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The relationship between socioeconomic status and healthy behaviors:
A mediational analysis

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Prior research has demonstrated that socioeconomic status (SES) and health are related such that positive health attitudes and behaviors are more prevalent among higher-SES than among lower-SES individuals. The present study was designed to examine the reasons for this relationship. Participants completed a questionnaire that assessed socioeconomic status, several health behaviors (e.g., smoking), and several variables proposed to mediate the association between socioeconomic status and health (e.g., education). Findings indicate that SES predicted the number of vegetables eaten each day and how frequently each participant exercised. Findings also indicated that the relationship between SES and exercise was mediated by a participant's health consciousness. None of the mediators were found to explain the relationship between SES and the number of vegetables eaten each day. This research is important in encouraging positive health behaviors and attitudes across all levels of socioeconomic status.

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There is a problem in the United States involving the health lifestyles of Americans. The overall health of the nation is rapidly declining and direct reasons for this decline are not well understood. For example, in studies collected by the Center for Disease Control in 2004, it was found that smoking in the United States has declined since 1974. However, about 23% of Americans were still smokers between 1999 and 2001, and the statistic is likely to be similar today. It was also shown that calorie consumption has increased 22% for women since 1971. Although people are consuming more calories, 60% of adults also do not engage in the recommended amount of physical activity. In fact, approximately 25% of adults do not engage in any activity at all. Physical activity is important for individuals because it can help to boost the immune system and reduce certain diseases, such as heart disease, which has been the number one cause of death since 1980. The Center for Disease Control also found that one-third of adults are considered obese.

Importantly, the statistics from the Center for Disease Control suggest that socioeconomic status (SES) and health behaviors may be related. For example, research completed in 2004 found that men who were below poverty level were twice as likely to smoke as men who were in the highest level of income that was surveyed. The same results were found for women. Similarly, studies by the Center for Disease Control comparing leisure-time physical activity and income level found that adults with incomes four times or more above the poverty level were about twice as likely than those below the poverty level to engage in regular physical activity. It was also found that adults with incomes four times or more above the poverty level were more than two times as likely as

the adults below poverty level to engage in rigorous physical activity three to four times per week. In terms of body weight, it was found that women below the poverty level were much more likely than women in the highest levels of income to be overweight. The results for obesity followed the same trend. Women below the poverty level were more likely to be obese. All of these findings show that the problem with poor health needs to be reversed, focusing particular attention on individuals in lower SES groups.

This study will examine the relationship between SES and healthy lifestyles, focusing, in particular, on identifying reasons why low SES and poor health appear to be related. We are defining healthy lifestyle as the behaviors or attitudes that are conducive to or promote health in terms of longevity and a holistic existence. The different behaviors that will be evaluated in this study include diet, exercise, obesity, and substance abuse. These behaviors have been shown in previous research to be correlated with SES. However, it is important to understand why these correlations occur because, although people are not always in control of the socioeconomic environment in which they live, they may be able to control variables (e.g., stress) that underlie the relationship between SES and health. Doctors, nutritionists, and patients should be made aware of these contributing variables and trained how to talk with their patients about their effects on patients' health. This might in turn lead to an overall healthier lifestyle for the individual and contribute to a healthier nation.

Socioeconomic Status and Healthy Lifestyles

Although health problems are evident across the population, the problems are especially evident among the nation's poor. In fact, a correlation between SES and health behaviors has been well established, not only by the Center for Disease Control but in a

wide range of studies. In one study Cairney (2000) found that people with a lower SES were more likely to report “poor” health. Those who reported “poor” health were more likely to neglect personal health care, such as going to the doctor. These characteristics are also often predictors of mortality. Cairney (2000) also found that participants with a lower SES were more likely to report physical ailments compared to the participants in a higher socioeconomic status. Low SES participants were also more likely to take part in unhealthy behaviors such as eating fast food more frequently, smoking, or choosing not to exercise. Similar results were found by Drukker and van Os (2003). These researchers examined associations between neighborhood SES and health-related quality of life. They found that when neighborhood-level SES was low, individuals reported a lower quality of mental and physical health. Finally, Lindstrom (2001) found that individuals in lower SES groups have less leisure-time physical activity than those in a higher SES group.

