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Inequality and Health: Stress Mediates the Relationship Between Subjective SES and Wellbeing

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INEQUALITY AND HEALTH:
STRESS MEDIATES THE RELATIONSHIP BETWEEN
SUBJECTIVE SES AND WELLBEING

By

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A Thesis Submitted in Partial Fulfillment
of the Requirements for a Degree with Honors
(Psychology)

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Abstract

Socioeconomic disadvantage is linked to a variety of health problems ranging from obesity to mental illness (Ball & Crawford, 2005; Wilkinson & Pickett, 2009). The problem lies not in the inequalities between societies, but within societies themselves (Wilkinson & Pickett, 2009). An individual's perception of his or her socioeconomic status (SES) relative to others may be more important to their health than objective measures of SES, such as income or education. Stress associated with the perception of low status could also be linked to negative health outcomes (Adler et al., 2000). In the current research, I examined the relationship between objective and subjective measures of SES, stress, and indicators of psychological and physiological wellbeing, specifically body mass index (BMI), general health, and self-esteem. Hypotheses included that both subjective and objective SES would be negatively related to stress and wellbeing, that the relationship between SES and wellbeing would be indirect, mediated by stress, and that subjective SES would be a better predictor of measures of wellbeing than objective measures of SES. These hypotheses were tested using structural equation modeling on a demographically diverse community sample of urban women. Results indicated that subjective SES was a better predictor of negative health outcomes than objective indicators of SES and that stress mediated these relationships. The findings of this study supported the hypotheses, suggesting perceived relative social position measured by subjective SES and may be a better predictor of indicators of wellbeing than objective measures of socioeconomic status.

Dedication

To my parents.

Thank you for your unfailing support, motivation,
and constant encouragement to be my best.

Acknowledgment

I would like to acknowledge Dr. Shannon McCoy, for without her continued guidance and support, this research would not have been possible.

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Inequality and Health:
Stress Mediates the Relationship Between Subjective SES and Wellbeing

“The greatest country, the richest country, is not that which has the most capitalists, monopolists, immense grabbings, vast fortunes, with its sad, sad soil of extreme degrading, damning poverty, but the land in which there are the most homesteads, freeholds—where wealth does not show such contrasts high and low, where all men have enough—a modest living—and no man is made possessor beyond the sane and beautiful necessities.”

-Walt Whitman

In society, there is a social hierarchy in which everyone has a place determined by their socioeconomic status (SES). There are the “haves” at the top of society, who have disposable income and are able to live comfortably, and the “have-nots” at the bottom, who may be struggling financially. The “have-nots” are those with low socioeconomic status. To measure one’s place, society and researchers often use material indicators of SES such as income and education level to produce an objective measure of an individual’s social class (Kraus, Piff, & Keltner, 2009; Ostrove, Adler, Kuppermann, & Washington, 2000). In 2010, a measure by the United States Census Bureau that took into account child care, transportation, medical, and utilities expenses found the national poverty rate to be 16% of the population (Tavernise & Gebeloff, 2011). However, it’s not just those in poverty who are considered to have low socioeconomic status. There may be over sixty million more households that live just above the poverty line (Herbert, 2008). Those who have low income, such as those who work at blue-collar jobs, work at a job without benefits, and who may sometimes participate in government assistance programs could also be considered to be of low socioeconomic status (Lott, 2012).

Being of low socioeconomic status is associated with a multitude of social and personal problems that extend from financial hardship. People of low SES often live in substandard housing and unsafe neighborhoods and send their children to under resourced schools (Fairchild, 1984). Down the road, it can be more difficult for a child from a low SES family to get into college than a child who grew up in an affluent family (Lott, 2012). In 2009, eighteen million households lacked access to adequate food and the diets of these households consisted of inexpensive, unhealthy foods that can lead to obesity (Lott, 2012). Obesity is a serious health problem among the socioeconomically disadvantaged (Ball & Crawford, 2005) and is unfortunately not the only threat to health and wellbeing. In women, low SES is associated with health issues such as hypertension, heart disease, cervical cancer, and other chronic health conditions (Adler & Coriell, 1997) and low SES among older adults is related to higher rates of many types of psychological and physical disorders (Estes, 1995). It is also more difficult for people of low SES to afford the high costs of health insurance which can negatively impact health and wellbeing (National Center for Health Statistics, 1995).

A massive research endeavor called the Whitehall II study (Marmot et al., 1991) examined health indicators among a group of over 10,000 British civil servants in relation to their job status over many years. The study found that men and women working at low status jobs in the British civil service had higher mortality rates and were at higher risk for heart disease, back pain, cancers, depression, suicide, and overall ill-health than those working at high status jobs. The higher status job an individual had, the less risk he or she faced for these chronic health problems. The study also accounted for factors that may only affect certain SES groups, such as the fact that those in lower status jobs may

be more likely to smoke and have less leisure time. There were no fundamental differences in access to care between the SES groups because of England's utilization of a public healthcare system. Astonishingly, even after controlling for these potential variables, the gradient between status and health continued to exist. Clearly, there is something else contributing to the relationship between socioeconomic status and health. Other research by Marmot, Shipley, and Rose (1984) indicated similar relationships between health and social class. They found that higher socioeconomic status is associated with better health across all levels of social class, from the lowest classes to the middle class and all the way up to the very highest social class (Marmot et al., 1984) which suggests that the relationship between health and SES is more complex than just meeting a person's basic health and survival needs (Operario, Adler, & Williams, 2004).

The answer may lie not in a person's objective socioeconomic status, but in a person's status in relation to others. Income inequality is an issue that is becoming more and more of a problem in affluent countries (Kenworthy, 2010). Someone's position in his or her country's social hierarchy is shown to be directly related to their health. "It appears that relative income or social position may be a better predictor of the social gradient in health within rich countries than are absolute material living standards" (Wilkinson & Pickett, 2009, p. 499). Wilkinson and Pickett's research examined the average life expectancy for men and women in affluent countries and found no significant relationship between national gross income per person and life expectancy. However within countries, they found that health and income level are strongly related across society. They show this in the relationship between the age-adjusted mortality rate per 10,000 people compared to the average income of United States zip codes. When

moving from the poor end of the spectrum to the rich end of the U. S. population, mortality gradually decreases at a nearly perfect linear rate. These findings illustrate that a relationship between inequality and health does exist and that the relative inequality of an individual may be a better predictor of health and wellbeing than raw income alone.

