Health Lifestyles in Late Middle Age

William Cockerham[1], Joseph D. Wolfe[2], and Shawn Bauldry[3]

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Abstract

A growing body of work identifies distinct health lifestyles among children, adolescents, and young adults and documents important social correlates. This study contributes to that line of research by identifying the health lifestyles of U.S. adults entering late middle age, assessing structural predictors of membership in different health lifestyles in this understudied age-group, and examining net associations between health lifestyles, chronic conditions, and physical health. The data come from the National Longitudinal Survey of Youth 1979 50+ Health Module. The analysis is based on respondents who answered the 50+ Health Module in 2008, 2010, 2012, or 2014 (N = 7,234). The results confirm similar relationships between health lifestyles and structural factors like class, gender, and race that prior studies observe and also reveal a unique pattern of associations between health lifestyle and health status because of diagnosed conditions that impact health behaviors in adulthood.

Keywords

health lifestyle theory, late middle age, physical health, health disparities

Late middle age is an important period with respect to physical health. At this time of life, health problems linked to the cumulative effects of poor behaviors often begin to surface. Obesity, alcoholism, diabetes, high cholesterol, high blood pressure, chronic inflammation, heart disease, and various other causes of or contributors to mortality become more common (Case & Deaton, 2015; Woolf et al., 2018). While some people have been protective of their physical condition by routinely living a healthy lifestyle, others, because of social and material disadvantages, deliberate disregard, lack of knowledge, or some combination thereof, have practiced lifestyles that are physically self-destructive over time. What happens when people with unhealthy lifestyles become diagnosed with chronic diseases in late middle age? Do they adopt healthier styles of life? Conversely, what happens when people with generally healthy lifestyles likewise develop health problems as part of the aging process? The question thus arises as to whether or not such lifestyles are generally healthier, mixed, or unhealthier at this stage of life and the extent to which they remain aligned with social position. That is, do health lifestyles still reflect class distinctions or do they coalesce toward a healthier norm as old age approaches regardless of class position?

Currently, we do not have a definitive answer for this question because relatively little research on health lifestyles has examined late middle age (for two notable exceptions, see Burgard, Lin, Segal, Elliott, & Seelye, 2018; Shaw, McGeever, Vasquez, Agahi, & Fors, 2014). Our current knowledge is largely concentrated in the earlier half of the life course, namely, childhood and adolescence (Burdette, Needham, Harper, & Hill, 2017; Daw, Margolis, & Wright, 2017; Lawrence, Mollborn, & Hummer, 2017; Lee, Tsenkova, Boylan, & Ryff, 2018; Mollborn, James-Hawkins, Lawrence, & Fomby, 2014; Mollborn & Lawrence, 2018), as well as early and young adulthood (Lawrence, 2017; Mize, 2017; Olson, Hummer, & Harris, 2017). This focus has produced consistent findings that early health lifestyles have lasting consequences for health.

Nevertheless, late middle age is also a critical period in the life course. It not only represents the beginning of the final phase of one's occupational and economic attainment, it is also the last stage of life prior to the onset of old age and inevitable physical decline. The purpose of our article, accordingly, is to clarify the direction of late middle age health lifestyles in

[1] University of Alabama at Birmingham, AL, and College of William & Mary, Williamsburg, VA, USA

[2] University of Alabama at Birmingham, AL, USA

[3] Purdue University, West Lafayette, IN, USA

Corresponding Author:

Joseph Wolfe, Department of Sociology, University of Alabama at Birmingham, 1401 University Blvd., Birmingham, AL 35233, USA. Email: jdwolfe@uab.edu

relation to class position and the effects of diagnosed chronic ailments.

Health Lifestyles in Late Middle Age

Among the few existing studies of health lifestyles in later adulthood, Jaye et al. (2018) interviewed a small number (N = 21) of middle-class individuals aged 54–65 years in New Zealand who were recruited because they were likely experiencing age-related health issues and degenerative conditions. The participants recognized the responsibility for good health through living a healthy lifestyle was under their control and the consequences of the failure to do so. Living such a lifestyle was depicted as a "moral obligation." Even so, some participants felt insecure about their past lifestyles and concern about their health in the next phase of life was common. They acknowledged that healthy living was not easy in that "it required personal sacrifices of enjoyable, but potentially lethal foodstuffs such as butter and fast food, pushing oneself to maintain adequate levels of fitness and resisting indulgent but irresponsible vices such as sunbathing, smoking and alcohol" (Jaye et al., 2018, p. 368). Not all of them expressed a willingness to consistently make such sacrifices but, nevertheless, did not question whether such an effort was worth it. This would suggest that perhaps middle-class people heading into old age, or already there, would adopt a healthy lifestyle if they did not previously have one.

But does this mean that health lifestyles in late middle age would be likely to be on the healthier side? Unfortunately, the Jaye et al. study does not address this question. The sample is also too limited to be representative of a larger population and confined to middle-class respondents. Other studies suggest that social class distinctions may retain their significance at older ages with healthier lifestyles remaining typical of people higher on the social scale compared to those toward the bottom (Jones, Papacosta, Whincup, Wannamethee, & Morris, 2011; Shaw et al., 2014). Jones, Papacosta, Whincup, Wannamethee, and Morris (2011), utilizing multiple correspondence analysis, analyzed data from men in the British Regional Heart Study at ages 40–59 in 1978–1980 who were followed up in 1992 and again in 1998–2000 when they were 60–79 years old. The participants tended to remain clustered in their usual class-based drinking and smoking patterns at similar levels into old age. Exercise was an exception in that it became minimal for all social classes over time. The findings suggest that class position remains a persistent ("locked-in") influence on smoking and drinking, at least for men, and there may not be a general trend toward a healthier lifestyle beginning in the 50th decade of life. Men higher in the class structure had healthier lifestyles, and those lower down tended toward less healthy practices.