Mediators of the Relation Between SES and Healthy Lifestyles

The reasons for the link between SES and health behaviors are not well understood. Prior research by Wardle and Steptoe (2003) has suggested that education, health consciousness, health locus of control, future salience, expectations of longevity, self-rated health, and stress might play a role in mediating the relationship between SES and health behaviors.

There is empirical evidence that these variables may be influential. For example, supporting the idea that future salience and health locus of control might play a role, Wardle and Steptoe (2003) found that low SES participants were less likely than high SES participants to think about the future and more likely to believe that good health was

the result of luck rather than the result of personality responsibility (e.g. taking care of oneself). These beliefs were, in turn, associated with health behaviors. Specifically, participants who rarely thought about the future were more likely to engage in smoking and poor eating habits than those who frequently thought about the future. Similarly, participants who believed that good health was the result of luck were more likely to smoke, lead a sedentary lifestyle, and have a diet low in fruits and vegetables.

Evidence that education may play a role is provided by Dobias et al.(2001). They found that when three levels of literature were provided to audiences of different educational experience, the amount of personal health care and consciousness was affected (Dobias et al. 2001). Specifically, participants with a lower education level were unable to sufficiently understand the more difficult literature and, as a result, less likely to recognize health problems. Also, those with lower education were not as likely to report any health difficulties that they were experiencing to a doctor (Dobias et al., 2001). Similar evidence for the mediating effects of education are reported by Hawkes and Holm (1993) who found that lower levels of education were associated with less participation in physical activity and with poorer overall health.

Stress has also been linked to health behaviors. For example, a study by Cartwright et al. (2003) found that when people are in stressful situations such as academic examinations, work environments, or parenting decisions they were more likely to engage in unhealthy eating habits. Unhealthy eating habits consisted of eating fatty foods, snacking often, and skipping breakfast. The results of this study also found that people who were obese were more likely to eat more often when stressed than people that were of low to average weight (Cartwright et al., 2003). Results from this study make it

clear that there is a relationship between stress and unhealthy eating behaviors. The unhealthy eating behaviors would then lead to more serious health problems in the future.

Studies like that conducted by Wardle and Steptoe (2003), Dobias et al. (2001), Hawkes and Holms (1993), and Cartwright et al. (2003) are important in suggesting variables that may lead lower SES individuals to have poor health habits. However, these types of studies do not empirically establish these linkages as clearly as they might. To do so, mediational analyses are required. Mediators are variables that explain the cause of the relationship between two other variables. For example, in this case, the degree to which an individual thinks about the future (the mediator) may explain the relationship between SES (the independent variable, or IV) and health behaviors (the dependent variable, or DV). That is, lower SES individuals may engage in more unhealthy behaviors because they are not future-focused and fail to consider how their unhealthy habits may threaten their future. Baron and Kenny (1986) offer three criteria that need to be met in order for a variable to be empirically established as a mediator. First, the IV (in this case, SES) must be correlated with the DV (in this case, health behaviors). Second, the mediator (in this case, thinking about the future) must be correlated with the DV controlling for the DV. Finally, the correlation between the IV and the DV must be reduced to non-significant levels after analyses adjust for the mediator. This study will use mediational analyses to determine the cause of the relationship between SES and health behaviors and attitudes. By doing so, this research will lead us one step further in finding ways to reach the same level of health behaviors and attitudes across all levels of socioeconomic statuses.

The Current Study

For this study, we hypothesize that people with a higher socioeconomic status will lead a healthier lifestyle than people with a lower socioeconomic status. In order to determine if socioeconomic status plays a role in the healthy behaviors and attitudes of individuals, we will correlate socioeconomic status with several health behaviors, including exercise, nutrition, smoking, and obesity. We also hypothesize that the relationship between socioeconomic status and health behaviors will be mediated by several factors. The variables that have been chosen in this study as potential mediators of the relation between SES and healthy behaviors include education, health consciousness, future salience, expectations of longevity, and stress.

