	-	-
4.Education	-0.131	-0.103	0.082	-	-	-	-	-	-	-
5.FinancialStrain	0.198	-0.213	-0.029	-0.339**	-	-	-	-	-	-
6.Discrimination	0.015	0.158	-0.185	-0.168	0.119	-	-	-	-	-
7.UrbanLifeStress	-0.110	-0.166	0.070	-0.165	0.406***	0.319**	-	-	-	-
8.PerceivedStress	-0.090	-0.041	-0.041	-0.103	0.310**	0.305**	0.572***	-	-	-
9.Depression	-0.028	-0.018	-0.039	-0.074	0.314**	0.313**	0.713***	0.683***	-	-
10.NeighborhoodDisorder	0.041	-0.077	0.107	-0.249*	0.180	0.290*	0.297*	0.207	0.142	-
11.Cigarettes Per Week	0.292*	-0.224	0.153	-0.141	0.285*	0.258*	0.347**	0.257*	0.408***	0.319**

[1] Non-Hispanic White = 0, Hispanic/Non-White = 1
[2] Male = 0, Female = 1
*$p < .05$; **$p < .01$; ***$p < 0.001$

Mediations: For aim 2 the PROCESS Macro developed by Hayes (2015) was employed to conduct all mediation analyses through SPSS. We used the simple mediation model (model 4), as outlined by Hayes (2013), to conduct our longitudinal design mediations, identifying stress variables that mediate the relationship between socioeconomic status and cigarettes smoked per week. Model 4 uses an ordinary least squares (OLS) regression-based path analysis to identify indirect effects of an independent variable (X) on an outcome variable (Y) through a mediating variable (M) (Hayes, 2013). Specifically, we looked at the indirect effect of socioeconomic status (X) on cigarettes smoked per week (Y) through chosen stress variables (M).

Analyses revealed a significant indirect effect of socioeconomic status on cigarettes smoked per week through financial strain ($b = -2.049$, 95% CI [-5.222, -0.321]). Specifically, lower socioeconomic status predicted greater financial strain, which in turn predicted an increased number of cigarettes smoked per week. Furthermore, when age was included into the

model as a covariate financial strain was still a significant mediator of this relationship ($b = -1.621$, 95% CI [-4.167, -0.154]). Additionally, analyses revealed a significant indirect effect of socioeconomic status on cigarettes smoked per week through perceived neighborhood disorder ($b = -1.700$, 95% CI [-4.532, -0.187]). Specifically, lower socioeconomic status predicted greater perceived neighborhood disorder, which in turn predicted an increased number of cigarettes smoked per week. Furthermore, when age was included into the model as a covariate perceived neighborhood disorder was still a significant mediator of this relationship ($b = -1.677$, 95% CI [-4.253, -0.127]). No other stress-related variables mediated the relationship between socioeconomic status and cigarettes smoked per week. Results of the mediation models for aim 2 are presented in Table 4.

Table 4. Mediation models linking SES with cigarettes smoked per week.

Mediator	X→M (a path)			M→Y (b path)			X→Y (c´ path/direct effect)			X→M→Y (ab path/indirect effect)		
	B	SE	95% CI	B	SE	95% CI	B	SE	95% CI	B	SE	95% CI
1.FinancialStrain	**-1.320**	**0.463**	**-2.244, -0.396**	1.228	0.656	-0.082, 2.537	-0.743	2.688	-6.105, 4.618	**-1.621**	**1.020**	**-4.167, -0.154**
2.Discrimination	-0.937	0.661	-2.256, 0.382	**0.985**	**0.456**	**0.075, 1.895**	-1.441	2.560	-6.548, 3.666	-0.923	1.127	-4.866, 0.305
3.UrbanLifeStress	-1.211	0.782	-2.771, 0.348	**1.285**	**0.367**	**0.5520, 2.018**	-0.807	2.444	-5.684, 4.069	-1.557	1.868	-7.700, 0.259
4.PerceivedStress	-0.186	0.189	-0.563, 0.191	**3.951**	**1.578**	**0.804, 7.098**	-1.629	2.514	-6.645, 3.386	-0.735	1.322	-5.410, 0.386
5.Depression	-0.436	0.662	-1.756, 0.885	**1.684**	**0.425**	**0.836, 2.531**	-1.631	2.361	-6.341, 3.080	-0.733	2.016	-7.123, 1.230
6.NeighborhoodDisorder	**-1.117**	**0.526**	**-2.166, -0.067**	1.502	0.564	0.376, 2.627	**-0.687**	**2.562**	**-5.798, 4.425**	**-1.677**	**1.004**	**-4.253, -0.127**

Note: X = independent variable (education), M = mediator (stress variables), Y = dependent variable (cigarettes smoked per week), B = unstandardized coefficient. Bolded values indicate statistically significant relationships ($p < .05$). Each potential mediator was evaluated separately in a model adjusted for age.
*Bias corrected bootstrapped confidence intervals (5000 bootstrap samples).

Additionally, we employed the same mediation procedures as described in aim 2 using the same independent and stress variables, but in a subgroup of daily smokers ($n = 51$). However, for this set of analyses we used daily smoking rate as the outcome variable. These analyses were conducted to determine if any of the proposed stress-related variables mediated the relationship between socioeconomic status and cigarettes smoked per day differently within in a sample of daily smokers compared to weekly smokers. However, no stress-related variables were found to mediate the relationship between socioeconomic status and cigarettes smoked per day in the subgroup of daily smokers.

CONCLUSION

Overview of Findings

The purpose of the current study was to determine whether several stress-related variables mediated the relationship between socioeconomic status and cigarette use. Specifically, whether stress-related variables mediated the relationship between socioeconomic status and smoking status as well as socioeconomic status and cigarettes smoked per week. Analyses indicated that financial strain significantly mediated the relationship between socioeconomic status and smoking status (identifying as a smoker vs. non-smoker) such that lower socioeconomic status individuals reported greater financial strain, which predicted an increased probability of being a smoker. Additionally, financial strain significantly mediated the relationship between socioeconomic status and cigarettes smoked per week such that lower socioeconomic status individuals reported greater financial strain, which predicted an increased number of reported cigarettes smoked over the course of a week. Both of these findings remained significant even when covariates were included into the models. Perceived neighborhood disorder was also found to significantly mediate the relationship between socioeconomic status and cigarettes smoked per week such that lower socioeconomic status individuals reported greater neighborhood disorder, which predicted an increased number of reported cigarettes smoked over the course of a week. Findings suggest that financial strain is an underlying mechanism by which socioeconomic status exerts an influence on smoking status as well as cigarettes smoked per week. Furthermore, findings also suggest that perceived neighborhood disorder is an underlying mechanism by which socioeconomic status exerts an influence on cigarettes smoked per week.