This relationship between inequality and health exists not only on an individual level, but on a societal level as well. The size of the gap between the richest and the poorest people within societies is closely correlated with the prevalence of an array of social and health problems: the bigger the gap, the more of these problems exist within the population. In research by Wilkinson and Pickett (2009), an Index of Health and Social Problems was compared to the average income per person of twenty of the top fifty richest countries in the world determined by gross national product per head. The Index included factors such as mental illness, life expectancy, infant mortality, and obesity. There was no significant relationship between scores on the Index and a country's average income per person, suggesting that an affluent country's income per person is not entirely indicative of the level of health and social problems it experiences. Wilkinson and Pickett went on to compare the Index of Health and Social Problems to the income inequality of the same countries. The level of inequality within a country was determined by ratios comparing the disparity in income between the top and bottom 20% of each country's population. They found that among rich countries, there is a correlation coefficient of .87 between inequality and the Index of Health and Social problems which indicates a very strong relationship. As inequality rises in a population, so does a multitude of negative health outcomes. It appears that the problem lies not in the inequalities in wealth between societies, but in the inequality within societies.

One reason that relative social position and inequality may be so important is because it is a natural tendency of humans to compare themselves to others. Festinger's (1954) theory of social comparison states that human beings have a drive to evaluate their opinions and abilities and do so by comparing their opinions and abilities to those of others when objective means are unavailable. This tendency to make comparisons is naturally ingrained in everyone and the results of these comparisons influence a person's experiences, judgments, behaviors, and have a large impact on the self (Corcoran, Crusius, & Mussweiler, 2011). Comparisons can be made in two directions: a person can compare themselves to someone worse than themselves, called a downward comparison, or to someone better than themselves, called an upward comparison. In research by Mendes, Blascovich, Major, and Seery (2001), upward comparisons elicited threat responses in participants during a cooperative task, suggesting that comparing oneself to someone better off can be a stressful experience. The tendency to compare oneself to others, because it is so natural and powerful, could help explain why relative social position is an important component of wellbeing.

One way to evaluate a person's status relative to others is to consider his or her subjective socioeconomic status. As opposed to objective SES, subjective SES is a measure of social status that examines an individual's perception of his or her social standing relative to others rather than looking at raw factors such as income and education level. The MacArthur Scale of Subjective Social Status (Ostrove et al., 2000) is a measure used to evaluate a person's perception of his or her relative social position. This measure consists of an image of a ladder and participants are instructed to select the

rung of the ladder that indicates where they feel they stand relative to the rest of society—his or her subjective SES. (Kraus, Piff, & Keltner, 2009; see Figure 1).

Figure 1. The MacArthur Scale of Subjective Social Status

Think of this ladder as representing where people stand in their communities.

People define community in different ways; please define it in whatever way is most meaningful to you. At the **top** of the ladder are the people who have the highest standing in their community. At the **bottom** are the people who have the lowest standing in their community.

Where would you place yourself on this ladder?

Please place a large "X" on the rung where you think you stand at this time in your life, relative to other people in your community.



Research shows that subjective SES correlates with objective measures of SES such as income, education level, and occupation, but that it may also be used as an independent measure of an individual's socioeconomic status (Ostrove et al., 2000). Although a relatively newer measure of SES, this scale is a promising indicator of an individual's perception of relative social standing across various levels of socioeconomic

status (Operario et al., 2004). The ladder is a way to capture on an individual level the relative inequality that Wilkinson and Pickett (2009) studied at the societal level.

Socioeconomic Status and Health

Both objective and subjective measures of SES have been examined frequently in recent research, particularly as predictors of health. Singh-Manoux, Marmot, and Adler (2005) tested the predictive ability of both types of SES on health and change in health status using data from the Whitehall II study (Marmot et al., 1991). They found that only subjective measures of SES, not objective measures, were significantly related to health status and decline in health status over time. They concluded that subjective SES using the MacArthur Scale of Subjective Social Status is a better predictor than objective measures of SES of health status and decline in health status over time in middle aged adults.

A study by Adler, Epel, Castellazzo, and Ickovics (2000) also examined the relationships between objective SES and subjective SES and a variety of psychological and physiological variables in a sample of women. The study found that subjective SES was significantly correlated with a number of physiological and psychological variables. Individuals that ranked themselves more highly on the subjective ladder, indicating higher subjective SES, had better self-rated health, a smaller waist-to-hip ratio, and a lower heart rate (Adler et al., 2000). Subjective SES was more strongly correlated than objective SES with all psychological and physiological health indicators. Adler and colleagues theorize that subjective SES takes into account an individual's past and future social status and is therefore a better synthesis of the elements that contribute to a

person's SES. In an extension of this research I hypothesize that subjective SES may capture perceived relative inequality and may lead to negative outcomes due to increased stress.

Socioeconomic Status and Stress

My hypothesis is consistent with the theoretical perspective of the Adler et al. (2000) study suggesting that, "low subjective SES could either increase stress directly or increase vulnerability to the effects of stress" (p. 590).

The relationship between stress, socioeconomic status, and poor health outcomes has been demonstrated in other research as well. In a study by Lantz, House, Mero, & Williams (2005), lower socioeconomic position was related to an increased exposure to more stressful life events and that higher financial stress was predictive of lower self-rated health scores over several years. This research indicates that stress is involved in the relationship between socioeconomic status and health indicators. Further, findings in research by Operario et al. (2004) suggest that increases in subjective social status may reduce psychological distress that negatively impacts an individual's health. Thus I hypothesize that those lower in SES will report greater stress, and that this relationship will be stronger for a subjective measure of SES.

Socioeconomic Status and Self-Esteem

Just as socioeconomic status reflects how society views someone, self-esteem is a reflection of how someone views him/herself (Twenge & Campbell, 2002) and thus it can be useful to examine these variables as they relate to each other. This relationship between socioeconomic status and self-esteem is also well documented in research: self-

esteem is positively correlated with SES (Malka & Miller, 2007) and in a meta-analysis by Twenge and Campbell (2002), research indicated that there was a statistically significant positive correlation between self-esteem and SES that becomes stronger as an individual gets older until decreasing after the age of retirement. Self-esteem also has a close relationship with a person's mental health (Hu, Li, & Wang, 2006) and is positively related to overall psychological wellbeing (Neff, 2011).

Research Goals and Hypotheses

The current research examines the relationship between socioeconomic status (both objective and subjective) and indicators of wellbeing, specifically stress, body mass index (BMI), general health, and self-esteem. The goal of this study is to better understand the relationship that exists between these variables, as the research mentioned previously has shown that there are links existing between them. Understanding these relationships could be valuable in determining which type of socioeconomic status measures are most predictive of an individual's wellbeing and potentially offer insight on how to intervene in or prevent negative health outcomes as a product of these variables.

