Measuring Socioeconomic Status

1. Learning Objectives

After reviewing this chapter readers should be able to:

- Understand what socioeconomic status is;
- Appreciate the difference between a composite and a proxy measure is;
- Identify the three major uses of SES in research; and
- Appreciate the limits of SES measurement.

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2. Introduction

Socioeconomic status is one of those terms typically learned in a seventh grade social studies or civics class and then used in college term papers to subtly suggest a deep understanding of how society works, or perhaps how it should work. While it is understandable that few go beyond a cursory understanding of the construct, among social scientists the term is serious business because it connotes one's position in the social hierarchy, how the hierarchy is structured, and very often one's consequent life chances. In other words, socioeconomic status (hereinafter SES) indicates one's access to collectively desired resources, be they material goods, money, power, friendship networks, healthcare, leisure time, or educational opportunities. And it is access to such resources that enable individuals and/or groups to prosper in the social world.

Social hierarchy, or stratification, appears to be intuitively recognized by most everyone everywhere (Smith et al. 2011). During social interactions various indicators are typically displayed or revealed in order to convey one's SES to other members of the social group . Common indicators include professional titles, clothing, hairstyles, automobiles, residential addresses and so forth. All social animals, be they wolves, whales, monkeys, or humans, appear to appreciate, or at least recognize, social hierarchies and their position in them (Gesquiere et al. 2011; Sapolsky 2005). The level of sophistication of a hierarchy may be as simple as a pecking order based entirely on physical prowess, often with an alpha male atop.

> **Hierarchies may also be extremely multidimensional and complex, such as contemporary human societies, with innumerate subgroups and subcultures, and with stratification built along many lines including intelligence, appearance, talent, experience, age, pedigree, language accent, work ethic, and so forth. Relatedly, the level in inequality within and between dimensions of SES varies as well (Smith et al. 2011).**

2. Introduction

Overview of the Research Process

There is a vast array research and inquiry into the nature and process of human social stratification over time and across societies, the mobility of actors within such societies, and the implications for well-being and life chances within the same (Krieger 1997; Oakes and Rossi 2003; Spilerman 2000; Van Leeuwen and Maas 2010). My take is that about half the work is devoted to descriptions and empirical facts about how a given society is stratified, and half is devoted to how a given society *should* be stratified, if at all. In any case, this is not the place to review the work or offer a serious taxonomy of it.

Many contemporary scholars appear interested in SES because it serves as an indicator of the health of a social system or society, often measured against some egalitarian or meritocratic ideal. Informally stated, the meritocratic ideal is that regardless of birth right or inherited endowments, individuals may increase their SES through effort, including but not limited to the development of their inherited endowments (Bowles, Gintis and Wright 1998) . Societies without such potential are often viewed as less healthy if not backwards. For meritocrats and egalitarians alike, stratification based on birth (i.e., luck) or discrimination based on race, gender, religious ideology, or ethnic background are anathema to social or civil progress (Arrow, Bowles and Durlauf 2000).

2. Introduction

Another group of contemporary scholars seems interested in SES in order to rule out the long established effects of SES on various measures of well-being and life outcomes. For this group, SES is a nuisance variable; one that must be controlled for or eliminated as a potential explanation of research findings or theoretical arguments. Here, SES is of interest only so far as it eliminates effects that confound the exposures or treatments of direct interest.

Given that there are volumes written on the topic, what follows should be viewed as a pragmatic summary for the applied researcher, by an applied research. In the main, I shall try to offer a few helpful citations to other work for readers interested in a deeper understanding. What is more, it is important to stress that my own work is largely focused around the relationship between SES and health in contemporary America. Consequently, this chapter is necessarily biased in this direction. I regret that I am not sufficiently skilled in the workings of other societies or time periods to do such work justice.

The aim of this chapter is to present and review some contemporary measures of SES and to offer recommendations about how best to think about and use such measures and those like them.

3. What is Socioeconomic Status?

It may surprise some but the fact is that there is no agreed upon definition of SES, and in my view there will never be. This is because the construct necessarily entails political ideologies about existing and desired social structures, and political ideologies and science do not mix well. For the last three decades or so, some scholars have defined SES as equivalent to simple, measurable things such as annual income. Others think race or ethnicity should be included. Some believe health status should be part of an SES measure since SES and health are so highly correlated and clearly cause each other. Few are certain how to assign SES to those not in the labor force, such as children, the elderly, or those who have intentionally dropped out. In sum, for a term that appears to be universally understood and employed it is profoundly ironic that its scientific underpinning is so under-developed.

> **I maintain that SES is a construct that reflects one's access to collectively desired resources, be they material goods, money, power, friendship networks, healthcare, leisure time, or educational opportunities (Oakes and Rossi 2003).**

It is access to such resources that enables individuals and/or groups to thrive in the social world. Those with higher SES tend to thrive and many aim to improve their SES – or the SES of their offspring – in order to improve their life chances. Although too often correlated with it, I do not think race or ethnicity are part of one's SES (Kaufman, Cooper and McGee 1997; Oakes and Rossi 2003). One should be able to improve their SES without changing their phenotype (including skin color) or linguistic accent. Further, I do not think health should be a part of SES, though health certainly affects SES. As with race/ethnicity, incorporating health into SES measures prevents our ability to discuss health outcomes by SES. Of course, phenomena such as racism disrupts social mobility and is therefore related to SES. Further, it is well established that poor health can cause down-turns in SES.