Financial strain's role in mediating the relationship between socioeconomic status and smoking is consistent with previous research. Intuitively, individuals of lower socioeconomic status tend to have lower gross annual incomes, which can lead to increased financial strain when compared to their higher socioeconomic status counterparts. Financial strain's relationship with cigarette use and cessation has been well documented within the literature as well. Spending on tobacco products has been determined to increase financial stress for individuals across the socioeconomic status gradient (Siahpush et al., 2003) Greater financial strain has been determined to be associated with poorer cessation outcomes (Siahpush & Carlin, 2006) and has even been found to mediate the relationship between withdrawal symptom severity and cessation (Kendzor, Businelle, Waters, Frank, & Hébert, in press). Additionally, research has found that ex-smokers experiencing financial burden are more likely to relapse (Siahpush & Carlin, 2006). Lastly, among lower socioeconomic status women the most prevalent reason for not quitting or having difficulty quitting was financial stress (Graham, 1993).

The role of neighborhood disorder and decay as a mediator of socioeconomic status and smoking rate is intuitive, yet to date no research has explicitly identified this underlying pathway. As stated prior, individuals of lower socioeconomic status tend to have lower gross annual incomes, which limits the areas where these individuals can reside. Disadvantaged neighborhoods have been found to be associated with increased tobacco advertising and marketing (Siahpush & Carlin, 2006) and have higher rates of smoking (Datta et al., 2006). Higher rates of tobacco advertising, as well as smoking rates in these neighborhoods, may lead lower socioeconomic status individuals to be more prone to engage in poorer health behaviors, such as smoking, that become normative for all living in the community (Macintyre et al., 1993; Sooman & Macintyre, 1995). Past research has also determined that individuals in poorer

neighborhoods tend to smoke at higher rates, even after adjusting for individual poverty, household income, and education (Ross, 2000).

The findings of the current study provide evidence for the role of financial strain as an underlying mechanism by which socioeconomic status exerts an influence on cigarette use. While the relationship between socioeconomic status and cigarette use is multidimensional and complex, there are clinical implications for the findings of our study. Including financial strain as a component to be targeted in cessation interventions for lower socioeconomic status individuals may be beneficial at increasing cessation rates. Notably, Kendzor et al. (2015) determined that the addition of financial incentives in exchange for biochemically verified abstinence for socioeconomically disadvantaged individuals in a cessation program significantly increased abstinence rates. Future research should look to go one step further and include a component of cessation treatment that covers financial accountability and budgeting as a way to reduce financial burden for lower socioeconomic status individuals.

Additionally, our findings supported perceived neighborhood disorder as an underlying mechanism by which socioeconomic status exerts an influence on cigarettes smoked per week. The specific clinical implications for this finding are less clear. However, from a public health standpoint this finding provides evidence that as you begin to go down the socioeconomic status gradient you tend to see increased reporting of perceived neighborhood disorder and that increased perceived neighborhood disorder is associated with increased smoking rates. Anti-smoking campaigns should focus on addressing the exploitation of tobacco advertising in these disadvantaged neighborhoods as a possible mechanism for reducing exposure and accessibility to tobacco products for this population.

Limitations

There were several limitations to the current study. First, the database used for the current study was archival and for this reason the methodological procedures for executing our aims was limited. Data for aim 1 was collected during one session and was cross-sectional. For this reason the results of aim 1 support financial strain as being a significant mediator between socioeconomic status and smoking status, yet causality cannot be determined. For aim 2, a subset of the overall sample was used to look at participants who reported smoking at least one cigarette over the course of the week that they completed their EMA daily dairy responses. The required sample size to run a simple mediation while having an adequate power (0.80) for finding a medium sized effect is 71 participants (Fritz & Mackinnon, 2007). Aim 2 included 73 participants who completed this longitudinal part of the study. For aim 2 we may have been slightly underpowered and our sample size may have resulted in the occurrence of a type II error for identifying other stress-related variables that may mediate the relationship between socioeconomic status and cigarettes smoked per week. Additionally, our exploratory analyses were very underpowered as our subgroup of daily smokers consisted of only 51 participants, which may have led to inconclusive results. While education is a commonly used indicator of socioeconomic status it should be noted that socioeconomic status is much more complex than a single variable. For this reason we consider the use of only one variable to assess socioeconomic status as another limitation of our study. Lastly, the Perceived Stress Scale and the Perceived Neighborhood Disorder and Decay questionnaire both showed poor internal reliability. The poor internal reliability of these questionnaires may have led to erroneous conclusions and the results from analyses that included these measures should be interpreted cautiously.

Future Directions

In conclusion greater financial strain was found to significantly mediate the relationship between socioeconomic status and smoking status. A similar effect was found to be true when looking at financial strain mediating the relationship between socioeconomic status and cigarettes smoked per week. Perceived neighborhood disorder was found to mediate the relationship between socioeconomic status and cigarettes smoked per week. The findings of the current study provide support for the importance of addressing financial strain within cessation programs for lower socioeconomic status individuals. Additionally, our findings provide support for the importance of addressing environmental problem that disadvantaged neighborhoods play in shaping and influencing smoking behaviors. Future research should look to determine further evidence of this relationship in a larger sample. Furthermore, cessation programs for lower socioeconomic status individuals should look to include some component that explicitly addresses financial strain as a significant factor in the perpetuation of smoking related behavior as well as its ability to act as a barrier to successful cessation. Financial strain and perceived neighborhood disorder are important factors in the maintenance of smoking behaviors for lower socioeconomic status individuals and addressing these as important components of interventions may help reduce the disparity in smoking prevalence seen across the socioeconomic status gradient.