Hypotheses included that both subjective SES, measured by the MacArthur Scale of Subjective Social Status (Ostrove et al., 2000), and objective SES, measured by income and level of education, would be negatively related to indicators of wellbeing and stress. I predicted that the effect of SES on wellbeing would be an indirect effect, mediated by stress. Finally, I hypothesized that subjective SES would be a better predictor of all measures of wellbeing than objective measures of SES or a combined measure of SES.

Method

Participants and Procedure

A racially and socioeconomically diverse group of urban women from the San Francisco Bay Area of California with ages ranging from 19 to 64 years of age ($N=597$, $M_{age}=28.39$, $SD=2.73$, Race: 58.3% White; see Table 1) were recruited to participate in this online study via a variety of methods including flyers in community centers, newspaper advertisements, and Craigslist posts. Participants reported demographic information (including measures of objective and subjective socioeconomic status and height and weight information that was calculated into BMI) and completed a variety of measures related to physical and psychological wellbeing. All measures, unless otherwise noted, used a 1 (strongly disagree) to 7 (strongly agree) scale for responses.

Table 1. Demographics

		(N=597)
Race		
	Latina	6.7%
	African American	6.4%
	White	58.3%
	Native American	1.0%
	Asian	18.0%
	Indian	2.4%
	Other	6.7%
Age		
	Mean (SD)	28.39 (2.73)
Education		
	Mean (SD)	4.5 (1.23)
Income		
	Mean (SD)	2.93 (1.35)

Measures

Objective SES

Participants indicated their education level on a 7 point scale (1 = some high school, 2 = high school graduate or equivalent, 3 = some college, 4 = junior college or technical college graduate, 5 = college graduate, 6 = master's degree, 7 = doctoral degree) and reported their household's yearly income (including the income of a spouse or partner) on a 6 point scale (0 = lowest through \$15,000, 1 = \$15,001 – \$25,000, 2 = \$25,001 - \$35,000, 3 = \$35,001 - \$50,000, 4 = \$50,001 – \$75,000, 5 = \$75,001 - \$100,000, 6 = \$100,001 – highest) as used in previous studies (Adler et al., 2000).

Subjective SES

Participants were given the MacArthur Scale of Subjective Social Status, a measure where they rank themselves on a ladder relative to other members of their community, where higher rungs represented increasing levels of income, occupational status, and education level (Adler et al., 2000); see Figure 2)

Stress

Participants completed Cohen's (1983) Perceived Stress Scale (10 items; e.g. "In the last month, how often have you felt that things were going your way?"; $\alpha=.91$; STRESS).

Body Mass Index

Participants' self reported height and weight were calculated into a BMI score, where $BMI = [\text{weight in pounds} / (\text{height in inches} \times \text{height in inches})] \times 703$.

Physical Health

Participants reported their current health status on three subscales from the Short Form (36) Health Survey (SF-36; Ware & Sherbourne, 1992): limitations to physical functioning (10 items; “climbing one flight of stairs”; $\alpha=.89$; PF), general health (5 items; “My health is excellent”; $\alpha=.71$; GH), and experience of physical pain (2 items; “How much bodily pain have you had in the last 4 weeks?”; $\alpha=.79$; PAIN). These three measures were used to create my latent variable of health.

Self-Esteem

Participants’ responses on Rosenberg’s (1965) global self-esteem scale (10 items; e.g. “I feel that I am a person of worth, at least on an equal basis with others.”; $\alpha=.89$; ROSE) and 2 subscales from Heatherton and Polivy’s (1991) self-esteem scale: performance (“I feel confident about my abilities”; PSE; $\alpha=.83$; PERF) and social (“I am worried about what other people think of me”; SSE; $\alpha=.90$; SOC) created the latent self-esteem variable.

Results

Preliminary Analyses. Descriptive statistics and correlations are presented in Table 2. The correlations between subjective SES and measures of wellbeing were stronger and more frequent than the correlations between objective SES measures (level of education and income) and measures of wellbeing. In fact, income category had no significant correlations with any of the wellbeing measures. This suggested right away that subjective SES may have more meaningful relationships in the models. Subjective SES, income, and education level were all significantly correlated with one another.

Subjective SES and education level were also significantly negatively correlated with stress, although education level was not as strongly correlated with stress as subjective SES. Income category and stress were not significantly related to one another. When examining the correlations, it was also apparent that stress was significantly related to all other measures of wellbeing, including BMI. Interestingly, no measure of SES was significantly correlated with BMI. This preliminary analyses suggested relationships in the data that would be consistent with hypotheses if they were reflected in the models.

Table 2. Correlations and Descriptive Statistics

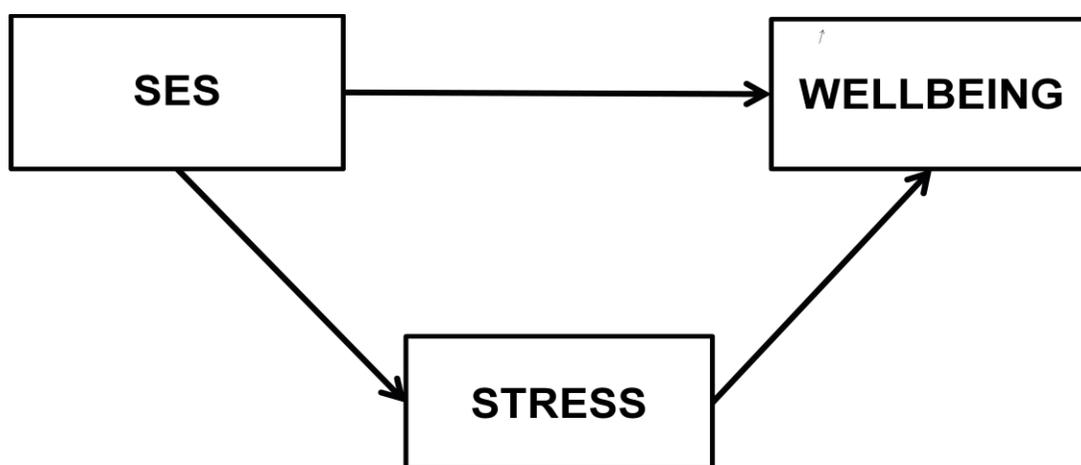
	1	2	3	4	5	6	7	8	9	10	11
1. Subjective SES	–	.26***	.24***	-.23***	-.06	.25***	.28***	.17***	.08	.09*	.05
2. Education Level		–	.20***	-.09*	-.06	.07	.19***	-.01	-.01	.10*	.09*
3. Income Category			–	-.13	.00	.02	.04	.06	.01	.09	.01
4. Perceived Stress				–	.09*	-.56***	-.55***	-.54***	-.31***	-.43***	-.14**
5. BMI					–	-.08	-.01	-.08	-.11*	-.18***	-.20***
6. Rosenberg Self-Esteem						–	.75***	.68***	.19***	.34***	.07
7. Performance Self-Esteem							–	.60***	.20***	.29***	.08
8. Social Self-Esteem								–	.20***	.28***	.03
9. Physical Pain									–	.38***	.20***
10. General Health										–	.26***
11. Physical Functioning											–
Mean (SD)		4.5 (1.23)	2.93 (1.35)	3.13 (0.67)	23.69 (4.98)	4.89 (1.02)	5.28 (1.02)	4.20 (1.39)	9.52 (1.60)	19.18 (2.99)	28.85 (2.26)