3. What is Socioeconomic Status?

There are a few terms that are similar to SES and many of these are used as synonyms. Accordingly, it seems best to offer a brief comment on them. The first is *social class.* Social class is a construct or measure that, like SES, aims to locate one's position in the social hierarchy. But unlike the multidimensional and often finely graded (continuous scale) aspects of SES, measures of social class are typically coarse and limited to one's relationship to the so-called means of production. Marxist in origin, social class measures tend to classify persons according to whether they own or control a business (or school!) or whether they are laborers in such places (Krieger 1997; Wright 1985). In any case, the understanding and use of social class is not unlike the use of SES and for purposes here, at least, I believe it is fair to use the terms synonymously.

Instead of SES, European scholars tend to use term *socioeconomic position (SEP)* (Galobardes et al. 2006). I also view these two terms as synonyms. I actually prefer SEP because, among experts, SES tends connote meanings limited to occupational prestige, which is a largely outdated idea. Yet in practical terms the distinction between "status" and "position" seems trivial. But since I'm intellectually biased toward American scholarship I use the term SES here and elsewhere.

3. What is Socioeconomic Status?

Though used less often, the term *caste* is also related to SES because caste tends to convey one's social class, status, or position. But unlike SES, or at times even social class, caste tends to convey a place in the hierarchy that is not surmountable by effort. Caste is set at birth and is rigid if not impenetrable. It is directly tied to the luck of one's birth parents (Arrow, Bowles and Durlauf 2000).

Even more rigid is the term *species.* In the biological sciences, species is a basic unit of taxonomy defined as an organism's ability to interbreed and produce viable offspring. Obviously all homo sapiens are able to interbreed and produce viable offspring. But when loaded with culturally charged emotions and biases, the idea of species becomes related to SES. Among palpable effects are anti-miscegenation laws in the US, global anti-Semitism, and Apartheid in South Africa.

3. What is Socioeconomic Status?

Whatever terms are used, it is essential to appreciate that SES is more difficult to define in the complex world of the 21st Century than it was in, say, the early 19th century or before. In the pre-modern era, SES may have been based on physical strength, intelligence, and/or choice of parents (a quip worthy of considerable thought). In the modern era, wealth, income, educational attainment, and occupational prestige have been defensible indicators of SES. But in our current post-industrial era, it is not altogether clear what indicators signal access to what resources and whether there is sufficient social consensus on the desirable resources themselves.

A final point about the definition of SES revolves around the issue of quantifying social inequality. One can define SES is a certain way and then measure how different or unequal persons or groups are given the definition. Alternatively, one can construct more direct measures of inequality, such as the Gini coefficient and Theil Index. Inequality measures such as these tend to tap just one dimension of SES, typically income or wealth, and serve as summary measures of variance or dispersion. Given their relative simplicity, inequality measures appear to be critical to address questions of whether socioeconomic inequality causes health to decline(Adler and Ostrove 1999; Bowles and Gintis 2002). However, the validity of inequality measures is not only based on their computational utility but also on their underlying conception of SES, which is clearly multifactorial. In any case, inequality measures, per se, are not the focus of this chapter.

Today there are college drop-outs who are Internet billionaires, poor persons with big-screen televisions and expensive luggage, and increasingly large number of people who are rejecting consumerism in favor of simpler and less environmentally damaging lifestyles. In short, SES today is clearly a hyper-dimensional latent variable that is difficult to pin down.

4. Why SES Matters

There are many reasons why the sound measurement of the SES of a person, group, era, or geographic region is fundamental to the social and health sciences. I offer five but surely these are among a larger set.

1. Measures of SES, and statistics based on them such as variances, are necessary to quantify if not understand the level of stratification or inequality in or between societies. Mismeasure SES and you end up mismeasuring social stratification and social inequality; poor decisions often follow.

2. Without sound measures of SES, it is impossible to capture and understand changes to the structure of a society, be it the rise of women in the workplace or the isolation of African Americans from opportunities for professional advancement. Societies are dynamic bodies and mismeasurement will (typically) mute the causes and effects of changing structures.

3. Relatedly, without sound measurement of SES it is impossible to understand the intergenerational change of social status over time. A solid understanding of the intergenerational variance in SES is critical to understanding changes the reproduction of social structure and in the egalitarian ideal mentioned above.

4. Without an understanding and sound measurement of SES, the relationship between other important social variables, such as race or sex, can be masked by the evident and often dominant relationship between outcomes and SES. In other words, SES matters because other variables matter and since most social variables are correlated one may misattribute effects to or from SES to such variables.

5. Finally, SES matters because it has been related to health and life outcomes for as long as social groups existed. In short, the more status or higher-rank a person or group the better the chances it has for a long and healthy life.