REFERENCES

Adler, N. E., Boyce, T., Chesney, M. A., Cohen, S., Folkman, S., Kahn, R. L., & Syme, S. L. (1994). Socioeconomic-Status and Health - the Challenge of the Gradient. *American Psychologist, 49*(1), 15-24. doi:Doi 10.1037/0003-066x.49.1.15

Adler, N. E., & Ostrove, J. M. (1999). Socioeconomic status and health: What we know and what we don't. *Socioeconomic Status and Health in Industrial Nations, 896*, 3-15. doi:DOI 10.1111/j.1749-6632.1999.tb08101.x

Anda, R. F., Williamson, D. F., Escobedo, L. G., Mast, E. E., Giovino, G. A., & Remington, P. L. (1990). Depression and the dynamics of smoking: a national perspective. *Jama, 264*(12), 1541-1545.

Bell, K., Salmon, A., Bowers, M., Bell, J., & McCullough, L. (2010). Smoking, stigma and tobacco 'denormalization': Further reflections on the use of stigma as a public health tool. A commentary on Social Science & Medicine's Stigma, Prejudice, Discrimination and Health Special Issue (67: 3). *Soc Sci Med, 70*(6), 795-799; discussion 800-791. doi:10.1016/j.socscimed.2009.09.060

Bruce, M. L., Takeuchi, D. T., & Leaf, P. J. (1991). Poverty and psychiatric status. Longitudinal evidence from the New Haven Epidemiologic Catchment Area study. *Arch Gen Psychiatry, 48*(5), 470-474.

Chen, E., & Matthews, K. A. (2001). Cognitive appraisal biases: an approach to understanding the relation between socioeconomic status and cardiovascular reactivity in children. *Ann Behav Med, 23*(2), 101-111.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*(4), 385-396.

Cohen, S., Kaplan, G. A., & Salonen, J. T. (1999). The Role of Psychological Characteristics in the Relation Between Socioeconomic Status and Perceived Health1. *Journal of Applied Social Psychology, 29*(3), 445-468.

Datta, G. D., Subramanian, S. V., Colditz, G. A., Kawachi, I., Palmer, J. R., & Rosenberg, L. (2006). Individual, neighborhood, and state-level predictors of smoking among US Black women: a multilevel analysis. *Soc Sci Med, 63*(4), 1034-1044. doi:10.1016/j.socscimed.2006.03.010

Dohrenwend, B. S. (1973). Social status and stressful life events. *Journal of personality and social psychology, 28*(2), 225.

Dorsett, R., & Marsh, A. (1998). *The health trap: poverty, smoking and lone parenthood* (Vol. 855): Policy Studies Institute London.

Duncan, C., Jones, K., & Moon, G. (1999). Smoking and deprivation: are there neighbourhood effects? *Soc Sci Med, 48*(4), 497-505.

Evans, G. W., & Kantrowitz, E. (2002). Socioeconomic status and health: the potential role of environmental risk exposure. *Annu Rev Public Health, 23*, 303-331. doi:10.1146/annurev.publhealth.23.112001.112349

Evans, G. W., & Kim, P. (2010). Multiple risk exposure as a potential explanatory mechanism for the socioeconomic status-health gradient. *Ann N Y Acad Sci, 1186*, 174-189. doi:10.1111/j.1749-6632.2009.05336.x

Everson, S. A., Maty, S. C., Lynch, J. W., & Kaplan, G. A. (2002). Epidemiologic evidence for the relation between socioeconomic status and depression, obesity, and diabetes. *J Psychosom Res, 53*(4), 891-895.

Fagan, P., Shavers, V. L., Lawrence, D., Gibson, J. T., & O'Connell, M. E. (2007). Employment characteristics and socioeconomic factors associated with disparities in smoking abstinence and former smoking among U.S. workers. *J Health Care Poor Underserved, 18*(4 Suppl), 52-72. doi:10.1353/hpu.2007.0119

Feldman, P. J., & Steptoe, A. (2004). How neighborhoods and physical functioning are related: the roles of neighborhood socioeconomic status, perceived neighborhood strain, and individual health risk factors. *Ann Behav Med, 27*(2), 91-99. doi:10.1207/s15324796abm2702_3

Fergusson, D. M., Goodwin, R. D., & Horwood, L. J. (2003). Major depression and cigarette smoking: results of a 21-year longitudinal study. *Psychol Med, 33*(8), 1357-1367.

Fernandez, E., Schiaffino, A., Borrell, C., Benach, J., Ariza, C., Ramon, J. M., . . . Kunst, A. (2006). Social class, education, and smoking cessation: Long-term follow-up of patients treated at a smoking cessation unit. *Nicotine Tob Res, 8*(1), 29-36. doi:10.1080/14622200500264432

Foundation, J. D. a. K. T. M. (2008). Detroit Area Study Assessment of Day-to-Day Discrimination *Research Network on SES & Health.* Retrieved from http://www.macses.ucsf.edu/research/psychosocial/detroit.php

Fritz, M. S., & Mackinnon, D. P. (2007). Required sample size to detect the mediated effect. *Psychol Sci, 18*(3), 233-239. doi:10.1111/j.1467-9280.2007.01882.x

Gallo, L. C., Bogart, L. M., Vranceanu, A. M., & Matthews, K. A. (2005). Socioeconomic status, resources, psychological experiences, and emotional responses: a test of the reserve capacity model. *J Pers Soc Psychol, 88*(2), 386-399.

Gallo, L. C., de los Monteros, K. E., Ferent, V., Urbina, J., & Talavera, G. (2007). Education, psychosocial resources, and metabolic syndrome variables in Latinas. *Ann Behav Med, 34*(1), 14-25. doi:10.1080/08836610701495532

Gallo, L. C., & Matthews, K. A. (2003). Understanding the association between socioeconomic status and physical health: Do negative emotions play a role? *Psychological Bulletin, 129*(1), 10-51. doi:10.1037//0033-2909.129.1.10

Graham, H. (1993). *When life's a drag: women, smoking and disadvantage*: HM Stationery Office London.

Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication monographs, 76*(4), 408-420.

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*: Guilford Press.

Hayes, A. F. (2015). The PROCESS macro for SPSS and SAS.

Health, U. D. o., & Services, H. (2014). The health consequences of smoking—50 years of progress: a report of the Surgeon General. *Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 17*.