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

I used structural equation modeling to test my hypotheses. The structure of the models would include the variables SES, stress, and an indicator of wellbeing with paths from SES to wellbeing, SES to stress, and stress to wellbeing (see Figure 2). I hypothesized that SES would be negatively associated with indicators of wellbeing,

specifically BMI, health, and self-esteem. I also predicted that this relationship would be mediated by perceived stress, meaning that the relationship between SES and wellbeing would be as a result of the stress associated with SES. I examined each outcome variable separately and compared three conceptualizations of SES: mixed (objective and subjective) SES, objective SES only, and subjective SES only.

Figure 2. Conceptual Model



I used criteria outlined by Hu and Bentler (1999) to evaluate good model fit: a nonsignificant chi-square, a root-mean-square error of approximation (RMSEA) value of .05 or lower, and a comparative fit index (CFI) greater than .95. I used the Akaike information criterion (AIC) for model comparison, assuming that a smaller AIC value indicates better fit than another model.

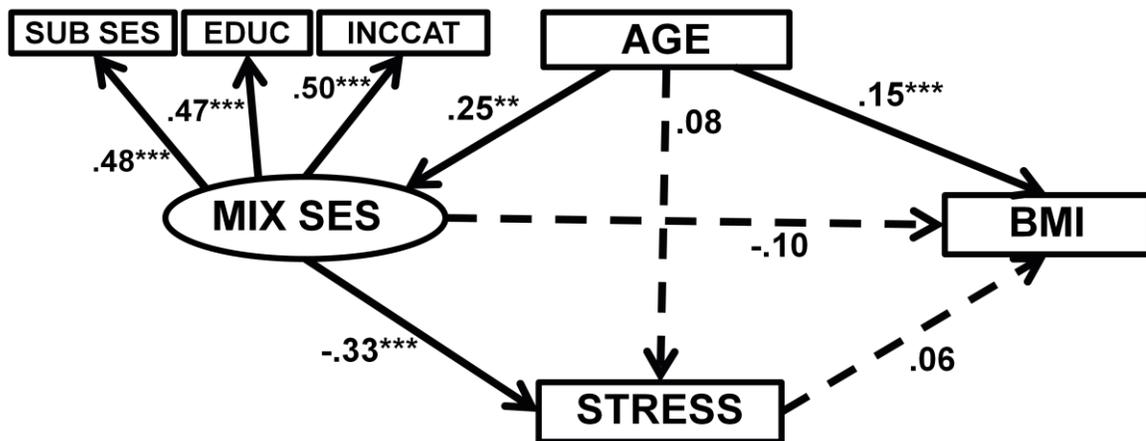
Age covariate. In the BMI models, I adjusted for age because age had a significant effect on BMI. Age was not significantly related to health or self-esteem in this sample, so age was removed from all of the health and self-esteem models.

BMI

Mixed SES and BMI

This model was not a good fit for the data ($\chi^2(6)=52.89, p=.00; CFI=.72, RMSEA=.115$ (CI: .09-.14); $AIC=94.89$; Model comparison: $\Delta AIC_{saturated}=54.00$; $\Delta AIC_{independence}=202.26$). The model is shown in Figure 3a.

Figure 3a. Mixed SES and BMI



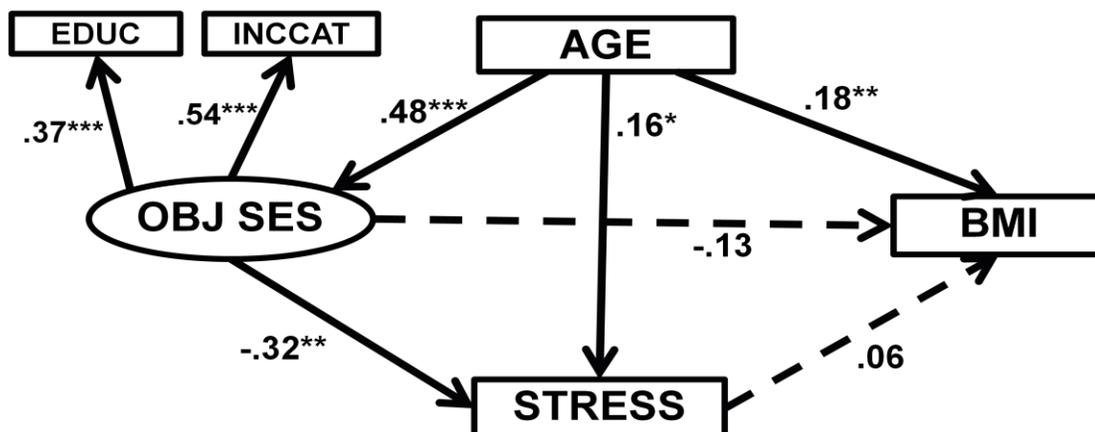
As shown in Figure 3a, age was significantly related to mixed SES ($\beta = .25, p < .01$) and BMI ($\beta = .15, p < .001$) and mixed SES and stress were significantly correlated ($\beta = -.33, p < .001$). The older participants were, the higher their mixed SES and BMI. There was no significant relationship between mixed SES and BMI or between stress and BMI. Coupled with the poor model fit, this model suggested a lack of relationship between the latent variable of mixed SES and BMI.

Objective SES and BMI

This model fit the data well ($\chi^2(2)=2.07, p=.38; CFI=.99, RMSEA=.01$ (CI: .00-.08); $AIC=38.07$; Model comparison: $\Delta AIC_{saturated}=40.00$; $\Delta AIC_{independence}=102.85$) and its

paths' significance were similar to those of the mixed SES and BMI model. The model is shown in Figure 3b.