Shaw, McGeever, Vasquez, Agahi, and Fors (2014) use latent class analysis (LCA) to analyze health risk behaviors in both men and women from the Health and Retirement Study. The average age of a respondent was 65.3 years, but the data were stratified by age-group. The results showed that smoking was greater among those classified as lower class, regardless of age, and obesity was most common among lower class women in different age cohorts, while heavy drinking and exercise was generally lower with age. Burgard et al. (2018) used LCA to analyze alcohol, smoking, and obesity in five waves of the Americans' Changing Lives study for periods of up to 25 years across middle and later adulthood. They found stability to be more common than change in the three health behaviors over the life course. Finally, there is a paper from Australia (Södergren et al., 2014) using LCA and data from the Wellbeing, Eating and Exercise for a Long Life (WELL) Study conducted in the greater area of Victoria with an average respondent age of 60.1 years. Respondents were sorted into two classes, healthy and unhealthy, with higher education significant for having a healthy lifestyle that consisted of less fast food, smoking, drinking, and TV viewing.

Just how strongly class position affects health lifestyles among people in their fifth decade of life needs more clarity, as does the general pattern of lifestyles and health at this time of life. This particular age cohort is selected as the focus of this article because of the lack of information about its health lifestyles, as its members are entering the critical period of late middle age when their health conditions for old age are becoming more obvious. We begin below by briefly reviewing health lifestyle theory to demonstrate the theoretical framework for our analysis, followed by a discussion of our data and method, results, and implications of our findings.

Theoretical Framework

Health lifestyle theory (Cockerham, 2005, 2013a, 2013b) does not depict lifestyle practices as the random behaviors of socially disconnected individuals, but as personal routines that blend into an aggregate form characteristic of the specific groups and social classes in which they originate. The theory posits that health behaviors cluster in distinctive lifestyles based on socioeconomic status (SES), age, gender, race, and other social variables. These patterns are not inadvertent. They are levied socially in a top-down process of socialization and experience that imposes awareness of the range of choices available to individuals and the socially determined protocols (appropriate or inappropriate) for choosing. People select their lifestyle practices, but typically their choices are consistent with their SES and in accordance with other structural variables applicable to them. Social structures thus channel health lifestyle choices down Particular Pathways as opposed to others that might be chosen.

Health lifestyle theory defines health lifestyles as "collective patterns of health-related behavior based on choices from options available to people according to their life chances" (Cockerham, 2005, p. 55). The term "life chances" originates with Weber (1978) and refers to an individual's probability or likelihood of obtaining satisfaction for desires and needs. Life chances are the structurally determined chances people have in life to achieve satisfaction because of their social position.

Weber's most important contribution to health lifestyle theory is his recognition of the dialectical interplay between choices and chances that interact to determine a lifestyle form (Cockerham, Ru¨tten, & Abel, 1997). Thus, although people choose a lifestyle, they typically do so within the structural parameters that align with their situation in life, enabling or constraining their choices.

While this suggests that class patterns can indeed "lock in" over the life course, those patterns may change in relation to changes in health brought on by past lifestyle practices or other causes such as aging, accidents, genetic inheritance, and the like. Another major component of health lifestyle theory is Bourdieu's (1984) concept of habitus that refers to the internalization of external social structures in the mind of the individual that becomes a basis for choosing. It is a process of reasoning in which internalized social and cultural conventions are considered, along with the individual's own inclinations, preferences, and interpretations, in selecting behavior. The habitus serves as a cognitive map routinely guiding and evaluating a person's choices and options in various settings or what Bourdieu call "fields." Dispositions to act in particular ways are socially acquired and not only become normative but in his view also habitual and intuitive.

In an effort to predict patterns of health behaviors, health lifestyle theory (Cockerham, 2005, 2013a, 2013b, 2014) integrates these sociological insights of Weber and Bourdieu to develop four major categories of structural variables consisting of (1) class circumstances; (2) age, gender, and race/ethnicity; (3) collectivities (social networks associated with marriage and kinship, religion, politics, ideology, the workplace, etc.); and (4) living conditions (quality of housing, access to basic utilities, neighborhood facilities, public safety, etc.) provide the social context for socialization and experience that collectively constitute life chances (structure) and influence choices (agency). Choices and chances interact and commission the formation of dispositions to act (habitus), leading to specific health-related practices (action). Health practices collectively constitute patterns of health lifestyles whose enactment results in their reproduction (or modification) through feedback to the habitus.

Although health lifestyle theory suggests that lifestyles are a key determinant of health, social class may be the underlying explanation for any association between midlife health lifestyles and health outcomes. The fact that class circumstances have a powerful association with health lifestyles is seen in the enduring and positive correlation between multiple operationalizations of social class, health, and health behaviors (Clouston, Richards, Caadar, & Hofer, 2015; Cockerham, 2005, 2013a, 2013b; Jones et al., 2011; Lee et al., 2018; McGovern & Nazroo, 2015; Missinne, Daenekindt, & Bracke, 2015). Social class is typically measured with indicators of SES like family income, educational attainment, and occupational status. Even though each of these indicators of SES is distinct and provides differing dimensions of stratification, they are nevertheless interrelated and structurally connected to each other and a principal determinant of health and health behaviors (Adler et al., 1994; Adler & Rehkopf, 2008; Wolfe, 2015). Low educational attainment is an especially strong predictor of poor health behaviors in adulthood (Andrews, Hill, & Cockerham, 2017; Pampel, Krueger, & Denney, 2010), but there are others. Thus, we control for multiple indicators of SES in an effort to isolate the association between lifestyle and health net of social class.