Jaffee, K. D., Liu, G. C., Canty-Mitchell, J., Amy, R., Austin, J., & Swigonski, N. (2005). Race, urban community stressors, and behavioral and emotional problems of children with special health care needs. *Psychiatric Services, 56*(1), 63-69. doi:DOI 10.1176/appi.ps.56.1.63

Jamal, A., Homa, D. M., O'Connor, E., Babb, S. D., Caraballo, R. S., Singh, T., . . . King, B. A. (2015). Current cigarette smoking among adults - United States, 2005-2014. *MMWR Morb Mortal Wkly Rep, 64*(44), 1233-1240. doi:10.15585/mmwr.mm6444a2

Keenan-Miller, D., Hammen, C. L., & Brennan, P. A. (2007). Health outcomes related to early adolescent depression. *J Adolesc Health, 41*(3), 256-262. doi:10.1016/j.jadohealth.2007.03.015

Kendzor, D. E., Businelle, M. S., Poonawalla, I. B., Cuate, E. L., Kesh, A., Rios, D. M., . . . Balis, D. S. (2015). Financial incentives for abstinence among socioeconomically disadvantaged individuals in smoking cessation treatment. *Am J Public Health, 105*(6), 1198-1205. doi:10.2105/AJPH.2014.302102

Kendzor, D. E., Businelle, M. S., Waters, A. F., Frank, S. G., & Hébert, E. T. (in press). Financial strain indirectly influences smoking cessation through withdrawal symptom severity. *Drug and Alcohol Dependence*.

Kendzor, D. E., Reitzel, L. R., Mazas, C. A., Cofta-Woerpel, L. M., Cao, Y., Ji, L., . . . Wetter, D. W. (2012). Individual- and area-level unemployment influence smoking cessation among African Americans participating in a randomized clinical trial. *Soc Sci Med, 74*(9), 1394-1401. doi:10.1016/j.socscimed.2012.01.013

Kotz, D., & West, R. (2009). Explaining the social gradient in smoking cessation: it's not in the trying, but in the succeeding. *Tob Control, 18*(1), 43-46. doi:10.1136/tc.2008.025981

Krueger, P. M., & Chang, V. W. (2008). Being poor and coping with stress: Health behaviors and the risk of death. *American Journal of Public Health, 98*(5), 889-896. doi:10.2105/Ajph.2007.114454

Lachman, M. E., & Weaver, S. L. (1998). The sense of control as a moderator of social class differences in health and well-being. *J Pers Soc Psychol, 74*(3), 763-773.

Macintyre, S., Maciver, S., & Sooman, A. (1993). Area, class and health: should we be focusing on places or people? *Journal of social policy, 22*(02), 213-234.

Matthews, K. A., & Gallo, L. C. (2011). Psychological perspectives on pathways linking socioeconomic status and physical health. *Annu Rev Psychol, 62*, 501-530. doi:10.1146/annurev.psych.031809.130711

Matthews, K. A., Gallo, L. C., & Taylor, S. E. (2010). Are psychosocial factors mediators of socioeconomic status and health connections? A progress report and blueprint for the future. *Ann N Y Acad Sci, 1186*, 146-173. doi:10.1111/j.1749-6632.2009.05332.x

Matthews, K. A., Raikkonen, K., Gallo, L., & Kuller, L. H. (2008). Association between socioeconomic status and metabolic syndrome in women: testing the reserve capacity model. *Health Psychol, 27*(5), 576-583. doi:10.1037/0278-6133.27.5.576

McLeod, J. D., & Kessler, R. C. (1990). Socioeconomic status differences in vulnerability to undesirable life events. *Journal of Health and Social Behavior*, 162-172.

Moussavi, S., Chatterji, S., Verdes, E., Tandon, A., Patel, V., & Ustun, B. (2007). Depression, chronic diseases, and decrements in health: results from the World Health Surveys. *Lancet, 370*(9590), 851-858. doi:10.1016/S0140-6736(07)61415-9

Pampel, F. C., & Rogers, R. G. (2004). Socioeconomic status, smoking, and health: a test of competing theories of cumulative advantage. *Journal of Health and Social Behavior, 45*(3), 306-321.

Parrott, A. C. (1999). Does cigarette smoking cause stress? *Am Psychol, 54*(10), 817-820.

Pearlin, L. I., Menaghan, E. G., Lieberman, M. A., & Mullan, J. T. (1981). The Stress Process. *Journal of Health and Social Behavior, 22*(4), 337-356. doi:Doi 10.2307/2136676

Radloff, L. S. (1977). The CES-D scale a self-report depression scale for research in the general population. *Applied psychological measurement, 1*(3), 385-401.

Ross, C. E. (2000). Walking, exercising, and smoking: does neighborhood matter? *Soc Sci Med, 51*(2), 265-274.

Ross, C. E., & Jang, S. J. (2000). Neighborhood disorder, fear, and mistrust: The buffering role of social ties with neighbors. *American Journal of Community Psychology, 28*(4), 401-420. doi:Doi 10.1023/A:1005137713332

Ross, C. E., & Mirowsky, J. (1999). Disorder and decay - The concept and measurement of perceived neighborhood disorder. *Urban Affairs Review, 34*(3), 412-432. doi:Doi 10.1177/10780879922184004

Sanders-Phillips, K. (1995). Correlates of health promotion behaviors in low-income Black women and Latinas. *American journal of preventive medicine, 12*(6), 450-458.

Sellers, S. L., Bonham, V., Neighbors, H. W., & Amell, J. W. (2009). Effects of racial discrimination and health behaviors on mental and physical health of middle-class African American men. *Health Educ Behav, 36*(1), 31-44. doi:10.1177/1090198106293526

Shiffman, S., Hickcox, M., Paty, J. A., Gnys, M., Richards, T., & Kassel, J. D. (1997). Individual differences in the context of smoking lapse episodes. *Addict Behav, 22*(6), 797-811.

Shiffman, S., Paty, J. A., Gnys, M., Kassel, J. A., & Hickcox, M. (1996). First lapses to smoking: Within-subjects analysis of real-time reports. *Journal of Consulting and Clinical Psychology, 64*(2), 366-379. doi:Doi 10.1037/0022-006x.64.2.366

Siahpush, M., Borland, R., & Scollo, M. (2003). Smoking and financial stress. *Tob Control, 12*(1), 60-66.