Examining these potential mediators is important because, while it is difficult to change a person's socioeconomic status, the mediators that affect the overall health of a person can often be altered. We hope to be able to find variables that could be addressed in the future to promote a healthier lifestyle for individuals and, in turn, lead the general health of the United States to begin increasing.

Methods

Participants

Participants in this study represented a convenience sample from Madison, Indiana; Bedford, Indiana; Indianapolis, Indiana; and Cincinnati, Ohio. Participants were selected at random from a warehouse and downtown in Cincinnati. Participants were also obtained through acquaintances. The sample consisted of 39 adults between the ages of 23 and 68 years old. The mean age of the participants was 46 years old. 59% of the participants were male and 41% were female. The sample of participants included 87%

Caucasian, 8% Hispanic, and 5% Black. Income of the participants ranged from \$16,000 to \$350,000 with a median of \$49,000.

Measures

Participants were asked to fill out a questionnaire that assessed socioeconomic status, several health behaviors (e.g., frequency of exercise), and several variables proposed to mediate the association between socioeconomic status and health (e.g. education level). The questionnaire was composed of seventeen questions and participants answered using Likert scale, fill-in the blank, or yes or no response formats. A full copy of the questionnaire is included in Appendix A.

Socioeconomic Status. To assess socioeconomic status, participants were asked to provide family income level and occupation.

Health Behaviors. Four health behaviors were assessed. Specifically, participants were asked the number of servings of fruits and vegetables that they consume each day (diet), the number of times that they exercise each week (exercise), their height and weight so that their body mass index (BMI) could be calculated, and whether they smoke cigarettes (substance abuse).

Proposed Mediators. Five potential mediators of the relation between SES and health behaviors were assessed. First, education was assessed by asking each participant his or her highest level of education. Second, each participant's expectation of longevity was determined by asking the participants to what age they expected to live. They answered with a numerical response. Third, future salience was assessed by asking participants how often they think about the future. Participants responded by using the options: all the time, very often, sometimes, or hardly at all. Fourth, health

education/consciousness was assessed by asking each participant, “How often do you think about things that you might do to keep yourself healthy or improve your health?” Participants responded on a 7-point Likert scale that ranged from rarely or not at all to several times per day. Finally, stress was determined by asking the participants, “How stressed do you feel?” The participants answered using a 4-point Likert scale that ranged from “extremely stressed” to “not stressed at all.”

Procedure

The procedure of the study was explained to the participants and they were told that the study was concerned with health and individual lifestyle. Before the questionnaires were handed out to the participants, all participants were asked to read over the informed consent form and sign the form agreeing to the terms provided. Completing the questionnaire took about five to ten minutes. Following completion of the questionnaire, participants were given a written debriefing, after which they were dismissed.

Results

To assess the degree to which SES predicted each of the five health behaviors, a series of regression analyses was performed. These analyses controlled for number of dependents so that income levels were more comparable across individuals none or few versus many children. As seen in Table 1, these analyses indicated that SES predicted the number of vegetables eaten each day and how frequently each participant exercised. Specifically, higher SES individuals ate significantly more vegetables and exercised more often than lower SES individuals. A second set of regression analyses was performed in order to determine if any of the five proposed mediators explained the relationship

between SES either number of vegetables eaten or exercise. As shown in Figure 1, the relationship between SES and exercise was mediated by a participant's health consciousness. Each of the three criteria for mediation suggested by Baron and Kenny (1986) were met. First, the IV (in this case, SES) predicted the DV (in this case, exercise), $\beta = .51$, $t(39) = 2.67$, $p < .01$. Second, the mediator (in this case, health consciousness) predicted the DV, controlling for the IV, $\beta = .39$, $t(39) = 2.51$, $p < .017$. Finally, the correlation between the IV and the DV was reduced to non-significant levels after analyses adjust for the mediator, $\beta = .35$, $t(39) = 1.87$, $p < .07$. A Sobel Test (1982) was conducted to determine whether the magnitude of the reduction was significantly different from zero. There was a significant decline, $z = 2.50$, $p < .01$, further confirming that the health consciousness was a mediator for the relationship between SES and exercise. No other variables were found to mediate the relationship between SES and exercise. Moreover, none of the mediators were found to explain the relationship between SES and the number of vegetables eaten each day.