While social class appears to have the most influence in determining health behaviors, health lifestyle theory acknowledges a number of other important social factors. We know, for example, that health lifestyles may be influenced by age (Burdette et al., 2017; Jones et al., 2011; Lawrence et al., 2017; Mize, 2017; Mollborn & Lawrence, 2018; Mollborn et al., 2014), gender (Cockerham, 2005, 2013b, 2014; Flood & Moen, 2015; Olson et al., 2017; So¨dergren et al., 2014), race (Cockerham et al., 2017), religion (Hill, Ellison, Burdette, & Musick, 2007), and marital status (Ross, Hill, & Mirowsky, 2016). Furthermore, even though health lifestyle practices have a general binary character (positive or negative), such practices may not be exclusively one way or the other in differentiating between lifestyles. They may also be a mixture or combination of both good and bad practices on the part of some people (Burdette et al., 2017; Cockerham et al., 2017; Maller, 2015; Mollborn & Lawrence, 2018; Mollborn et al., 2014; Saint Onge & Krueger, 2017). It is the sum total of participation in a particular set of practices that results in health outcomes for individuals or groups (Maller, 2015).

Research Aims

Our study is guided by three aims. The first aim is to identify health lifestyles among a sample of late middle-age adults in the United States. The second aim is to assess the structural predictors of membership in different health lifestyles in this age-group, with a particular focus on SES. Our third aim is to explore the relationships between health lifestyles, previously diagnosed chronic health conditions, and current physical health status. In combination, these three aims provide a portrait of health lifestyles and health among late middle-aged adults and correlates of the health lifestyles that join a growing body of work examining such lifestyles at earlier ages.

Method

Sample

The data for this study come from the National Longitudinal Survey of Youth 1979 (NLSY-79) conducted by the U.S. Bureau of Labor Statistics. The NLSY-79 is an ongoing longitudinal survey of a nationally representative sample of 12,686 American women and men. The NLSY-79, which is still ongoing, began in 1979 when respondents ranged in age from 14 to 22. The survey contains multiple years of information concerning health behaviors, health outcomes, and indicators of

structural predictors of health lifestyles such as SES, gender, and race. Our analysis is based on the 7,694 respondents who answered the 50+ Health Module in 2008, 2010, 2012, or 2014, as they became or were about to become 50 years of age. After listwise deletion of 298 respondents due to missing data and 162 respondents who were younger than 49 or older than 52 when they answered the 50+ Health Module, the final sample is 7,234.

Variables

Physical health at 50. To examine physical health, we consider respondents current health status in addition to preexisting health problems. We measure current health status using the 12-item short form health survey (SF-12), which is an inventory of self-reported physical health (Ware, Kosinski, & Keller, 1996). In large national surveys of the U.S. population, the SF12 physical health scores have a mean of 50 and a standard deviation of 10. For our analysis, we standardize scores such that the mean is 0 and each one-point difference above or below 0 corresponds to a standard deviation change. Respondents with scores above 0 have better health than the average 50year-old respondent, and respondents with scores below 0 have poorer health than the average. We measure respondents' diagnosed health problems using seven binary indicators of heartrelated problems (heart attack, coronary heart disease, angina, and congestive heart failure), hypertension, stroke, diabetes, cancer (any type of cancer or malignant tumor), lung-related problems (asthma or chronic lung disease), and arthritis.

Health lifestyle indicators. There are a wide variety of health-promoting behaviors that could coalesce into different health lifestyles. Some past studies take a holistic approach that incorporates numerous measures (e.g., Krueger, Bhaloo, & Vaillancourt, 2009; Mollborn & Lawrence, 2018; Mollborn et al., 2014), while others focus on key sets of health behaviors that are consistently linked with physical health (e.g., Daw et al., 2017; Cockerham et al., 2017; Mize, 2017). In this study, we take the latter approach and consider health behaviors related to four domains: smoking, drinking, physical activity, and diet. These particular domains of health behaviors were chosen because they have been shown in past studies to lead to various forms of chronic disease and deterioration in physical health in later life that are the focus of our study.

Cigarette use is measured as a set of indicators identifying those who never smoked, former smokers, and current smokers (occasionally or daily). For alcohol consumption, we created two variables. First, respondents were asked how many drinks they consumed during an average day. We use this information to create a categorical variable denoting abstainers, light/moderate drinkers, and unhealthy drinkers per National Institute on Alcohol Abuse and Alcoholism (2004) guidelines and studies of alcohol use and health (O'Keefe, Bhatti, Bajwa, DiNicolantonio, & Lavie, 2014; O'Keefe, Bybee, & Lavie, 2007). Women who drank one drink, on average, per day are coded as light/moderate drinkers and two or more drinks as heavy drinkers. For men, we code one to two drinks, on average, per day as light/moderate drinkers and three or more as heavy drinkers. The NLSY-79 also collected data on the number of times respondents had six or more drinks on a single occasion in the past month. We use this to create an indicator variable for any occurrence of binge drinking in the past month, which is associated with cirrhosis, seizures, stroke, and cancer (O'Keefe et al., 2014).

The NLSY-79 has relatively limited measures of physical activity. The best measure available is how often respondents reported performing at least 10 or more minutes of physical activity specifically designed to strengthen muscles (e.g., lifting weights, calisthenics). We used this measure to create a set of indicator variables denoting those who are not physically active in relation to those who are physically active either less or more than 3 times a week. We use a 10-minute minimum, along with the number of days respondents exercise, because the NLSY-79 asks respondents about exercising for at least 10 min, and physical activity guidelines for older adults recommend 10 or more minutes of exercise spread over multiple days of the week (Elsawy & Higgins, 2014; Nelson et al., 2007). Although an imperfect measure of exercise, it does capture a meaningful domain of physical activity and appears to distinguish between respondent health lifestyles in our analysis.