Siahpush, M., & Carlin, J. B. (2006). Financial stress, smoking cessation and relapse: results from a prospective study of an Australian national sample. *Addiction, 101*(1), 121-127. doi:10.1111/j.1360-0443.2005.01292.x

Sooman, A., & Macintyre, S. (1995). Health and perceptions of the local environment in socially contrasting neighbourhoods in Glasgow. *Health & Place, 1*(1), 15-26.

Wetter, D. W., Cofta-Gunn, L., Irvin, J. E., Fouladi, R. T., Wright, K., Daza, P., . . . Gritz, E. R. (2005). What accounts for the association of education and smoking cessation? *Prev Med, 40*(4), 452-460. doi:10.1016/j.ypmed.2004.07.001

Williams, D. R. (1999). Race, socioeconomic status, and health. The added effects of racism and discrimination. *Ann N Y Acad Sci, 896*, 173-188.

Winkleby, M. A., Jatulis, D. E., Frank, E., & Fortmann, S. P. (1992). Socioeconomic status and health: how education, income, and occupation contribute to risk factors for cardiovascular disease. *Am J Public Health, 82*(6), 816-820.

**APPENDIX A – CONCEPTUAL MODEL DEVELOPED BY ADLER AND OSTROVE (1999)**
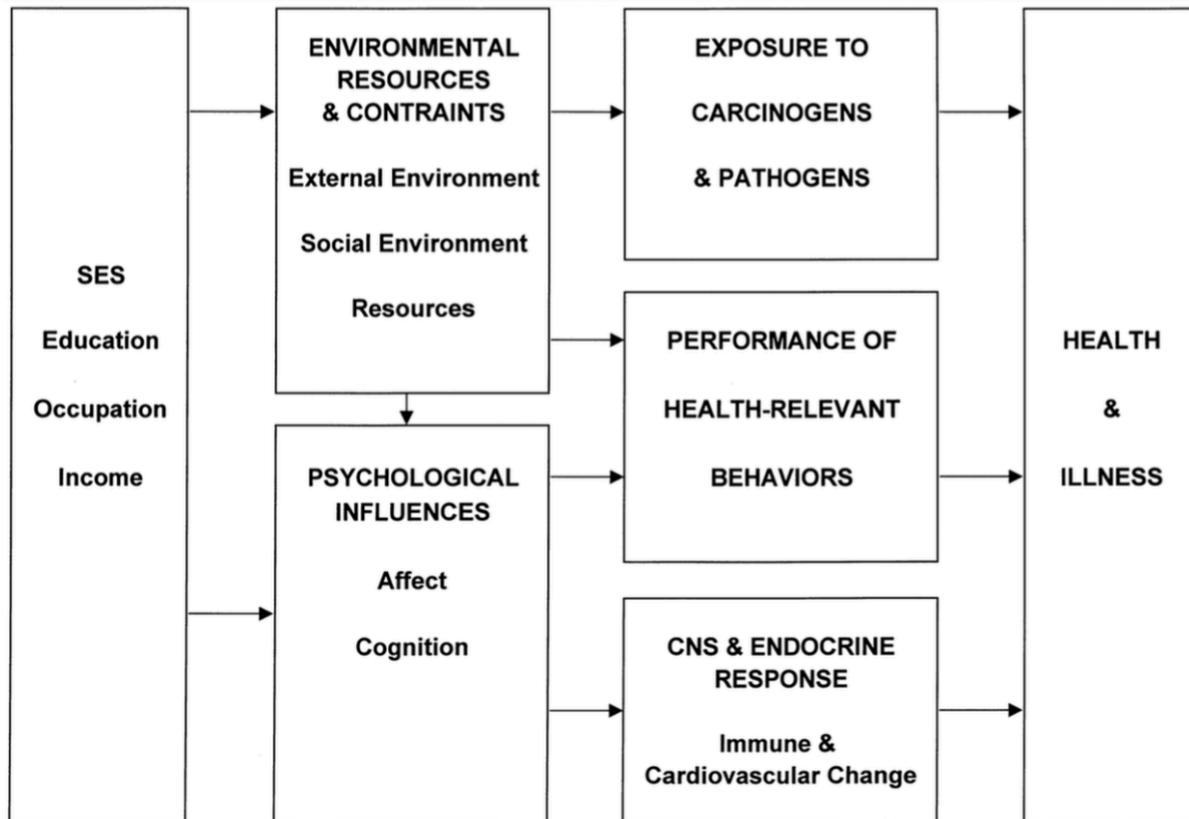

Figure 3. Adler and Ostrove (1999).
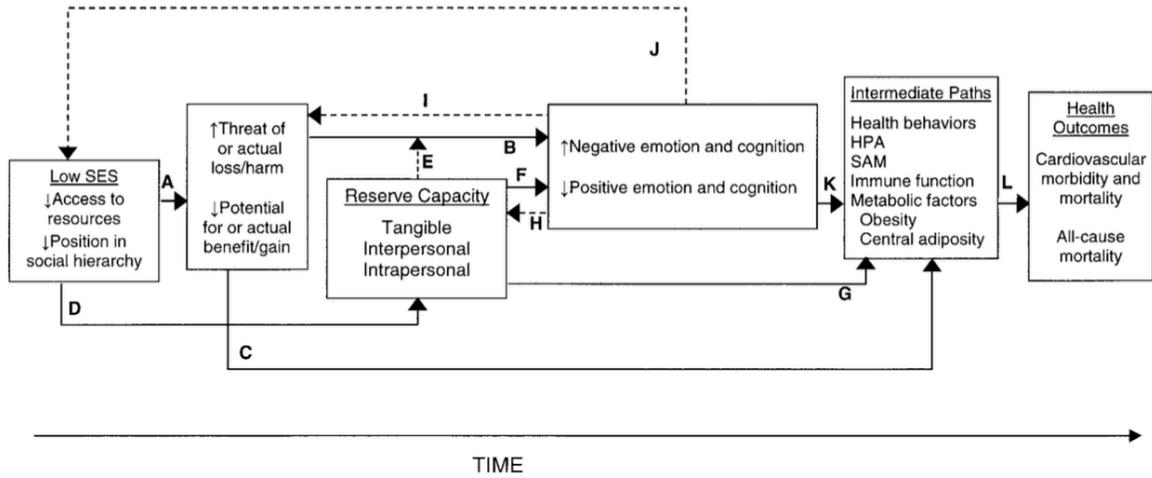
Figure 4. Gallo and Matthews (2003).