Figure 3b. Objective SES and BMI

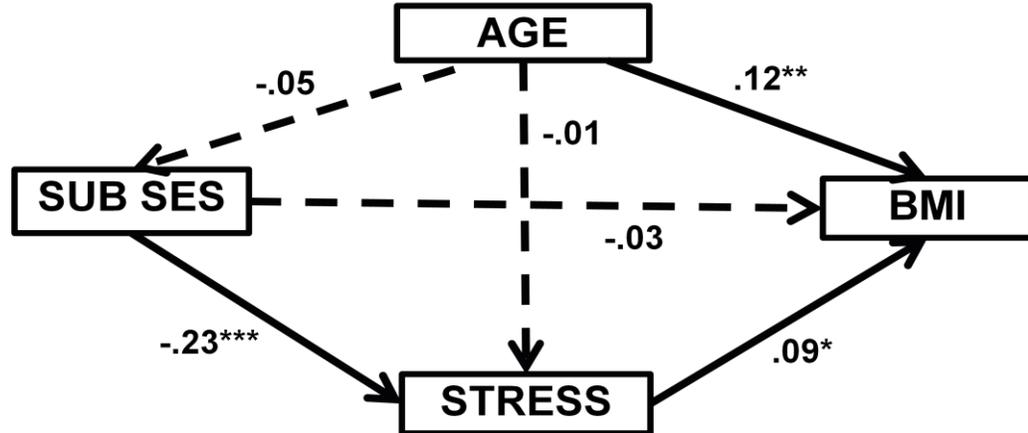


In this model, age was significantly related to objective SES ($\beta = .48$, $p < .001$), stress, ($\beta = .16$, $p < .05$) and BMI ($\beta = .18$, $p < .01$). As participants' age increased, their objective SES, stress, and BMI increased. Objective SES and stress were significantly correlated ($\beta = -.32$, $p < .01$), so as objective SES increased, stress levels decreased. The paths between objective SES and BMI and between stress and BMI were both insignificant, indicating a lack of relationship between objective SES and BMI directly or with stress as a mediator

Subjective SES and BMI

Compared to the mixed SES and objective SES models, this model examining subjective SES and BMI had the best fit ($\chi^2(1)=2.237$, $p=.53$; $CFI=1.00$, $RMSEA=.00$ (CI: .00-.06); $AIC=24.24$; Model comparison: $\Delta AIC_{\text{saturated}}=28.00$; $\Delta AIC_{\text{independence}}=56.42$) with the data set. The model is shown in Figure 3c.

Figure 3c. Subjective SES and BMI



In the first test of the model, I found that age was unrelated to both subjective SES and stress and that removing the paths between age and those two variables did not negatively impact the model. The relationship between age and BMI was significant ($\beta = .12$, $p < .05$). As participants got older, BMI increased. There was no significant relationship between subjective SES and BMI. However, subjective SES was significantly related to stress ($\beta = -.23$, $p < .001$) and stress was significantly related to BMI ($\beta = .09$, $p < .05$). As subjective SES decreased, perceived stress increased, in turn increasing BMI. This suggested that subjective SES was related to BMI with stress mediating the relationship.

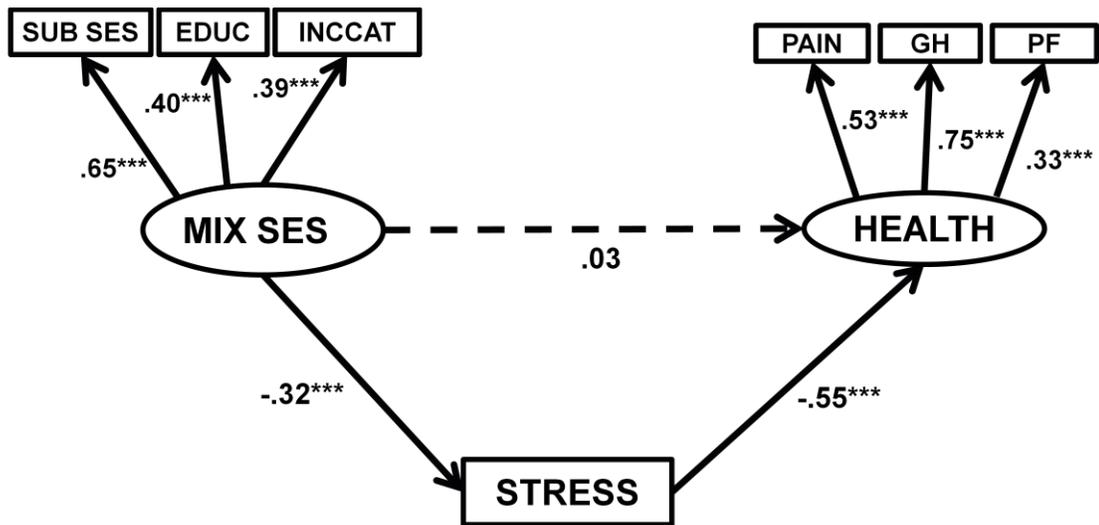
Health

Mixed SES and Health

This model fit the data well ($\chi^2(12)=16.19$, $p=.18$; $CFI=.99$, $RMSEA=.02$ (CI: .00-.05); $AIC=62.19$; Model comparison: $\Delta AIC_{\text{saturated}}=70.00$; $\Delta AIC_{\text{independence}}=418.34$).

The model is shown in Figure 4a.

Figure 4a. Mixed SES and Health

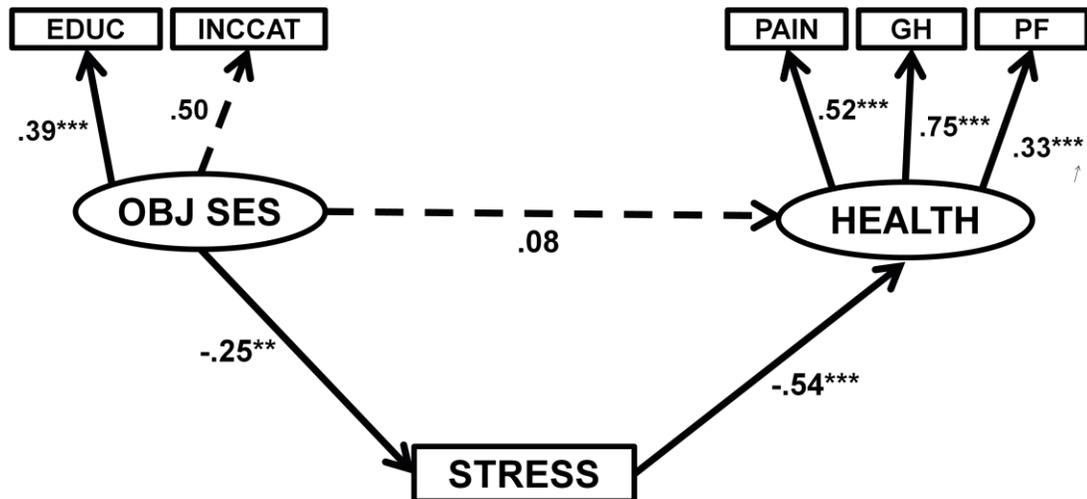


Mixed SES was related to stress ($\beta = -.32$, $p < .001$) and stress was related to health ($\beta = -.55$, $p < .001$), so as SES decreased, stress increased and in turn increased health. There was no direct relationship between mixed SES and health, so it appears that the relationship between mixed SES and health was indirect, mediated by stress.