Respondents also reported their food consumption from fast food restaurants in the past week. The data are used to create an indicator variable identifying those who ate fast food 3 or more times in the past 7 days, which has been linked to obesity and Type 2 diabetes (Jiao, Moudon, Kim, Hurvitz, & Drewnowski, 2015). The NLSY-79 additionally obtained information on respondents' consumption of sugary soft drinks or sodas, which was used to create an indicator variable for those who drank seven or more sugary drinks in the past week, putting them at significantly greater risk of developing Type 2 diabetes, obesity, and cardiovascular disease (Malik & Hu, 2015). The NLSY-79 does not include measures of caloric intake or fruit and vegetable consumption. Nevertheless, excessive fast food and sugary drink consumption capture important dimensions of diet that are known to have a negative impact on health.

Structural variables. To examine the relationships between health lifestyles and structural variables, our analysis includes measures of SES, gender, race, and marital status. SES is operationalized as individuals' average log income, years of schooling, and occupation (Adler & Rehkopf, 2008, Torssander & Erikson, 2010, Wolfe, 2015). Average log income is constructed using respondents' income from their late 30s until the year they receive the 50+ Health Module. Years of schooling is measured as a categorical variable with categories for 0–11, 12, 13–15, and 16 or more years of schooling. Occupation is measured as a set of variables indicating whether respondents are unemployed or, if employed, whether their occupation is characterized as white collar (managerial or professional), skilled (technical and related support, sales, administrative support, protective services, or the military), or manual (private household, service, operators, transportation,

laborers, and farmers). If married and unemployed, spouse's occupation is used.

The final set of structural variables includes gender, race, and marital status. Gender is measured as a binary variable indicating which respondents are female. Race distinguishes between those who identified as White, Black, or Hispanic. Marital status indicates whether respondents were married, divorced/widowed, or never married the year that they received the 50+ Health Module.

Analysis

The analysis proceeds in four steps. First, LCA is used to identify health lifestyles (see Collins & Lanza, 2010). Research investigating health lifestyles increasingly relies on LCA as the statistical model is ideal for identifying groupings or categories of individuals who follow similar health lifestyles as defined by their responses to specific measures of health behaviors (e.g., Burdette et al., 2017; Cockerham et al., 2017; Daw et al., 2017; Mize, 2017; Krueger et al., 2009; Mollborn & Lawrence, 2018; Mollborn et al., 2014; Saint Onge & Krueger, 2017; So¨dergren et al., 2014).

In the second step of our analysis, we examine the structural correlates by assigning respondents to the health lifestyle for which they have highest probability of being a member and then using these assignments as an outcome in a multinomial logit model. We note, however, that prior research suggests the multistep approach we use for analyzing predictors (and outcomes) of latent class membership may introduce a degree of attenuation bias (Lanza, Tan, & Bray, 2013; Vermunt, 2010). Fortunately, simulation studies find that the bias is minimal for models with high entropy, as in our analysis (Asparouhov & Muthe´n, 2014; Bakk, Tekle, & Vermunt, 2013; Bakk & Vermunt, 2016).

The third and fourth steps of our analysis involve examining the relationships between health lifestyles and chronic conditions and then our general measure of physical health, respectively. Given that the self-reports of chronic conditions have the potential to influence health lifestyles (i.e., the diagnoses likely are temporally prior to the reports of the health behaviors), we interpret these analyses as simply identifying relationships that could plausibly operate in either direction. Then, in our analysis of the general measure of physical health, we fit a series of models that introduce the structural measures as correlates, then add the health lifestyle indicators to see the adjusted associations, and then add the measures of chronic conditions to see whether health lifestyles maintain associations with general physical health net of diagnosed chronic conditions. For this final analysis, we conduct formal tests of attenuation in the estimates of the relationship between health lifestyles and physical health with the inclusion of chronic conditions in the model.

For the LCA in our first step, we use Mplus Version 7 (Muthe´n & Muth´en, 2012). For all other analyses and data preparation, we use Stata Version 15.1 (StataCorp, 2015). All of the code to prepare the data and conduct the analysis is maintained at https://osf.io/kbqmh/ to facilitate replications and extensions.

Results

Identifying Health Lifestyles

We begin the LCA by fitting models that allow for one to six health lifestyles (or classes). In order to help avoid local solutions, all of the models were run with 200 initial stage random starts and 10 final state optimizations. One challenge with latent class models lies in determining the optimal number of classes. We establish the best fitting model by considering several model fit statistics, including the Bayesian information criterion (BIC), the w^2 test statistic, and the Lo–Mendell–Rubin (L-M-R) test statistic. We also consider entropy, a summary measure of the degree of uncertainty in the classification of respondents into classes, in addition to the substantive meaning of the classes that emerge. Based on the overall results of these fit statistics, the preferred latent class model is used to assign respondents to the health lifestyle (latent class), in which they have the highest estimated probability of membership.

Table 1. Model Fit from Latent Class Analysis of Health Lifestyles.

N Classes	Entropy	BIC	w_2	df	L-M-R
Two class	.78	62,296	1,230***	196	1,089***
Three class	.58	61,742	466***	186	447***
Four class	.69	61,730	369***	176	346***
Five class	.66	61,744	290***	166	270***
Six class	.51	61,775	234***	156	212**

Note. N = 7,234. BIC = Bayesian information criterion; LMR = Lo–Mendell–Rubin. *p < .05. **p < .01. ***p < .001 (two-tailed tests).