APPENDIX C – FINANCIAL STRAIN QUESTIONNAIRE

The next items concern the type of difficulty that can arise because of economic problems. Please indicate what is true for you at the present time.

1. At the present time, are you able to afford a home suitable for yourself and your family?
1=Yes, definitely
2=Yes, with some difficulty
3=Yes, with great difficulty
4=No, I cannot afford

2. At the present time, are you able to afford furniture or household equipment that needs to be replaced?
1=Yes, definitely
2=Yes, with some difficulty
3=Yes, with great difficulty
4=No, I cannot afford

3. At the present time, are you able to afford the kind of car you need?
1=Yes, definitely
2=Yes, with some difficulty
3=Yes, with great difficulty
4=No, I cannot afford

4. At the present time, are you able to afford the kind of food you and your family should have?
1=Yes, definitely
2=Yes, with some difficulty
3=Yes, with great difficulty
4=No, I cannot afford

5. At the present time, are you able to afford the kind of medical care you and your family should have?
1=Yes, definitely
2=Yes, with some difficulty
3=Yes, with great difficulty
4=No, I cannot afford

6. At the present time, are you able to afford the kind of clothing you and your family should have?
1=Yes, definitely
2=Yes, with some difficulty
3=Yes, with great difficulty
4=No, I cannot afford

7. At the present time, are you able to afford the leisure activities you and your family want?

1= Yes, definitely
2= Yes, with some difficulty
3= Yes, with great difficulty
4= No, I cannot afford

8. At the present time, do you have problems in paying your bills?

0=Yes, great deal of difficulty
1= Yes, some difficulty
2=Yes, a little difficulty
3=No difficulty

9. At the end of the month, do you have:

1=Some money left over
2=Just enough to make ends meet
3=Not enough to make ends meet

APPENDIX D – DETROIT AREA STUDY ASSESSMENT OF DAY-TO-DAY DISCRIMINATION

1. In your day-to-day life how often are you treated with less courtesy than other people because of your race, ethnicity, gender, age, religion, physical appearance, sexual orientation, or other characteristics?
    1=Almost every day
    2=At least once a week
    3=A few times a month
    4=A few times a year
    5=Less than once a year
    6=Never

2. In your day-to-day life how often are you treated with less respect than other people because of your race, ethnicity, gender, age, religion, physical appearance, sexual orientation, or other characteristics?
    1=Almost every day
    2=At least once a week
    3=A few times a month
    4=A few times a year
    5=Less than once a year
    6=Never

3. In your day-to-day life how often do you receive poorer service than other people at restaurants or stores because of your race, ethnicity, gender, age, religion, physical appearance, sexual orientation, or other characteristics?
    1=Almost every day
    2=At least once a week
    3=A few times a month
    4=A few times a year
    5=Less than once a year
    6=Never

4. In your day-to-day life how often do people act as if they think you are not smart because of your race, ethnicity, gender, age, religion, physical appearance, sexual orientation, or other characteristics?
    1=Almost every day
    2=At least once a week
    3=A few times a month
    4=A few times a year
    5=Less than once a year
    6=Never

5. In your day-to-day life how often do people act as if they are afraid of you because of your race, ethnicity, gender, age, religion, physical appearance, sexual orientation, or other characteristics?

        1= Almost every day
        2= At least once a week
        3= A few times a month
        4= A few times a year
        5= Less than once a year
        6=Never

6. In your day-to-day life how often do people act as if they think you are dishonest because of your race, ethnicity, gender, age, religion, physical appearance, sexual orientation, or other characteristics?

        1=Almost every day
        2=At least once a week
        3=A few times a month
        4=A few times a year
        5=Less than once a year
        6=Never

7. In your day-to-day life how often do people act as if they're better than you are because of your race, ethnicity, gender, age, religion, physical appearance, sexual orientation, or other characteristics?

        1=Almost every day
        2=At least once a week
        3=A few times a month
        4=A few times a year
        5=Less than once a year
        6=Never

8. In your day-to-day life how often are you called names or insulted because of your race, ethnicity, gender, age, religion, physical appearance, sexual orientation, or other characteristics?

        1=Almost every day
        2=At least once a week
        3=A few times a month
        4=A few times a year
        5=Less than once a year
        6=Never

9. In your day-to-day life how often are you threatened or harassed because of your race, ethnicity, gender, age, religion, physical appearance, sexual orientation, or other characteristics?
    1=Almost every day
    2=At least once a week
    3=A few times a month
    4=A few times a year
    5=Less than once a year
    6=Never

10. What was the main reason for the discrimination you experienced? (Skip if 1 to 9 = 6)
    1=Your age
    2=Your gender
    3=Your race
    4=Your ethnicity or nationality
    5=Your religion
    6= Your height or weight
    7= Some other aspect of your appearance
    8= A physical disability
    9= Your sexual orientation
    10= Other

APPENDIX E – URBAN LIFE STRESS SCALE

In your day to day life, how much stress do you generally experience related to the following:

1. In your day to day life, how much stress do you generally experience related to money or finances.

1=No Stress
2=Little Stress
3=Some Stress
4=A Lot Of Stress
5=Extreme Stress

2. In your day to day life, how much stress do you generally experience related to your job satisfaction.

1=No Stress
2=Little Stress
3=Some Stress
4=A Lot Of Stress
5=Extreme Stress

3. In your day to day life, how much stress do you generally experience related to raising children/being a parent.

1=No Stress
2=Little Stress
3=Some Stress
4=A Lot Of Stress
5=Extreme Stress

4. In your day to day life, how much stress do you generally experience related to death, injury, or illness of someone close.