Objective SES and Health

This model was also a good fit to the data ($\chi^2(7)=11.88$, $p=.11$; $CFI=.98$, $RMSEA=.03$ (CI: .00-.07); $AIC=51.89$; Model comparison: $\Delta AIC_{\text{saturated}}=54.00$; $\Delta AIC_{\text{independence}}=331.04$). The model is shown in Figure 4b.

Figure 4b. Objective SES and Health

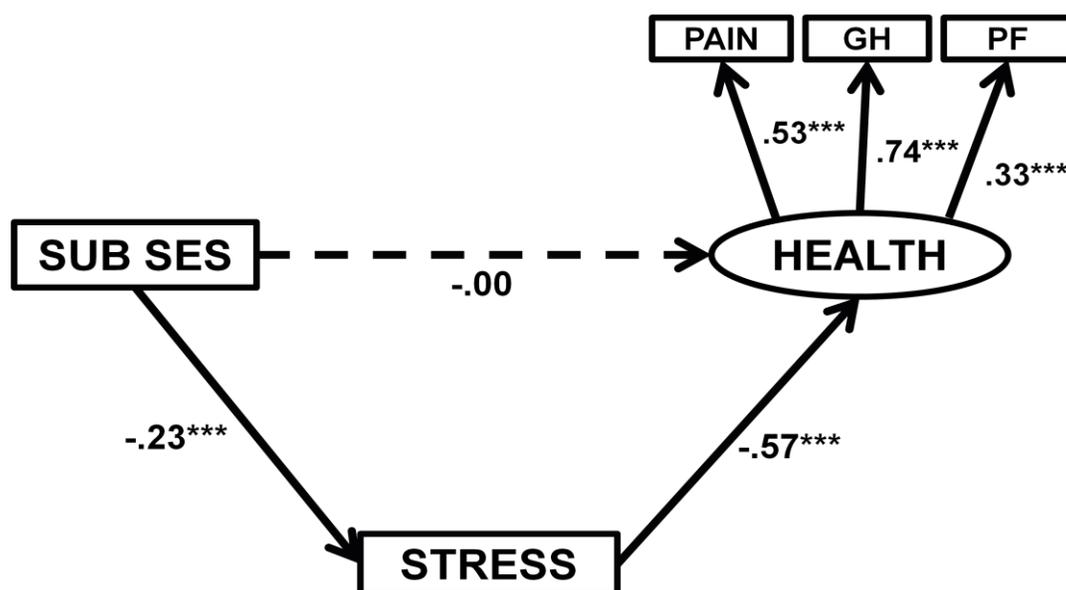


Similar relationships existed in this model as in the model with mixed SES and health: objective SES was negatively related to stress ($\beta = -.25$, $p < .01$) and stress was negatively related to health ($\beta = -.54$, $p < .001$), but a direct relationship between objective SES and health was not significant. The pathways in the model once again indicated that participants of low SES had higher stress levels, leading to lower health ratings.

Subjective SES and Health

This model fit the best of the models examining health ($\chi^2(4)=4.4$, $p=.36$; $CFI=.99$, $RMSEA=.01$ (CI: .00-.06); $AIC=36.40$; Model comparison: $\Delta AIC_{\text{saturated}}=40.00$; $\Delta AIC_{\text{independence}}=322.71$). The model is shown in Figure 4c.

Figure 4c. Subjective SES and Health



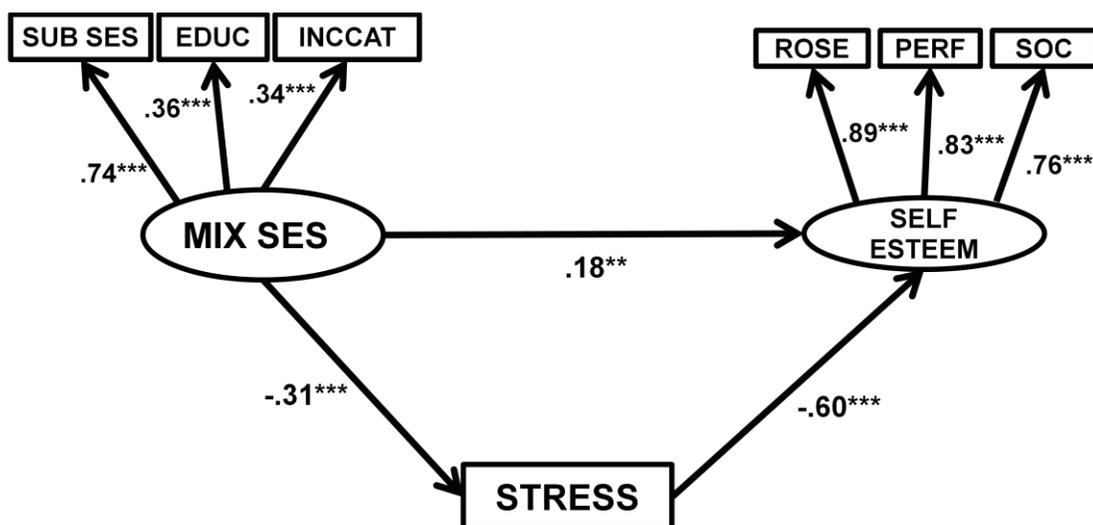
As seen in Figure 4c, there was no direct relationship between subjective SES and health, but there were significant relationships between subjective SES and stress ($\beta = -.23$, $p < .001$) and between stress and health ($\beta = -.57$, $p < .001$). Similar to the other health models, lower SES was associated with increased stress which led to lower health ratings. This indicated an indirect effect of subjective SES on health mediated by stress. In contrast to the BMI model, the conclusions regarding the relationship of SES to health are similar regardless of which SES measure is used. Of note, the model fit is best for the subjective SES and health model than the other SES and health models.

Self-Esteem

Mixed SES and Self-Esteem

This model was not a good fit for the data ($\chi^2(12)=62.39$, $p=.00$; $CFI=.96$, $RMSEA=.08$ (CI: .06-.11); $AIC=108.39$; Model comparison: $\Delta AIC_{\text{saturated}}=70.00$; $\Delta AIC_{\text{independence}}=1366.379$). The model is shown in Figure 5a.