Table 1 reports model fit statistics for latent class models allowing between two and six classes. Multiple statistics were utilized to compare these models. The values of entropy are highest for the two-, four-, and five-class models of health lifestyles (.78, .69, and .66, respectively). Among these three models, the BIC suggests that the four-class model provides the best fit (Raftery, 1995), whereas the w^2 and the L–M–R provide some support for the five- and six-class models. Our analysis focuses on the four-class model due to its parsimony, high entropy, low BIC, and because conditional item response probabilities revealed the most meaningful clustering of health behaviors (see Figure 1).

Figure 1 illustrates the conditional item response probabilities and allows for a general characterization of the four health lifestyles identified by LCA. The first health lifestyle, labeled healthy, is particularly characteristic for N = 1,269 (17%) and includes respondents with low probabilities of smoking and consuming fast foods and sugary soft drinks coupled with a relatively high probability of light drinking of

alcohol and frequent exercise. The second health lifestyle, labeled healthy diet, is most characteristic for N = 3,258 (45%) and represents respondents with low probabilities of exercise and fast food, soft drink, and alcohol consumption but also little exercise. The third health lifestyle, labeled smoking and drinking, is characteristic for N = 1,580 (22%) and is associated with relatively high probabilities of binge drinking combined with the highest probability of current smoking and relatively low probabilities of exercise. The final lifestyle, labeled unhealthy diet, is characteristic for N = 1,127 (16%) and associated with high probabilities of eating fast food and drinking sugary beverages, along with relatively low probabilities of alcohol use and exercise.

Structural Predictors of Health Lifestyles

Table 2 presents the means (or proportions if binary or categorical) of health outcomes and structural variables. With respect to SES, those with the healthy lifestyle have the highest incomes, most education, and white-collar occupations. This group also tends to be mostly White, married, and reports the fewest occurrences of past health problems. At the other end of the spectrum, the unhealthy diet lifestyle contains an overrepresentation of low-SES families and African Americans. The smoking and drinking lifestyle has similarly low levels of SES and a high proportion of Whites and manual workers. SES is generally higher in the healthy diet lifestyle compared to the smoking and drinking and unhealthy diet lifestyles. The healthy diet lifestyle has low probabilities of fast food and sugary drink consumption and contains the largest proportion of women (56%).

To examine the relative magnitude of associations between structural variables and lifestyle, Figure 2 displays the difference in the probabilities of a lifestyle between two key values of each structural variable. For example, in the first panel, we see that those who have higher incomes, educational attainment, and occupational status also have higher probabilities of having a healthy lifestyle, whereas being Black and married have significantly lower probabilities of having the healthy lifestyle. The values displayed in Figure 2 were calculated using coefficients from a multinomial logistic regression model predicting health lifestyle with structural variables (see Table A1 in the Appendix for relative risk ratios).

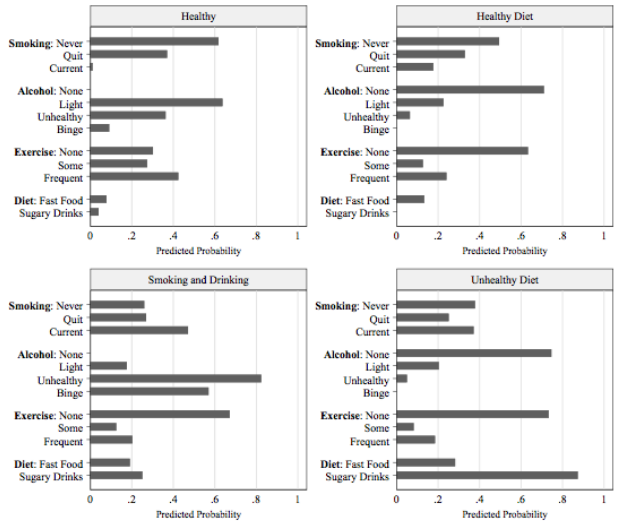
Figure 2 reveals a few notable patterns. First, although we find a robust relationship between SES and being in the healthiest lifestyle, we find variation in how indicators of SES relate to other lifestyles. Income, education, and occupation have similar associations with having the healthiest or least healthy lifestyles (see "healthy" and "unhealthy diet" panels). For the other two lifestyles, however, the relationship between SES and lifestyle is not so clear. For example, we find that income-related differences in the probability of a smoking and drinking lifestyle are not significant, whereas for education, we see that those who have 16 or more years of schooling have a significantly smaller probability of being in the smoking and drinking lifestyle compared to those with less than 12 years.

Second, we find that differences related to race, gender, and marital status are largest for the healthy diet and smoking and drinking lifestyles (see Figure 2). Black respondents have a greater probability of being in either the healthy diet or unhealthy diet lifestyles than the White sample and a substantially smaller probability of being in the smoking and

Table 2: Means or Proportions of Health Outcomes and Model Covariates by Health Lifestyle

	Healthy	Healthy Diet	Smoking & Drinking	Unhealthy Diet	Total Sample
N	1,269	3,258	1,580	1,127	7,234
Health Measures					
SF-12 physical	0.36	-0.13	0.09	-0.17	0.00
Heart-related	0.03	0.07	0.06	0.08	0.06
Hypertension	0.27	0.41	0.38	0.39	0.38
Stroke	0.01	0.03	0.02	0.03	0.03
Diabetes	0.08	0.19	0.11	0.12	0.14
Cancer	0.04	0.05	0.05	0.04	0.05
Lung-related	0.04	0.09	0.08	0.12	0.09
Arthritis	0.19	0.28	0.26	0.29	0.26
Structural Variables					
Average log income	11.24	10.60	10.65	10.33	10.68
Years of schooling					
0 to 11	0.03	0.09	0.11	0.17	0.10
12	0.29	0.43	0.50	0.51	0.43
13 to 15	0.25	0.26	0.23	0.21	0.24
16 or more	0.44	0.22	0.16	0.12	0.23
Occupation					
White collar	0.39	0.24	0.22	0.15	0.25
Skilled	0.36	0.30	0.26	0.22	0.29
Manual	0.19	0.30	0.42	0.46	0.33
Unemployed	0.06	0.17	0.10	0.18	0.13
Race					
White	0.60	0.45	0.55	0.43	0.50
Black	0.22	0.35	0.26	0.37	0.31
Hispanic	0.18	0.20	0.19	0.20	0.19
Female	0.54	0.56	0.46	0.45	0.52
Marital status					
Married	0.67	0.56	0.50	0.48	0.55
Divorced/Sep./Wid.	0.25	0.27	0.32	0.34	0.29
Never married	0.09	0.17	0.19	0.18	0.16