1=No Stress
2=Little Stress
3=Some Stress
4=A Lot Of Stress
5=Extreme Stress

5. In your day to day life, how much stress do you generally experience related to housing, your living situation.

1= No Stress
2= Little Stress
3=Some Stress
4=A Lot Of Stress
5=Extreme Stress

6. In your day to day life, how much stress do you generally experience related to your physical health.

1=No Stress
2= Little Stress
3= Some Stress
4= A Lot Of Stress
5=Extreme Stress

7. In your day to day life, how much stress do you generally experience related to your neighborhood environment.

1=No Stress
2=Little Stress
3=Some Stress
4=A Lot Of Stress
5=Extreme Stress

8. In your day to day life, how much stress do you generally experience related to transportation.

1=No Stress
2=Little Stress
3=Some Stress
4=A Lot Of Stress
5=Extreme Stress

9. In your day to day life, how much stress do you generally experience related to your education.

1=No Stress
2=Little Stress
3=Some Stress
4=A Lot Of Stress
5=Extreme Stress

10. In your day to day life, how much stress do you generally experience related to marriage or romantic relationships.

1=No Stress
2=Little Stress
3=Some Stress
4=A Lot Of Stress
5=Extreme Stress

11. In your day to day life, how much stress do you generally experience related to other family problems.

1=No Stress
2=Little Stress
3=Some Stress
4=A Lot Of Stress
5=Extreme Stress

12. In your day to day life, how much stress do you generally experience related to using public services.

1=No Stress
2=Little Stress
3=Some Stress
4=A Lot Of Stress
5=Extreme Stress

13. In your day to day life, how much stress do you generally experience related to crime and violence.

1=No Stress
2=Little Stress
3=Some Stress
4=A Lot Of Stress
5=Extreme Stress

14. In your day to day life, how much stress do you generally experience related to gang activity.

1=No Stress
2=Little Stress
3=Some Stress
4=A Lot Of Stress
5=Extreme Stress

15. In your day to day life, how much stress do you generally experience related to experiences involving racism or discrimination.

1=No Stress
2=Little Stress
3=Some Stress
4=A Lot Of Stress
5=Extreme Stress

16. In your day to day life, how much stress do you generally experience related to social life, social activities.

1=No Stress
2=Little Stress
3=Some Stress
4=A Lot Of Stress
5=Extreme Stress

17. In your day to day life, how much stress do you generally experience related to drugs or alcohol.

1=No Stress
2=Little Stress
3=Some Stress
4=A Lot Of Stress
5=Extreme Stress

18. In your day to day life, how much stress do you generally experience related to communication or cultural conflicts.

1=No Stress
2=Little Stress
3=Some Stress
4=A Lot Of Stress
5=Extreme Stress

19. In your day to day life, how much stress do you generally experience related to family violence.

1=No Stress
2=Little Stress
3=Some Stress
4=A Lot Of Stress
5=Extreme Stress

20. In your day to day life, how much stress do you generally experience related to relations with racial groups not your own.

1=No Stress
2=Little Stress
3=Some Stress
4=A Lot Of Stress
5=Extreme Stress

21. In your day to day life, how much stress do you generally experience related to relations with police.

1=No Stress
2=Little Stress
3=Some Stress
4=A Lot Of Stress
5=Extreme Stress

APPENDIX F – PERCEIVED STRESS SCALE

The questions in this scale ask you about your feelings and thoughts during the last week. In each case, please choose the response that corresponds to how often you felt or thought that certain way.

1. In the last week, how often have you felt that you were unable to control the important things in your life?

0=Never
1=Almost never
2=Sometimes
3=Fairly often
4=Very often

2. In the last week, how often have you felt confident about your ability to handle your personal problems?

0=Never
1=Almost never
2=Sometimes
3=Fairly often
4=Very often

3. In the last week, how often have you felt that things were going your way?
0=Never
1=Almost never
2=Sometimes
3=Fairly often
4=Very often

4. In the last week, how often have you felt difficulties were piling up so high that you could not overcome them?
0=Never
1=Almost never
2=Sometimes
3=Fairly often
4=Very often

APPENDIX G – CENTER FOR EPIDEMIOLOGICAL STUDIES DEPRESSION

As you read each statement, ask yourself how many times during THE LAST WEEK you felt that way.

1. During the past week, I was bothered by things that usually don't bother me.
0=rarely (less than one day)
1=some of the time (1 - 2 days)
2=occasionally (3 - 4 days)
3=most of the time (5 - 7 days)

2. During the past week, I didn't feel like eating; my appetite was poor.
0=rarely (less than one day)
1=some of the time (1 - 2 days)
2=occasionally (3 - 4 days)
3=most of the time (5 - 7 days)

3. During the past week, I felt that I could not shake off the blues even with help from my friends.
0=rarely (less than one day)
1=some of the time (1 - 2 days)
2=occasionally (3 - 4 days)
3=most of the time (5 - 7 days)

4. During the past week, I felt like I was just as good as other people.
0=rarely (less than one day)
1=some of the time (1 - 2 days)
2=occasionally (3 - 4 days)
3=most of the time (5 - 7 days)

5. During the past week, I had trouble keeping my mind on what I was doing.
0=rarely (less than one day)
1=some of the time (1 - 2 days)
2=occasionally (3 - 4 days)
3=most of the time (5 - 7 days)

6. During the past week, I felt depressed.
0=rarely (less than one day)
1=some of the time (1 - 2 days)
2=occasionally (3 - 4 days)
3=most of the time (5 - 7 days)

7.   During the past week, I felt like everything I did was an effort.
0=rarely (less than one day)
1=some of the time (1 - 2 days)
2=occasionally (3 - 4 days)
3=most of the time (5 - 7 days)

8.   During the past week, I felt hopeful about the future
0= rarely (less than one day)
1= some of the time (1 - 2 days)
2= occasionally (3 - 4 days)
3=most of the time (5 - 7 days)

9.   During the past week, I thought my life had been a failure.
0=rarely (less than one day)
1=some of the time (1 - 2 days)
2=occasionally (3 - 4 days)
3=most of the time (5 - 7 days)

10. During the past week, I felt fearful.
0=rarely (less than one day)
1=some of the time (1 - 2 days)
2=occasionally (3 - 4 days)
3=most of the time (5 - 7 days)

11. During the past week, my sleep was restless.
0=rarely (less than one day)
1=some of the time (1 - 2 days)
2=occasionally (3 - 4 days)
3=most of the time (5 - 7 days)

12. During the past week, I was happy.
0=rarely (less than one day)
1=some of the time (1 - 2 days)
2=occasionally (3 - 4 days)
3=most of the time (5 - 7 days)

13. During the past week, I talked less than usual.
0=rarely (less than one day)
1=some of the time (1 - 2 days)
2=occasionally (3 - 4 days)
3=most of the time (5 - 7 days)