Figure 5a. Mixed SES and Self-Esteem

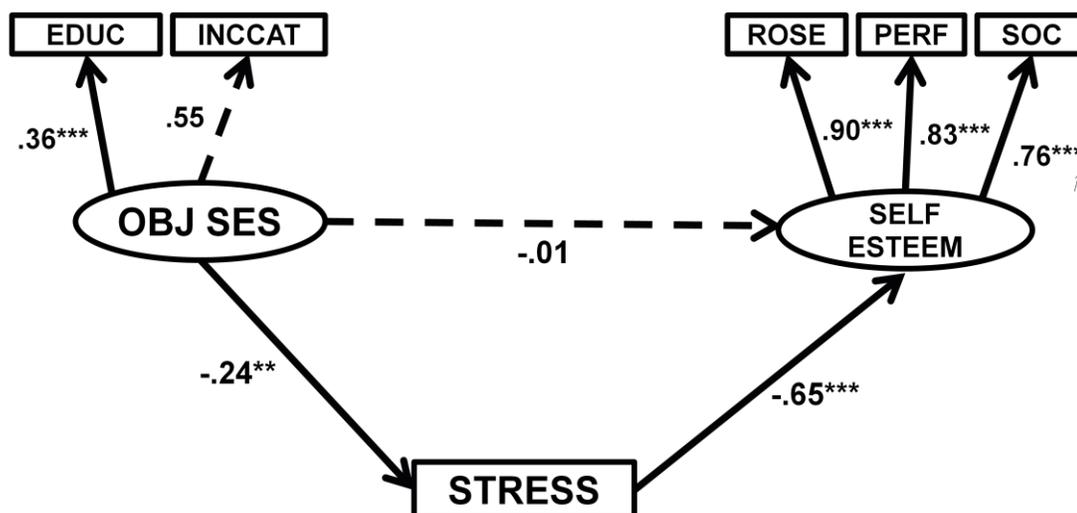


As seen in Figure 5a, the relationship between mixed SES and stress was significant ($\beta = -.31$, $p < .001$), as well as the relationship between stress and self-esteem ($\beta = -.60$, $p < .001$). Participants with lower SES were more stressed and participants that were more stressed were lower in self-esteem. The direct path between mixed SES and self-esteem was also positively correlated ($\beta = .18$, $p < .05$), showing that participants with higher mixed SES are also higher in self-esteem.

Objective SES and Self-Esteem

Like the mixed SES and self-esteem model, this model was not a good fit for the data ($\chi^2(7) = 51.85$, $p = .00$; $CFI = .96$, $RMSEA = .10$ (CI: .08-.13); $AIC = 91.85$; Model comparison: $\Delta AIC_{\text{saturated}} = 54.00$; $\Delta AIC_{\text{independence}} = 1259.88$). The model is shown in Figure 5b.

Figure 5b. Objective SES and Self-Esteem

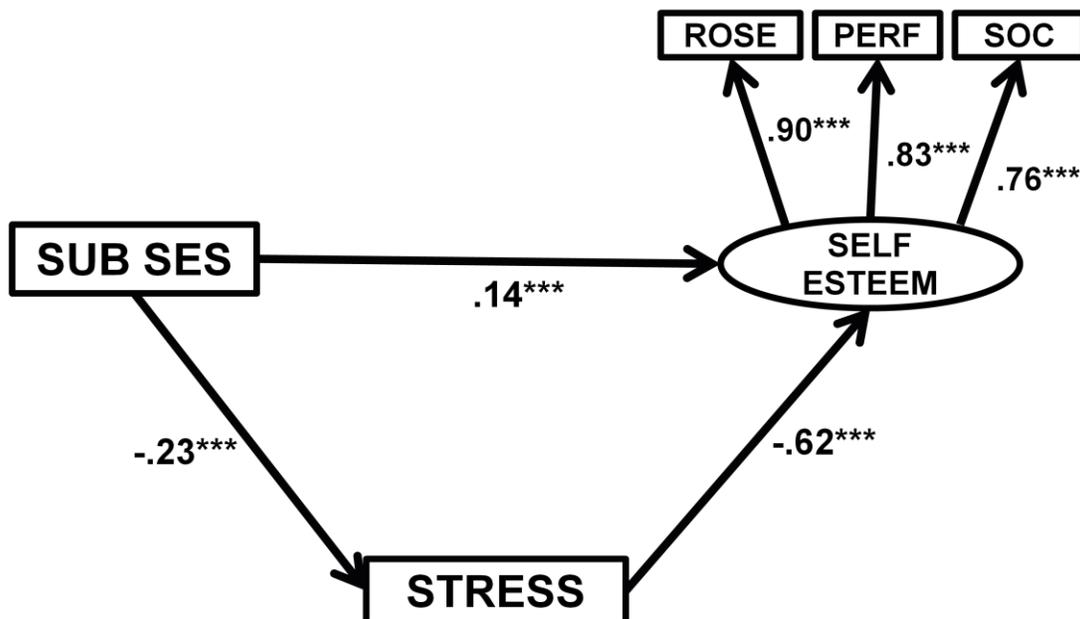


As seen in Figure 5b, the path from objective SES to stress ($\beta = -.24$, $p < .01$), and the path between stress and self-esteem was significant ($\beta = -.65$, $p < .001$), showing that lower SES participants were higher in stress and thus had lower self-esteem. Unlike mixed SES, the direct relationship between objective SES and self-esteem was not significant, but the paths from SES to stress and stress to self-esteem suggested an indirect relationship mediated by stress.

Subjective SES and Self-Esteem

This model fit better than the general SES and objective SES and self-esteem models, but it was still not a great fit ($\chi^2(4) = 18.65$, $p = .00$; $CFI = .99$, $RMSEA = .08$ (CI: .05-.12); $AIC = 50.65$; Model comparison: $\Delta AIC_{\text{saturated}} = 40.00$; $\Delta AIC_{\text{independence}} = 1242.87$) for the data set. The model is shown in Figure 5c.

Figure 5c. Subjective SES and Self-Esteem



In Figure 5c, subjective SES and stress were significantly related ($\beta = -.23$, $p < .001$), as was the relationship between stress and self-esteem ($\beta = -.62$, $p < .001$). Participants lower in SES were higher in stress and were therefore lower in self-esteem. The direct path between subjective SES and self-esteem was, like the mixed SES and self-esteem model, also significant ($\beta = .14$, $p < .001$), indicating that as participants' subjective SES went up, their self-esteem rose with it. Although the model was not a good fit for the data, because every path in the model was significant ($p < .001$), the model indicated a relationship between subjective SES and self-esteem, both direct and indirect with stress as a mediator.