Figure 1: Conditional Item Response Probabilities by Health Lifestyle (N = 7,234)



Notes:
- Conditional item response probabilities are calculated based on equation (1) and represent predicted probabilities for each category of each health behavior conditional on membership in the given health lifestyle (i.e., latent class).

drinking lifestyle. Compared to men, women have a larger probability of being in the healthy diet lifestyle and a smaller probability of being in the smoking and drinking lifestyle. With respect to marital status, marriage is related to a larger probability of being in the healthy diet lifestyle and a somewhat smaller probability of the smoking and drinking lifestyle.

Health Problems and Health Status at 50

Returning to Table 2, the largest difference in the SF-12 physical health measure occurs between the healthy lifestyle, which is .36 standard deviations above the average physical health in the sample, and the unhealthy diet lifestyle, which is .13 standard deviations below the average. Somewhat surprisingly, the smoking and drinking lifestyle, rather than the healthy diet lifestyle, has the second highest average reported health. A similar pattern emerges for diagnosed health problems. That is, the healthy and smoking and drinking lifestyles are generally healthier than the healthy diet and unhealthy diet lifestyles. This pattern likely reflects a tendency for those with diagnosed health problems to moderate their diet, especially for the high proportion of diabetics in this group, whereas major health problems have not developed yet—or simply remain undiagnosed—for those who are still engaging in heavy drinking and smoking at 50.

Table 3 presents the odds of diagnosed health problems from logistic regression models adjusting for lifestyle, SES, race, gender, and marital status. Compared to the healthy lifestyle, we find that other lifestyles generally have significantly higher odds of being diagnosed with a health problem. Notably, however, the healthy diet lifestyle is most consistently related to every diagnosed problem. This provides further evidence that the healthy diet lifestyle is a unique lifestyle comprised in part of people who moderate their lifestyle based on a preexisting health problem.

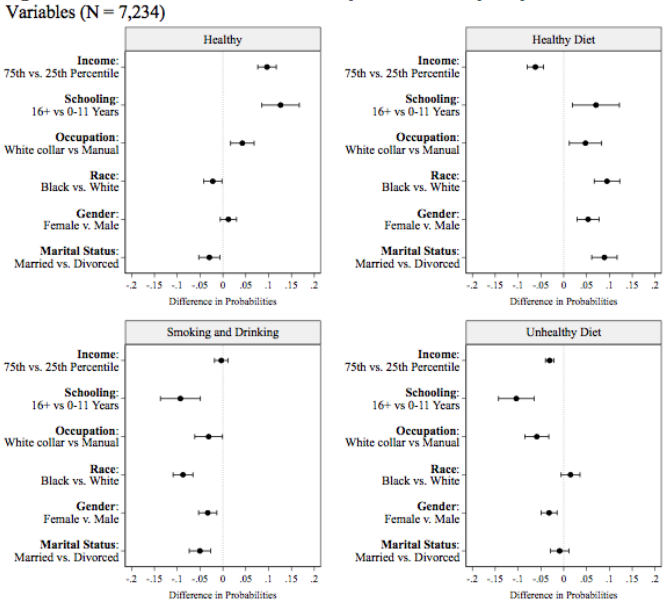
To evaluate the associations between current health status at age 50 and lifestyle, our final analysis in Table 4 considers three ordinary least squares models predicting the SF-12 physical with structural variables, health lifestyles, and diagnosed problems. In Model 1, we begin with a baseline model that includes structural variables and excludes lifestyle in order to examine the degree to which structural variables are attenuated by the inclusion of health lifestyles. In Model 2, although we find that lifestyles are associated with a reduction in health when compared to the healthy lifestyle, the relationships between structural variables and health remain essentially the same as Model 1. When we add diagnosed conditions in Model 3, however, we find that lifestyle and structural variables are significantly attenuated. For instance, the estimate for healthy diet reduces by 0.11, about 40% of the estimate from Model 2, and we see similar reductions for unhealthy diet and smoking and drinking (see Table A2 in the Appendix for estimates). Again, we find evidence suggesting that the healthy diet lifestyle in part reflects preexisting health conditions. Nevertheless, each of the lifestyles still has significantly poorer health than the healthy lifestyle, even after controlling for structural variables and diagnosed conditions.