4. Why SES Matters

This last point merits a little more attention. Figure 1 is a sketch of what I call the fundamental graph of public health. The figure is intentionally drawn in a cartoon-like fashion because it is not precise. In actuality, the slope and the intercept of the (regression) line varies by disease, time and place, and there are surely non-linearities to consider. Yet the core principle remains: the higher one's SES, the greater their expected health. What is more, to the extent it reflects empirical reality, Figure 1 suggests that health may be improved in just two ways. First, a person or group's health may be improved by moving them along the line, left to right, on the horizontal SES axis. Given the slope, this would increase the expected value of health (vertical axis) for the person or group. Political and economic efforts to enhance education or increase earnings are interventions consistent with this approach. Social scientists tend to focus on this class of potential interventions. Some economists often propose policies to increase a person's educational opportunities (i.e., human capital) so that they may get a better job and increase their SES. Other economists may aim to increase a nation's gross domestic product (GDP) in order to raise the entire slope (effectively changing the intercept) and improving everyone's health. On the other hand, health may be improved while keeping SES constant. This is symbolized by the red-colored vertical line and associated question mark. Policies and interventions of this type tend to be medical in nature. Examples include vaccines, pharmaceuticals, and surgeries. Each of these interventions increases health without altering the fundamental social structure of society or a person or group's SES. It follows, that the medical interventions are often easier to "sell" to the public since there is little dispute over the potential for restructuring society's winners and losers. Interestingly, perhaps the greatest public health intervention ever stumbled upon, fluoridation of water, may be viewed as a combination of both approaches because it led to more productive workers and increased (oral) health directly.

Figure 1: Fundamental Graph of Public Health
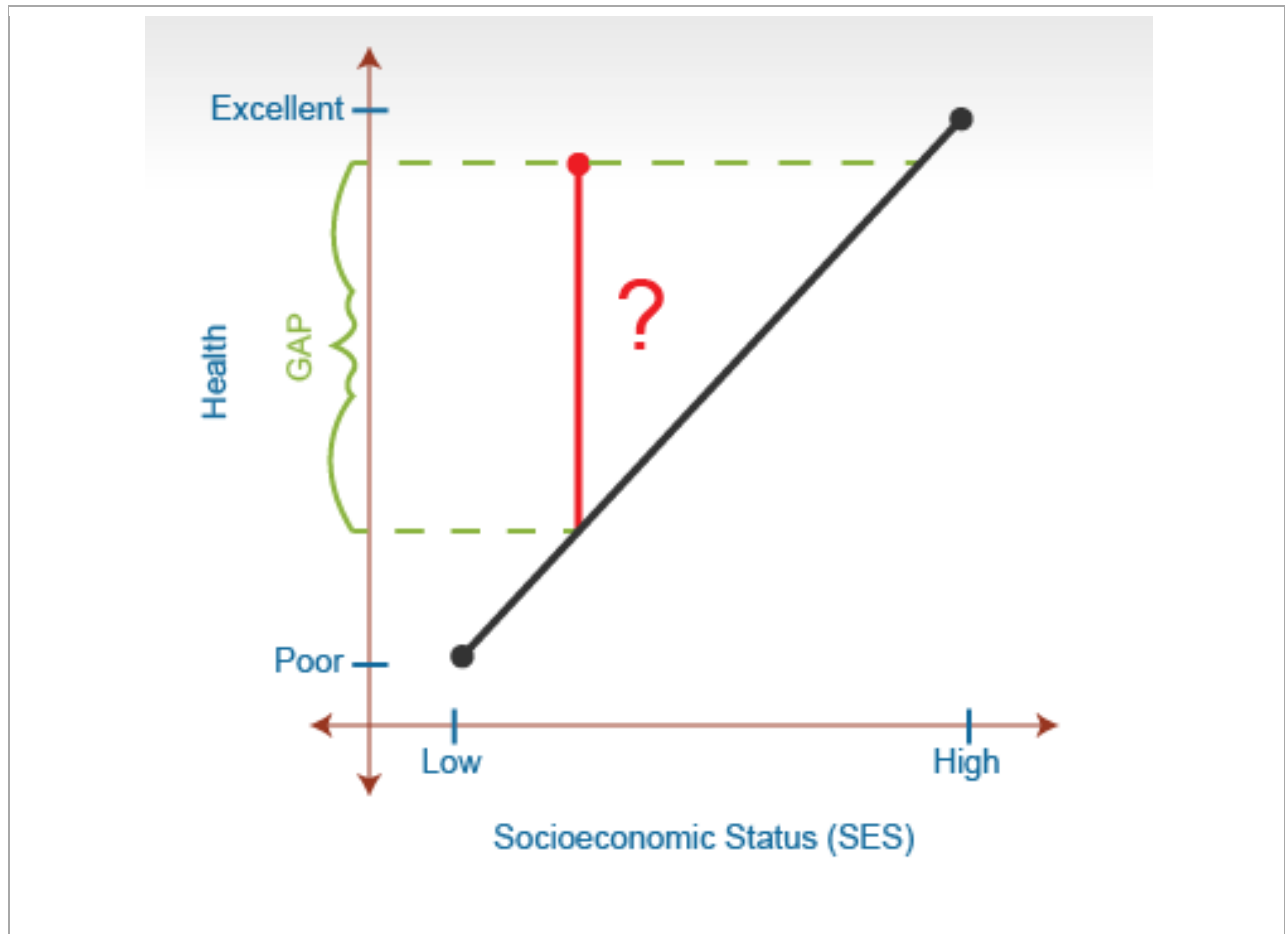
4. The Design and Planning Phase

The Research Design

Socioeconomic status is a latent variable in the sense that, like mood or well-being, it cannot be directly measured (Oakes and Rossi 2003). Unlike height or weight, there is no mechanical device that permits direct and relatively precise measurement of SES. Instead, SES is a complicated construct that summarizes a person or group's access to culturally relevant resources useful for succeeding in if not moving up the social hierarchy. As such, to have teeth, SES measures must be tied to particular cultures, eras, and even geographic places. It is hard to imagine a universal measure of SES that would be helpful in all research. The roots of power may be similar among all human societies but the nuances of social stratification and social mobility seem to different and important enough require differentiation in SES measure for many research problems (Henrich et al. 2005; Smith et al. 2011; Spilerman 2000; Van Leeuwen and Maas 2010).