Discussion

Our findings concluded that SES was correlated with both the number of vegetables eaten per day and the frequency of exercise per week. Although nothing was found to mediate the relationship between SES and the number of vegetables eaten per day, our findings did indicate that health consciousness was a mediator for the relationship between SES and exercise. Therefore, it was not merely a person's SES that was the cause of their frequent exercise, it was the people with the higher SES that were more able to think about things that would improve their health. This conscious health thought is what led higher SES participants to exercise more frequently. This may be

because higher SES individuals think about health due to the resources that surround them and encourage healthy activity. Also, they might have more leisure time that would allow them the time to exercise.

One reason that we might not have found significance in all of the variables that we were examining is because we did not have enough variability in some of our samples. For example, we found only three of the thirty-nine participants to be smokers. Because we did not have many participants that smoked we could not draw conclusions about smokers and their health.

Also, we found that the BMI measurement was not a good enough predictor of obesity and over-all health. There is much more that should be considered when evaluating a person's health than just their height and weight proportion. For instance, the BMI test does not account for muscle mass. Therefore, someone with much muscle mass might be considered obese because they weigh more than someone with the same weight and less muscle.

One reason that we did not find significance in the correlation between SES and the number of servings of fruit eaten each day may have been because of the current diet fad that enforces little to no carbohydrate consumption. Therefore, while we considered high fruit intake as a healthy behavior, others might have found eating fruit as a diet restriction while still being conscious of eating healthy and watching their weight closely.

Because health consciousness was found to mediate the relationship between SES and exercise, it would seem beneficial to provide programs that would encourage people to think more about their health. These programs might include school interventions that would encourage healthy living for children, starting at an early age. It would also be

important to encourage advertisers to market healthier products and activities in areas that have lower SES circumstances. Targeted advertisements might help to lower the effect that SES has on health attitudes and behaviors.

Future research should include a larger sample size with a greater variability in those samples. It would also be beneficial to use a longitudinal study in order to better examine other causes for the relationship between SES and the different health behaviors. Using a longitudinal study and examining participants on a more regular basis could examine a broader variety of health behaviors. Finally, it would be beneficial for a longitudinal study to include groups of participants who are exposed to different health programs. Examining such programs may help researchers determine the ones most beneficial for promoting health consciousness.

Table 1. The relationship between SES and health behaviors.

Health Behaviors	β	t
Fruits	0.18	0.86
Vegetables	0.60*	3.28
Exercise	0.51**	2.67
Obesity	0.08	0.38
Smoking	-0.26	-1.27