Table 3: Odds of Diagnosed Health Problems by Lifestyle and Structural Variables (N = 7,234)

	Heart-related	Hyper-tension	Stroke	Diabetes	Cancer	Lung-related	Arthritis
Health lifestyles (ref. healthy)							
Healthy diet	1.61**	1.59***	2.45**	2.24***	1.53*	1.77***	1.38***
	(0.28)	(0.12)	(0.77)	(0.25)	(0.26)	(0.28)	(0.12)
Smoking and drinking	1.47*	1.50***	1.44	1.14	1.45	1.52*	1.31**
	(0.28)	(0.13)	(0.51)	(0.15)	(0.28)	(0.26)	(0.13)
Unhealthy diet	1.59*	1.32**	1.86	1.15	1.06	2.12***	1.41***
	(0.32)	(0.12)	(0.65)	(0.16)	(0.24)	(0.37)	(0.15)
Structural variables							
Average log income	0.89**	0.97	0.93	0.97	0.99	0.89**	0.92**
	(0.03)	(0.03)	(0.05)	(0.03)	(0.06)	(0.03)	(0.03)
Schooling (ref. 0 to 11 years)							
12	0.70*	0.89	0.79	0.92	1.27	0.71**	0.97
	(0.11)	(0.08)	(0.18)	(0.11)	(0.29)	(0.09)	(0.09)
13 to 15	0.87	0.95	0.96	1.10	1.35	0.71*	0.93
	(0.15)	(0.09)	(0.24)	(0.14)	(0.33)	(0.11)	(0.10)
16 or more	0.54**	0.81	0.43*	0.83	1.67	0.56**	0.74*
	(0.11)	(0.09)	(0.15)	(0.12)	(0.44)	(0.10)	(0.09)
Occupation (ref. white collar)							
Skilled	1.06	1.09	1.44	1.18	0.82	1.10	0.99
	(0.17)	(0.08)	(0.41)	(0.12)	(0.13)	(0.16)	(0.08)
Manual	1.04	1.02	1.42	1.17	0.94	1.37*	1.27**
	(0.17)	(0.08)	(0.41)	(0.13)	(0.17)	(0.20)	(0.11)
Unemployed	2.50***	1.61***	3.98***	1.99***	1.54*	2.32***	2.59***
	(0.43)	(0.15)	(1.15)	(0.25)	(0.29)	(0.36)	(0.26)
Race (ref. white)							
Black	0.83	2.10***	1.05	1.22*	0.67**	0.71**	0.76***
	(0.10)	(0.13)	(0.18)	(0.10)	(0.09)	(0.08)	(0.05)
Hispanic	0.71*	0.99	0.55*	1.44***	0.71*	0.67***	0.64***
	(0.10)	(0.07)	(0.13)	(0.13)	(0.11)	(0.08)	(0.05)
Female	0.96	0.83***	1.16	0.97	2.83***	2.20***	1.75***
	(0.10)	(0.04)	(0.18)	(0.07)	(0.37)	(0.21)	(0.10)
Marital status (ref. married)							
Divorced/Sep./Wid.	1.47***	1.02	1.81***	1.06	1.67***	1.53***	1.07
	(0.17)	(0.06)	(0.32)	(0.09)	(0.22)	(0.16)	(0.07)
Never married	0.83	0.98	0.98	1.02	1.03	1.21	0.79**
	(0.13)	(0.08)	(0.24)	(0.11)	(0.20)	(0.16)	(0.07)

Notes: * $p < .05$, ** $p < .01$, *** $p < .001$ (two-tailed tests). Models also control for the year respondents completed the 50+ Health Module.

Figure 2: Difference in the Predicted Probability of Health Lifestyles by Structural Variables (N = 7,234)



Notes: A difference is not significant at .05 if its confidence interval is overlapping 0. *Notes*: This model also controls for the year respondents completed the 50+ Health Module.

Discussion

This study addresses health lifestyles in late middle age and confirms the continuity of a strong class pattern seen in studies of younger age groups. Taken together, our findings (1) identify patterns of health behaviors that coalesce into distinct health

lifestyles in late middle age; (2) establish similar relationships between health lifestyles and structural factors like class, gender, and race that prior studies have observed; and (3) uncover an association between health lifestyles and health status due to the onset of serious illness that seems to impact health behaviors that support the few studies on this topic to date.

First, the LCA found that, although specific health lifestyles practices generally have a basic binary character (good or bad), most respondents do not have overall lifestyles that are perfectly one or the other. Consistent with other studies, both healthy and unhealthy behavioral practices are often components of the same lifestyle (Burdette et al., 2017; Cockerham et al., 2017; Mize, 2017; Mollborn & Lawrence, 2018). For example, the healthy lifestyle consists of no current smokers, predominantly light alcohol use, the most frequent exercise, and low levels of fast food and sugary drink consumption. Oddly, there are no nondrinkers, which one would have expected to find in the healthiest lifestyle. Next in rank order is the healthy diet lifestyle that shows some smoking and drinking, less exercise than the healthy lifestyle, but little fast food and no sugary drink consumption. On the less healthy side is the smoking and drinking lifestyle with the most current smokers along with binge drinkers and little exercise. The unhealthy diet lifestyle includes some smoking, little drinking, and exercise, but the most fast food and sugary drink consumption by far. Thus, while the health lifestyles of these 50+ year-olds tilt toward the healthy end of the health continuum, overall, it cannot be claimed that the general pattern is especially healthy.

Second, with respect to predictors of membership in different health lifestyles, summary statistics and multinomial logistic regression models show a general gradient from high to low matching SES with the different health lifestyle classes. For example, the healthiest lifestyle is composed largely of above average earners with graduate degrees and jobs in nonmanual occupations. Alternatively, the unhealthy diet lifestyle had the lowest incomes, levels of education, and proportion of white-collar workers, along with slightly higher unemployment. As for race, members of different racial groups were spread throughout all health lifestyles, with the highest proportion of Whites in the healthy lifestyle and Blacks in the unhealthy diet lifestyle, while Hispanics were generally disbursed in equal proportions. These results make clear that health lifestyles patterns are strongly related to socioeconomic position but can also be affected to varying degrees by other structural variables.