A principal goal of modern social science has been to measure the SES of persons (and families) and estimate how such measures changed over time. The history of such efforts, especially in post-World War II America, has been already explicated (Galobardes et al. 2006; Krieger 1997; Oakes and Rossi 2003; Van Leeuwen and Maas 2010). Suffice it to say that until recently the central focus of such research was on occupational prestige and status, and the big debate was whether corresponding measures should be subjective or objective. The focus on occupational prestige, and its derivatives, is understandable since persons (typically males) often had one lifetime career and the system was rather static. One's occupation was often set by the age of twenty five and there was little change thereafter. Measuring prestige or status resulted in a useful measure of SES.

⚙ Exercise 1: Appropriate Research Methods

Referring to Figure 1, decide whether each of the following examples attempts to improve the expected value of health by moving people up along the X-axis (SES), Y-axis (Medical) or a combination of both.

A mentoring program for inner-city high school students

X-axis	Y-axis	Both

Improved antibiotics to prevent infection after surgeries

X-axis	Y-axis	Both

A scholarship program to increase opportunities for low income students to go to college

X-axis	Y-axis	Both

Ethnic diversity training for primary care physicians

X-axis	Y-axis	Both

Health

GAP

Excellent

Poor

?

Low

High

Socioeconomic Status (SES)
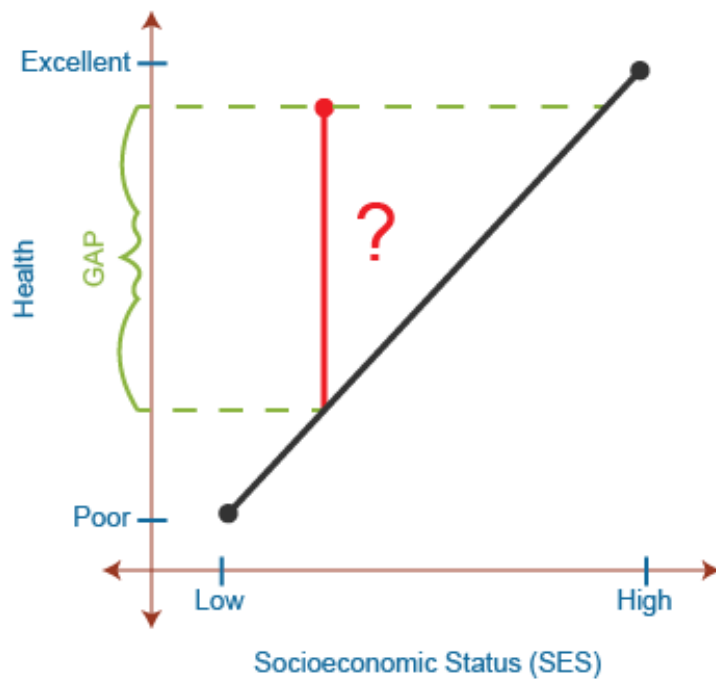
5. The Design and Planning Phase

At this point it seems helpful to add that before the advent of modern social science, one's SES was known and acknowledged by all members of their particular community. This was accomplished through historically derived social norms that produced opportunity and power structures within communities (Henrich et al. 2005; Krieger 2001; Van Leeuwen and Maas 2010). The SES of each community member was known because communities were relatively small and close knit, if not technically closed. Everyone interacted and knew each other and therefore the hierarchy was almost intuitively understood and enforced. As communities grew in size they also grew in complexity. With the industrial revolution came specificity in the division of labor and more specialized social roles. Persons traveled to new lands and it became increasingly true that community members did not know one another personally and as such did not intuitively understand their role and thus their status relative to others. Further, social status enforcement mechanisms grew somewhat weaker which meant one could theoretically increase their SES through the development of human and social capital accumulation; social mobility up the hierarchy was possible.

When thinking about measuring SES today, is it is useful to make the distinction between two types: (1) composite measures and (2) proxy measures. Composite measures are those that aim to incorporate several domains of information into a singular (i.e., scalar) quantity. Common examples include efforts to integrate information about educational attainment, annual earned income, and occupational prestige into a single number for each person or group. The aim of composite measures of SES is to combine information from the multiple domains relevant to one's definition of SES, weight each component appropriately, and calculate a single number of rank. Of course the (statistical) weights matter a great deal and are the most controversial part of any composite measure. On the other hand, proxy measures typically tap a single domain, such as annual earned income, and are often (inappropriately) used to reflect one's total SES.

5. How SES is Measured

I will now summarize some well-known or innovative measures from each of the two strata. Experienced readers may note that their favorite measure is missing from this discussion. I beg your indulgence in hopes of making some points about all such measures in the text that follows. More details may be found here: (Bowles and Gintis 2002; Galobardes et al. 2006; Krieger 1997; Oakes and Rossi 2003; Smith et al. 2011; Van Leeuwen and Maas 2010).