14. During the past week, I felt lonely.
0=rarely (less than one day)
1=some of the time (1 - 2 days)
2=occasionally (3 - 4 days)
3=most of the time (5 - 7 days)

15. During the past week, people were unfriendly.
0=rarely (less than one day)
1=some of the time (1 - 2 days)
2=occasionally (3 - 4 days)
3=most of the time (5 - 7 days)

16. During the past week, I enjoyed life.
0=rarely (less than one day)
1= some of the time (1 - 2 days)
2= occasionally (3 - 4 days)
3=most of the time (5 - 7 days)

17. During the past week, I had crying spells.
0=rarely (less than one day)
1=some of the time (1 - 2 days)
2=occasionally (3 - 4 days)
3=most of the time (5 - 7 days)

18. During the past week, I felt sad.
0=rarely (less than one day)
1=some of the time (1 - 2 days)
2=occasionally (3 - 4 days)
3=most of the time (5 - 7 days)

19. During the past week, I felt that people dislike me.
0=rarely (less than one day)
1=some of the time (1 - 2 days)
2=occasionally (3 - 4 days)
3=most of the time (5 - 7 days)

20. During the past week, I could not get "going."
0=rarely (less than one day)
1=some of the time (1 - 2 days)
2=occasionally (3 - 4 days)
3=most of the time (5 - 7 days)

APPENDIX H – PERCEIVED NEIGHBORHOOD DISORDER AND DECAY

Thinking about your neighborhood, please indicate the extent to which you agree or disagree with the following statements:

1. Indicate the extent to which you agree or disagree that: There is a lot of graffiti in my neighborhood.
1=Strongly disagree
2=Disagree
3=Agree
4=Strongly Agree

2. Indicate the extent to which you agree or disagree that: My neighborhood is noisy.
1=Strongly disagree
2=Disagree
3=Agree
4=Strongly Agree

3. Indicate the extent to which you agree or disagree that: Vandalism is common in my neighborhood.
1=Strongly disagree
2=Disagree
3=Agree
4=Strongly Agree

4. Indicate the extent to which you agree or disagree that: There are a lot of abandoned buildings in my neighborhood.
1=Strongly disagree
2=Disagree
3=Agree
4=Strongly Agree

5. Indicate the extent to which you agree or disagree that: My neighborhood is clean.
1=Strongly disagree
2=Disagree
3=Agree
4=Strongly Agree

6. Indicate the extent to which you agree or disagree that: People in my neighborhood take good care of their houses and apartments.
1=Strongly disagree
2=Disagree
3=Agree
4=Strongly Agree

7. Indicate the extent to which you agree or disagree that: There are too many people hanging around on the streets near my home.

1= Strongly disagree
2=Disagree
3=Agree
4=Strongly Agree

8. Indicate the extent to which you agree or disagree that: There is too much drug use in my neighborhood.

1=Strongly disagree
2=Disagree
3=Agree
4=Strongly Agree

9. Indicate the extent to which you agree or disagree that: There is too much alcohol use in my neighborhood.

1=Strongly disagree
2=Disagree
3=Agree
4=Strongly Agree

10. Indicate the extent to which you agree or disagree that: I'm always having trouble with my neighbors.

1=Strongly disagree
2=Disagree
3=Agree
4=Strongly Agree

11. Indicate the extent to which you agree or disagree that: There is a lot of crime in my neighborhood.

1=Strongly disagree
2=Disagree
3=Agree
4=Strongly Agree

12. Indicate the extent to which you agree or disagree that: In my neighborhood, people watch out for each other.

1=Strongly disagree
2=Disagree
3=Agree
4=Strongly Agree

13. Indicate the extent to which you agree or disagree that: The police protection in my neighborhood is adequate.
1=Strongly disagree
2=Disagree
3=Agree
4= Strongly Agree

14. Indicate the extent to which you agree or disagree that: My neighborhood is safe.
1=Strongly disagree
2=Disagree
3=Agree
4=Strongly Agree

15. Indicate the extent to which you agree or disagree that: I can trust most people in my neighborhood.
1=Strongly disagree
2=Disagree
3=Agree
4=Strongly Agree

APPENDIX I – IRB APPROVAL

ACTION ON EXEMPTION APPROVAL REQUEST

LSU

TO: Amy Copeland
Psychology

Institutional Review Board
Dr. Dennis Landin, Chair
130 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.5983
irb@lsu.edu
lsu.edu/research

FROM: Dennis Landin
Chair, Institutional Review Board

DATE: May 1, 2017

RE: **IRB#** E10482

TITLE: Identifying Stress Variables Linking Socioeconomic Status and Smoking

New Protocol/Modification/Continuation: New Protocol

Review Date: 5/1/2017

Approved_____X_____   Disapproved_____

Approval Date: 5/1/2017   **Approval Expiration Date:** 4/30/2020

Exemption Category/Paragraph: 4a

Signed Consent Waived?: N/A

Re-review frequency: (three years unless otherwise stated)

LSU Proposal Number (if applicable):

Protocol Matches Scope of Work in Grant proposal: (if applicable)

By: Dennis Landin, Chairman _____
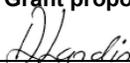
PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING –
Continuing approval is CONDITIONAL on:

1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants, including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
7. Notification of the IRB of a serious compliance failure.
8. **SPECIAL NOTE: When emailing more than one recipient, make sure you use bcc.   Approvals will automatically be closed by the IRB on the expiration date unless the PI requests a continuation.**

* *All investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at http://www.lsu.edu/irb*

VITA

Aaron F. Waters, originally from Marin County, California, completed his Bachelor of Science in Psychology from California Lutheran University (CLU) in 2014. During his time at CLU, he worked in a research lab that looked to identify predictors of resilience among college students and adults in recovery from substance use. For his undergraduate thesis he developed a brief self-administered treatment for substance users in a twelve-step based recovery program. Upon graduating CLU, Aaron worked as a neuropsychological tester for Dr. Michael F. Green at the Department of Veterans Affairs (VA) VISN 22 Mental Illness Research Education and Clinical Center (MIRECC). Aaron's interest in clinical psychology and substance use have led him to Louisiana State University where he is currently studying to complete his Doctor of Philosophy in Clinical Psychology under the supervision of Dr. Amy L. Copeland. Aaron's current research interests include the development of substance use and smoking cessation interventions for at-risk and socioeconomically disadvantaged populations.