Finally, the results suggest that certain class-related health lifestyle practices are generally "locked-in" by late life (Jones et al., 2011), but with an important exception—people with serious illness seem to transition to healthier lifestyles. That is, in a finding consistent with a few other studies (Kelly et al., 2016; Quin˜ones et al., 2017; Vierboom, Preston, & Stokes, 2018), healthy behaviors among late middle age (and perhaps older) adults appear to reflect efforts to cope with already existing chronic diseases. So, while the health lifestyles of younger adults may be "locked in" along class lines when reaching late midlife and old age, such lifestyles appear to change in a healthier direction for those individuals with chronic diseases, whether or not they had unhealthy or healthy lifestyles in the past. This suggests that health lifestyles are dynamic throughout the life course as the factors motivating one's health lifestyle change. When considered alongside the robust associations between SES and lifestyle that we found, this finding presents an interesting question: Does SES determine who is able to successfully change lifestyles? Given scholarship on education and health-related lifestyles (see Mirowsky & Ross, 2015), we predict that educational attainment and the human capital it provides play important roles in the lives of those who are able to change—not just a behavior—but their entire lifestyle in response to illness.

Our analysis comes with a few limitations. First, LCA is a data-driven technique and it is not our intention to suggest that

Table 4: Linear Regression of SF-12 Health Indices on Health Lifestyles, the Structural Predictors of Lifestyle, and Diagnosed Health Problems (N = 7,234)

	Model 1	Model 2	Model 3
Health lifestyles (ref. healthy)			
Healthy diet		-0.28***	-0.17***
		(0.03)	(0.02)
Smoking and drinking		-0.12***	-0.05*
		(0.03)	(0.03)
Unhealthy diet		-0.26***	-0.18***
		(0.04)	(0.03)
Structural variables			
Average log income	0.11***	0.10***	0.07***
	(0.02)	(0.02)	(0.01)
Schooling (ref. 0 to 11 years)			
12	0.14**	0.14**	0.10*
	(0.05)	(0.05)	(0.04)
13 to 15	0.15**	0.15**	0.12**
	(0.05)	(0.05)	(0.04)
16 or more	0.30***	0.28***	0.20***
	(0.05)	(0.05)	(0.05)
Occupation (ref. white collar)			
Skilled	-0.05	-0.05	-0.04
	(0.03)	(0.03)	(0.02)
Manual	-0.12***	-0.11***	-0.07*
	(0.03)	(0.03)	(0.03)
Unemployed	-0.97***	-0.94***	-0.67***
	(0.05)	(0.05)	(0.04)
Race (ref. white)			
Black	0.02	0.04	0.03
	(0.03)	(0.03)	(0.02)
Hispanic	0.07*	0.08*	0.00
	(0.03)	(0.03)	(0.03)
Female	-0.16***	-0.15***	-0.07**
	(0.02)	(0.02)	(0.02)
Marital status (ref. married)			
Divorced/Sep./Wid.	-0.09**	-0.10***	-0.05*
	(0.03)	(0.03)	(0.02)
Never married	-0.01	-0.01	-0.05
	(0.04)	(0.04)	(0.03)
Diagnosed health problems			
Heart-related			-0.49***
			(0.05)
Hypertension			-0.19***
			(0.02)
Stroke			-0.53***
			(0.08)
Diabetes			-0.26***
			(0.03)
Cancer			-0.35***
			(0.06)
Lung-related			-0.35***
			(0.04)
Arthritis			-0.63***
			(0.03)
BIC	19,263	19,189	17,447

Notes: * $p < .05$, ** $p < .01$, *** $p < .001$ (two-tailed tests). Models also control for the year respondents completed the 50+ Health Module.

the population of later middle-aged adults is solely composed of people who fall into these particular distinct health lifestyles. Rather, we view this study as contributing to the growing body of work using LCA to identify clusters of health behaviors. Second, it is possible that unmeasured confounders underlie some of the observed associations (e.g., a genetic propensity toward alcohol addiction might shape an individual's health lifestyle as well as their physical health). Finally, though the NLSY-79 Health Module contains a number of high-quality measures of health behaviors, there are additional measures that could provide further information. For instance, more detail about diet and physical activities should generate even more precise clusters of health lifestyles.

Despite limitations, this research addresses a missing period of the life course, late middle age, in prior studies of health lifestyles and confirms the continuity of a strong class pattern seen in studies of younger age groups. While the health lifestyles that emerged did have a basic binary character (good or bad), most respondents' lifestyles were not completely one or the other. Both healthy and unhealthy behavioral practices were mixed in the same lifestyle class as well as varying between classes. These lifestyles cluster in distinct and what will be seen as socially meaningful ways, denoting different configurations of health lifestyle practices. Specifically, our findings illustrate the powerful of SES in determining health lifestyles along the lines suggested by health lifestyle theory that, in turn, matches up with levels of physical health. Future research should seek to address the limitations noted above and also adopt a longitudinal framework. Such a framework would allow for an assessment of the evolution of health lifestyles over the life course and include consideration of how lifestyle practices can shift in response to the diagnosis of specific ailments.

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Author Biographies

William C. Cockerham is Distinguished Professor of Sociology and Chair Emeritus at the University of Alabama at Birmingham and Research Scholar of Sociology at the College of William & Mary. His most recent book is Sociological Theories of Health and Illness (Routledge, in press).

Joseph D. Wolfe is an associate professor in the Department of Sociology at the University of Alabama at Birmingham. His interests are in health and mortality, the life course, and social stratification. His current lines of research involve studies of multigenerational processes and mortality, the relationship between family attainments and women's health across historical contexts, and the intergenerational experiences that influence substance use and its association with mental health.

Shawn Bauldry is an associate professor of sociology at Purdue University. His research examines interrelationships between socioeconomic resources and health over the life course and across generations.