Composite Measures

There are several well-known composite measures of SES. I offer a brief description of a few that are relevant to this discussion. Broadly speaking, the advantage of composite measures is that they offer potentially sophisticated scalar quantities useful for cross-tabulating coarsened or categorized SES measures by outcome measures. The main disadvantage of composite measures is that they combine constituent information and thus necessarily require strong theory about how to properly weight such information. If the weights that combine the information are incorrect, then the outcome scalar is incorrect, and the measure of SES itself is incorrect.

5. How is SES Measured

Composite measures

Duncan SEI & Nam-Powers OSS

The Duncan Socioeconomic Index (SEI) has been dominant in US research and is associated with census data. The measure is a scalar quantity on the continuous scale and ultimately based on data from subjective assessments of occupational prestige: viz, being a judge is more prestigious than being a garbage collector. Educational attainment and income are implicated. The underlying logic behind the SEI was to regard education as a prerequisite for an occupation, and income its reward.

Related to the SEI is the "objective" measure of SES developed by Nam and Powers. The Nam-Powers Occupational Status Score (OSS) differed from the SEI in that subjective ratings were not used. Instead, measured income and educational status were used to create a single composite quantity. When social mobility research showed the correlation between father and son's "objectively" defined occupational status was much larger than the correlation between father and son's "subjectively" defined prestige scores, American stratification researchers viewed prestige as epiphenomenal and an inferior measure of SES. More in tune with the British model, occupational status thus gained dominance in the American sociological literature.

Although survey respondents readily provide their occupations, occupational prestige information is difficult to come by. There is no consensus on how ranks should be determined, especially when there are hundreds of occupations in even the simplest of taxonomies. Scores for some "occupations" – such as full and partial retirees, students, homemakers, and military personnel – are problematic. Gendered and segregated subpopulations pose other problems, as do children. Mapping stated occupations into (census) defined codes is difficult and often time consuming. Finally, occupations are increasingly changing over time. Hauser and Warren (Hauser and Warren 1997) conclude, "While composite measures of occupational status may have heuristic uses, the global concept… is scientifically obsolete."

In today's world of shifting occupations and dynamic global economic forces, it is reasonable to ask if occupational prestige still represents a sound measure of SES. My view is that other measures are superior and agree with Hauser and Warren's statement.

5. How SES is Measured

Identify the population to be studied

Household prestige scale

In 1974, Peter Rossi and colleagues developed a household prestige (HHP) score. Anticipating work published 25 years later, Rossi argued that the household be considered the primary unit of stratification. He employed his factorial survey approach (Rossi and Anderson 1982) where husband's occupation and education, along with wife's occupation were randomly varied in a set of vignettes. In his original study, Rossi recruited a convenience sample of N=146 white adults in Baltimore and asked them to rate the social standing of households described in terms of spouses' occupations, incomes, and ethnicities. He then regressed the resulting ratings on characteristics of vignette examples to infer the relative influence (regression coefficients) of the social characteristics of families. The resultant equation permits investigators to assign unbiased status scores to households based on the occupations, educational levels and ethnicities of spouses. Nock and Rossi later applied this method to national samples and calculated weights that apply more generally (Nock and Rossi 1979; Nock and Rossi 1978). This approach has not received widespread attention. My view is that the HHP remains an under-appreciated measure of SES. That said, it would take a large effort to create new weights through a new study and convince a presumably skeptical scientific audience of the utility of the measure.

5. How SES is Measured

Composite measures

CAPSES

Some years ago I attempted to develop a new measure of SES that was psychometrically sound, consistent with the modern political economy, and useful over the life course (Oakes and Rossi 2003). With the help of the Peter Rossi, I defined SES as one's access to resources and then defined resources as (1) material capital (income, wealth, trust funds, etc.), (2) human capital (skills, abilities, credentials, etc.), and (3) social capital (instrumental relationships such as being friends with lawyers and doctors). Since all domains tapped some form of "capital", I named the construct CAPSES.

I believe that there were two important innovations in CAPSES. First, was the incorporation of social capital into otherwise somewhat conventional ideas about SES. Social capital is critical because it permits scientists to consider a child's SES a function of their parent's SES. Whereas a parent might have income and education, a child gains their SES by their social connections to their parents. The child owns nothing and has no fungible skills. It is the social relationship – their social capital – that matters. In fact, it was the inclusion of social capital that permitted the second important innovation: theoretically, the measure worked across the life course. I envisioned a life course approach where the three (capital) components of SES were traded off and leveraged as persons moved within or across social structures over time. A graduate student, for example, would have little material capital, but would be gaining human and social capital that could eventually be exploited to gain material capital. SES (or more correctly, CAPSES) may thus be constant across a life course even as education and income ebbed and flowed.

While initial research revealed promise for the new measure, subsequent work revealed it was not all that empirically useful, at least marginally so. In short, material capital (e.g., income) and human capital (e.g., educational attainment) swamped all other measures, no matter how elements were weighted. In other words, by measuring income and/or education, there was little gain in adding other information. Further, the convention of imputing to a child or student their parent's income or educational status proved just as predictive as CAPSES.

Every so often I get an inquiry from a scholar excited about the potential of CAPSES but it seems everyone ends end up where I did: income and/or education are such strong proxies for

SES that they dominate any more nuanced parameter estimates. Upon reflection, this should not be too surprising. The rules of social structure (i.e., structuration) cause strong correlations among all forms of capital: one's instrumental social capital is typically bound up in their education and occupation. Few impoverished persons are good friends with lawyers and doctors. The materialism of modern society clusters persons of similar abilities and interests.