* significant at the $p < .05$ level

** significant at the $p < .01$ level

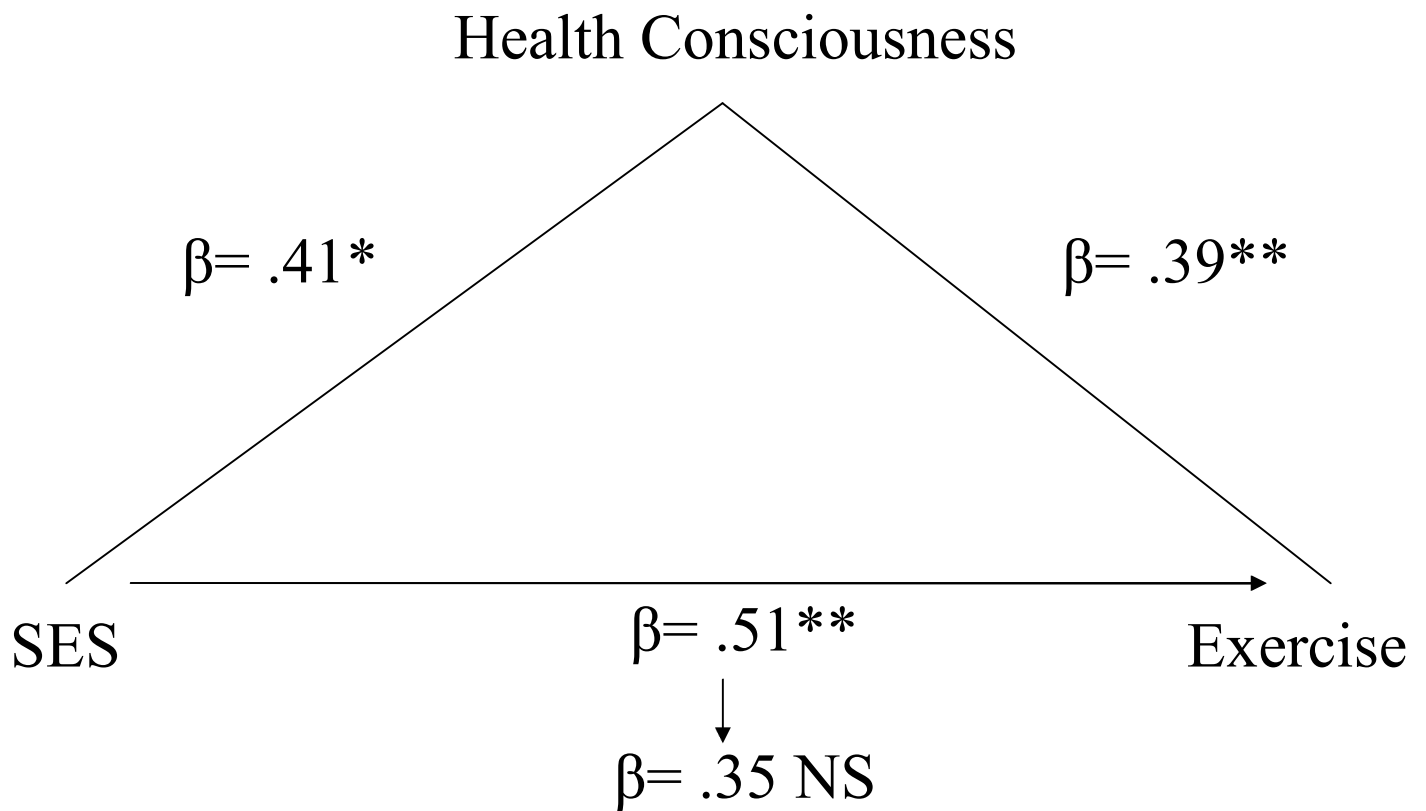


Figure 1. There is a significant relationship between SES and exercise. This relationship is mediated by a person's health consciousness. Once the mediator is added in, the relationship between SES and exercise drops to non-significant levels. There is also a significant relationship between SES and health consciousness and a significant relationship between exercise and health consciousness. This further shows that health consciousness is a mediator of the relationship between SES and exercise.

* significant at the $p < .05$ level

** significant at the $p < .01$ level

Appendix A

Age _____

Sex: Male Female

Race _____

What is your occupation? _____

What is the occupation of your spouse? (if applies) _____

What is your family income? (optional) _____

Do you smoke? Yes No

How many servings of fruits do you eat per day? _____

How many servings of vegetables do you eat per day? _____

On average, how frequently do you exercise each week?

5 or more times/week 3-4 times/week 1-2 times/week Not at all

What is your height? _____

What is your weight? _____

What is your highest level of education? _____

How often do you think about things that you might do to keep yourself healthy or improve your health?

Several times/day At least once/day Every 2-3 days Once/week

Once/month Every few months Rarely or never

How often do you think about the future?

All the time Very often Sometimes Hardly at all

To what age do you expect to live? _____

On average, how stressed do you feel?

Extremely stressed Moderately stressed A little stressed Not at all stressed

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