Discussion

Consistent with predictions, stress mediated the relationship between SES and wellbeing measures in nearly every model. Lower socioeconomic status leads to an

increase in stress which in turn raises BMI and lowers health and self-esteem. Subjective SES models were the best fitting models for all wellbeing measures and had the only significant relationships for BMI.

When evaluating the relationship between SES and BMI, subjective SES was the only model to predict an increase in BMI mediated by stress. No model had a direct relationship from SES to BMI. Mixed and objective SES models had significant paths between SES and stress, but did not show a significant relationship between stress and BMI. Subjective SES had significant paths from SES to stress and from stress to BMI, suggesting that a primary reason BMI increases in response to lower subjective SES is because of stress.

When examining the relationship between SES and health, SES did not have a direct significant relationship to health with stress in the models. Although direct paths between SES and health were not significant for any model, all models had significant relationships between SES and stress and between stress and health. This indicates that when stress is in the model, it may be mediating the relationship between SES and health for all types of SES measures.

None of the models were a relatively good fit when examining the relationship between SES and self-esteem. However, when mixed SES was broken down into separate models of objective and subjective SES as predictors of self-esteem, the subjective SES model was the best fit to the data. The significant paths in the subjective SES model reflected similar, yet stronger, relationships than the mixed SES model and the objective SES model, although the objective SES model was the only model to lack a

direct path from SES to self-esteem. It may be that subjective SES by itself is the best indicator of self-esteem compared to objective or mixed SES because its relationships were similar to mixed SES and it is a more parsimonious measure.

Stress is clearly an important factor in the relationship between socioeconomic status and wellbeing, as it had a mediating effect on the relationship between SES and indicators of wellbeing in most models. The results support Adler et al. (2000) and my hypothesis that low subjective SES may increase stress and that stress acts as a mediator between subjective SES and health indicators. Negative health outcomes are not necessarily the direct product of low socioeconomic status, but rather the stress of being a low SES individual is what produces negative health outcomes. The implications of this research are that more focus should be put on how people feel relative to others than someone's objective status in society.

There are a few potential problems with the current research. First, the sample was made up entirely of women and thus is not representative of the population. Women and men may handle stress differently and thus the results and implications of this research may not be applicable across both genders. Additionally, the BMI measure of participants was based on height and weight measurements that were self-reported by participants and therefore may not be entirely accurate. It would have been ideal to have height and weight measurements taken in person so that it was certain that the BMI values were accurate. Another potential issue noted in research by Singh-Manoux, Marmot, and Adler (2005) is that people's perceptions of their health status may influence their reported socioeconomic status, or that both ratings may be influenced by personality and are inaccurate as a result. However the authors explain that other studies

show that response bias is not a major explanation and their current study further indicated that it was unlikely to influence the relationship between SES and reported health status.

Other limitations to the research relate to the components of the objective SES and mixed SES variables. Although participants reported which category of annual household income they were in, family size was not reported. This may skew the measure of income, because while a certain annual income might mean a comfortable lifestyle for a household of two, it could mean a very difficult lifestyle for a household of eight. Income per family member of a household could be a more accurate measure of income. Similar problems exist for participants' reported education level. Education is reported by the highest level of education or degree earned, but not all degrees translate to the same opportunities. A degree from a community college and a degree from an Ivy League school would be reported the same way, but the opportunities and implications associated with an Ivy League degree would be very different from that of a community college (Operario et al., 2004). This difference may not be apparent in objective SES measures, but could be better reflected in a measure of subjective SES.

Missing data may also be a limitation to the results of the current research, as not every participant responded to every item in the questionnaire. As it is preferable to keep as much data as possible in the sample, the estimations in the models were created using a procedure called Full Information Maximum Likelihood (FIML) to handle the missing data. However not all of the missing data was necessarily random. Income category was missing data from 112 participants and it is possible that some of these participants could have been very low income which made them feel uncomfortable responding to this

measure. Because income category was a key component of the objective and mixed SES variables, this could have skewed the results. I was also unable to examine indirect relationships between variables because of the missing data.

Despite these flaws, the results of this research deliver an important message. The effect that SES has on indicators of wellbeing is because of stress that is negatively associated with SES. The fact that stress was a mediator in this relationship suggests that methods aimed at reducing stress could ultimately help to improve people's wellbeing. Current policies in the United States often focus on solving these problems directly, such as remedying health by increasing access to care or working to reduce obesity rates by promoting better nutrition and fitness habits among children and adults. In addition to these efforts, creating policies and initiatives aimed at reducing stress could also potentially yield improvements in wellbeing. Policies should encourage neighborhoods, schools, and communities to provide more outdoor activities, entertainment and shows, classes, parks, gardens, and other areas for people to go to relax and take a step back from their busy, stressful lives.

Reducing the stigma associated with low SES could be another way to improve wellbeing, as the perception of low SES is strongly negatively related to stress. I see this as a much more difficult endeavor than implementing policies to assist with stress reduction because money and material possessions are praised and valued so strongly. To reduce the stigma of low SES, interventions could begin in younger populations such as school-age children. A policy as simple as implementing a dress code could prevent others from passing judgment and criticism on a child from a low SES family because of the way they dress. Through all years of schooling, school systems should find ways to

emphasize to children and teenagers that social status is not a permanent state, but one that may be changed. Every student should be given equal guidance, support, and encouragement regardless of their SES so that they may feel less singled out, and therefore less stigmatized. Although it may be a far cry to attempt to close the growing income gap across society, there are possibilities and opportunities available to reduce, in the words of Walt Whitman, the “contrasts high and low”--the feeling and stigma of relative inequality.

Future research could examine what other health indicators are related to subjective socioeconomic status and stress. Use of both male and female participants would be especially helpful, as well as evaluating the associations between SES, stress, and health indicators over a cross-sectional or longitudinal study to see how the relationships develop and whether they strengthen or weaken with age. Studies could also aim to examine how to reduce the stigma associated with low socioeconomic status.

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Author's Biography

Elizabeth Lauren Tull was born in Lansing, Michigan on June 17, 1990. She spent her childhood years in Arnold, Maryland and Yarmouth, Maine before she moved to Holland, Michigan, graduating from West Ottawa High School in 2008. Elizabeth was a Psychology major with an abnormal/social concentration and she had a minor in Legal Studies. On campus, Elizabeth was a member of Chi Omega Fraternity, the All Maine Women Honor Society, Psi Chi International Honor Society in Psychology, Order of Omega Greek Honor Society and Phi Beta Kappa. She was a recipient of an Undergraduate Research and Creative Activity Fellowship and graduated as the Co-Outstanding Senior in Psychology.

Upon graduation, Elizabeth will be continuing her education at the University of Maine School of Law in Portland, Maine and looks forward to a career in the legal field.