5. How SES is Measured

Composite measures

Cambridge scale

The British Cambridge Social Interaction and Stratification Scale (CAMSIS) relies on patterns of social interaction to determine social structure and an individual's position in it. Distance among persons in the social structure is defined by similarities in lifestyles and resources that occupational groups share. As mentioned above, the clustering of social values and behaviors appears fundamental to all societies. In any case, the Cambridge Scale is technically a continuous measure that is often categorized into four to six ordinally ranked groups. The nice thing about the scale is it gives extra information about the clustering of social interactions. The downside is it relies heavily on occupational groups.

NS-SEC

In the UK, the National Statistics Socioeconomic classification (NS-SEC) is now the primary (governmental) measure of SES. The NS-SES replaced the Registrar General's Occupational Social Class (RGSC) scale in the year 2000. The NS-SES is similar to the an earlier scale called the Erikson-Goldthorpe scale. In short, the NS-SEC is a complex measure using several aspects of one's job and employment relations to calculate a scalar measure of SES (or SEP). It is important to appreciate that the NS-SES is not a simple hierarchical scale. It is relational, which can make analyses complicated. Only the grouping that collapses into 3 categories can be considered hierarchical.

Exercise 2:

For each of the potential composite measures of SES, identify one advantage and one disadvantage and place one of each with the appropriate measure.

Advantages:

Presumes SES is a household-level measure	Provides extra info about clustering of social interactions	Incorporates critical concept of "social capital"
Psychometrically sound measure	Comparability to many historical studies	Uses objective ratings shown to be superior to subjective ratings

Disadvantages:

Uses difficult to classify occupational prestige rankings	Relies heavily on occupational groups	Requires more evaluation; may not be accepted by scientific audience
Uses subjective ratings shown to be inferior to objective ratings	Relational nature of scale can make analyses complicated	Showed little gain to adding info beyond income/education

Composite measures of SES	Advantages	Disadvantages
Duncan Socioeconomic Index		
Nam-Powers Occupational Status Score		
Household Prestige Scale		
CAPSES		
Cambridge Social Interaction and Stratification Scale		
National Statistics Socioeconomic Classification		

How did I do?

5. How SES is Measured

Univariate measures

There are several well-known univariate or proxy measures of SES. As with the composite measures, I offer a brief description of a few that are relevant. Broadly speaking, the advantage of univariate or proxy measures is that they offer potentially simple scalar quantities that can be readily collected. The main disadvantage of univariate measures is that they do not tap the rich aspects of the latent SES measure.

Income

Perhaps the most commonly used if not expected measure of SES is a person's earned income. Often annualized, income is a simple indicator of SES in that aims to captures one's ability to literally purchase desired resources. Conceptually speaking, annual income if relatively easy to measure. The researcher may offer categories for the respondent, request an exact amount, or perhaps even consider using tax or other administrative records to collect such data. Unfortunately, income is an imperfect measure of SES.

Among the problems with income is the fact that approximately 30% of respondents are unwilling to reveal it, and those that do may misstate their income in one direction or another. Income can also be extremely volatile and fluctuate considerably over the course of a year, let alone the life-course. Income is also fairly age-dependent: retirees often have no income from earnings. Relatedly, it is unclear if income should include money from all sources (eg, illegal activity, government subsidy) or just earnings from legitimate work. Finally, income alone does not necessarily reflect purchasing power since income is not equal to wealth, which varies greatly by race and age. Some have argued for the use of a three-year average income or something related. This may be better but does not obviate the concerns raised here.

5. How is SES Measured

Univariate measures

Wealth

Unlike income which reflects a flow of resources, wealth represents a stock of resources. Wealth it tied up in bank accounts, stocks and bonds, real estate, business ownership, and so forth. Wealth is often accumulated over a life time and, when available, past down to future generations through various inheritance mechanisms.

Theoretically, wealth is an excellent measure of SES. The trouble is that wealth is extremely difficult to measure in practice. Further, the mass of citizens, especially minorities in America, have little wealth – in fact, many have negative wealth. When it comes to SES it is almost as if wealth is a dichotomous variable: some have it, most others do not. Those who have wealth are almost always high SES persons. In this way, wealth is almost the mirror image of poverty measures.

5. How is SES Measured

Univariate measures

Educational Attainment

For those older than 25 years, educational attainment is an excellent proxy measure of SES. One reason for this is that after age 25, educational attainment is relatively constant (those pursuing advanced degrees after age 25 are typically high achievers). Another reason is that educational attainment, at least if the contemporary US is relatively easy to measure and, unlike income, respondents are often willing to answer questions truthfully. Researchers tend to measure educational attainment by either highest degree earned (eg, High School, College) or years of education (eg, 1-30). The latter tends to be more problematic for while years of education may matter, research shows degrees matter more: it is credentials, not time, that appears to be return the most rewards.

But like income educational attainment is neither a perfect measure of SES nor a perfect measure of IQ or other dimensions of human capital. Among the issues are differential returns to education by race and gender, cohort effects, and heterogeneity of status by subsets (e.g., Ivy League schools and online "degree mills"). Additionally, the percentage of college graduates has increased, there are some high SES high-tech persons with relatively low levels of formal education, and there are highly educated but low income persons – such as graduate students or new assistant professors. Further, the lack of variability in education for most adults precludes the opportunity to assess how health status is affected by (exogenous) changes in education. Finally, many studies that use education as an indicator of SES are individualistic in approach and do not incorporate information about the education level of other members of the household.

5. How SES is Measured

Univariate measures

Poverty

Poverty measures are important for many areas of research but poverty is not a very good measure of SES. This is because poverty is too coarse. Impoverished persons and families are almost universally of very low SES and without further information researchers are typically limited to analyzing mere dichotomies: above or below the poverty line. What is more, given the vast history of research on the deleterious effects of poverty, one should be surprised only when the impoverished fair well relative to the non-impoverished. Methodologically, poverty thresholds are typically determined as a function of annual earned income and therefore all of the problems associated with annual income are applicable to the poverty measures. Measures associated with poverty, such as "food stamps" and free and reduced school lunch suffer the same fate.

5. How SES is Measured

Univariate measures

Area/contextual level measures

During the past 5-10 years researchers have been increasingly using measures of SES tied to one's residential neighborhood, which is often defined as a census tract or block-group (a consensus definition of "neighborhood" is as elusive as "SES"). The idea is that social structure increasingly segregates persons by SES such that the poor increasingly live with the poor and the rich live with the rich. Consequently, the poor struggle for employment and educational opportunities while the rich leverage their material wealth and social relationships to access even greater shares of desired goods and services, such as elite college educations and occupations. It follows that, especially in highly segregated America, knowing where one resides is a superb indicator of their SES due to high level of "clustering."

Previous work examined whether so-called area-level measures were a good proxies for individual-level measures of SES. In an important paper, Geronimus and colleagues (Geronimus, Bound and Neidert 1996) showed that area level measures were not highly correlated with person-level SES and cautioned against their use as such. I have come to a different conclusion from the same evidence. The fact that area-level measures do not correlate perfectly with individual level measures of SES does not mean area level measures are wrong or even inferior. To the contrary, I have come to believe that a person's "choice" of residence is the best single source of information about their status or place in the social structure — again, especially in segregated America. It is individual level measures of education and income that seem to not capture the full force of the latent variable SES. Though clearly imperfect, and with respect to US Census data, I think a block-group's median value of owner-occupied housing is perhaps the best indicator of a person's SES. Because of the "Great Sort" by economic means and political ideology (Bishop 2008), the median value of housing is high in desired areas and low in undesired areas. The simple supply and demand of real estate markets thus yields a strong indicator of SES.

⚙ Exercise 3:

For each of the potential proxy measures of SES, identify one advantage and one disadvantage and place one of each with the appropriate measure.

Advantages:

Can be determined for all individuals	Captures the richness of the latent SES measure	Relatively simple, easy to measure way to capture ability to purchase desired resources
	Status is maintained over economic shocks (like job loss)	

Disadvantages:

Difficult to measure	Requires residential address information	Can be volatile, fluctuate throughout the year and throughout a lifetime
	Decreasing variability relative to some other measures	

Proxy measures of SES	Advantages	Disadvantages
Income		
Wealth		
Educational attainment		
Area/contextual level measures		

How did I do?

6. How SES Should Be Measured

Recall that there is no consensus definition of SES and in my opinion probably never will be. Therefore, with a variety of SES measures at least theoretically available to the researcher, the natural question is which one should be used? Which is best? Regrettably, I must write that it depends…

On one level, there are pragmatic concerns. In short, one should collect as much socioeconomic data as reasonably possible; the more the better. But given real world constraints, the amount of SES information that can be collected is often limited to conventional measures of educational attainment or annual household income. If one is working with existing data, there are obviously limits to the availability of measures. If the Duncan SEI exists in the data being analyzed then using it seems prudent. If you are left with nothing but a coarse measure of educational attainment, then use it. Relatedly, it may be prudent to measure SES as previous researchers did, even if you disagree with the approach taken, since this will enhance comparability (or replication) of prior work. For better or worse, comparing estimated relationships between SES and health in, say, two source population requires the same measure of SES be used.

However, I hope that my "it depends" answer gains some intellectual traction when viewed at a deeper level. The key idea is that one should collect data appropriate for answering their particular research question. In other words, since there is no agreed-upon measure of SES, researchers should select the one that best informs their research question.

6. How SES Should Be Measured

There are three major uses of SES and how it should be measured depends on which use is intended. To make this point concrete, I shall refer to the following regression equation in the discussion below:

$$Y = \alpha + \beta X + \gamma Z + \varepsilon \qquad (1)$$

The first major use of SES is as an outcome measure: the Y in equation (1). In this case, researchers typically aim to estimate the impact, X, of this or that exposure or intervention, X, on SES. Composite measures are helpful here since they aim to capture the rich meaning of SES. That said, most health researchers aim to understand and explain not SES but health; health, not SES, is the outcome. Accordingly, I shall say nothing more about optimal measures of SES when SES is the outcome.

The second major use of SES is as a primary exposure or risk factor for some (health) outcome. Here the goal is to evaluate the relationship, β, between the latent SES measure, Y, and the outcome variable of interest, Y. In this case, composite measures seem to have an advantage because they aim to fully measure the latent SES construct and offer a scalar (even if coarsened and categorized) quantity for each subject. For example, one might collect or exploit data so as to assign each subject an occupational prestige or status score and then evaluate early mortality outcomes by each level of this "SES" measure.

6. How Should SES Be Measured

Utilizing as much information about the latent construct SES through a composite measure is beneficial because mismeasurement leads to residual confounding which results in biased effect estimates and potentially incorrect conclusions. In other words, unless one's measure of SES is perfect, one's estimated effect of SES on health will be biased, and the direction of the bias is uncertain. Because they incorporate multiple sources of information, presumably in some theoretically meaningful way, psychometrically sound composite measures appear preferably to proxy measures in terms of bias and imprecision.

On the other hand, as far as potential policy interventions go, composite measures are less helpful than simple, clear, and potentially actionable manifest measures such as educational attainment or annual income. In other words, no matter how unbiased and precise the effect of SES on some outcome is, the practicability of findings based on composite measures is questionable. Just what is a policymaker to do with results that show that the health of persons with low SES is worse than the health of persons with high SES? If the relationship is causal (and it surely is), how can SES as a latent and conceptually slippery construct be increased? What is the policy lever? Accordingly, less technically precise measures of SES, per se, are often the most useful in policy discussions. For example, demonstrating that relative to higher levels, lower levels of education cause health problems is an actionable finding. If interested in a remedy, policymakers may pursue strategies to enhance the educational attainment of persons or groups. Similarly, if low household income is shown to cause asthma in children, then policymakers may aim to increase the minimum wage or offer tax credits to the less fortunate among us. The upshot is that the use of theoretically, if not psychometrically, pleasing composite measures of SES may not be the most useful approach for policy research.

6. How Should SES Be Measured

The third major use of SES is as a control or adjustment variable. Here the analyst needs a measure of SES in order to "control for" its strong confounding power. For example, one might control for SES in a regression model estimating the relationship between smoking and lung cancer. With respect to equation (1) above, the approach is using SES as Z. This is important since without sufficient control of SES, the effects of smoking on lung cancer could be misstated since SES is related to both smoking and lung cancer risk; there may be an inappropriate mixing of the effects of smoking with the effects of SES. It is important to appreciate that if the researcher were able randomize many persons to treatment conditions the control for SES would not be necessary since SES would, by dint of randomization, be balanced across experimental conditions – randomization of large numbers obviates confounding. It is from this framework that we can view SES not as a variable of substantive interest (as above) but as a nuisance variable who effect is to be eliminated.

Assuming the analyst aims to control for SES through the machinery of multiple regression (including propensity score methods), the optimal measure of SES is *many*. That is, optimal control for SES in a regression framework entails having many measures that tap the multiple elements of the latent SES in the model. One might include measures of annual income, educational attainment, parental job prestige, residential neighborhood income or home values, and so forth. With respect to equation (1) above, the single variable SES indicated by Z, now becomes a matrix of several variables, denoted Z. When adjusting for SES in a multiple regression framework it is best to enter many (proxy) measures of SES individually because each will consume some of the variance of the outcome measure and, theoretically, free the exposure or treatment of interest from confounding bias captured in . Mismeasurement of one measure will leave variance for another to soak up. Use of a single composite measure is not optimal for regression control since, by the machinery of regression models, more variance will be accounted for by the component measures. However, use of a composite measure (including a propensity score) *and* multiple proxy measures is probably a good thing if such measures are available.

6. How Should SES Be Measured

I insist that regression adjustment for SES merits careful consideration. Too few appreciate that regression "adjustment" is a form of imputation where the outcome measure being analyzed is altered by the machinery of the model being employed – often linear interpolation. In other words, adjustment for SES may give an analyst comfort in that she enhanced the exchangeability of confounding risk factors. But such comfort comes with the cost of assuming a correct model, including full control of the confounding influence of SES. The trouble is that our models are hardly ever correct: viz, assuming that a poor man has the same access to resources as a rich man once we statistical equate their income is simply absurd. Further, all too often researchers "adjust for SES" across racial groups and conclude that the remaining effect of race is genetically induced (Kaufman, Cooper and McGee 1997). I refer the reader to the great insights of the late William Cochran (Cochran 1957; Cochran 1963; Cochran 1968) who I dare to summarize as saying that one should use regression adjustment only when it is *not* needed because when it is needed there is great potential to end up comparing apples to oranges and supporting inferences not with real data but on model-induced "facts." Over the past few years I have advanced these ideas into the definition of structural confounding, a term I coined to convey the problem of confounding that cannot be overcome by regression adjustment without heroic modeling assumptions (Oakes, Messer and Mason 2010).

Exercise 4:

For each of the following examples, decide which meaure of SES would b most appropriate. Some measures may be used more than once, and others may not be used at all.

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Example A: A researcher wishes to examine the relationship between diet and colon cancer.

| Composite measure | Single proxy measure | Multiple proxy measure | Unclear/unknown |

Example B: A state official is interested in designing a new program to improve mental health outcomes in her state.

| Composite measure | Single proxy measure | Multiple proxy measure | Unclear/unknown |

Example C: A researcher aims to provide a policy maker with a simple yet compelling data analysis about the relationship between SES and teen cigarette smoking.

| Composite measure | Single proxy measure | Multiple proxy measure | Unclear/unknown |

Example D: A researcher aims to assess the impact of social mobility over the life course on the risk of a heart attack at age 70.

| Composite measure | Single proxy measure | Multiple proxy measure | Unclear/unknown |

How did I do?

7. Recommendations

Another serious challenge comes in studies over the life course. Since it is possible, if not probably, that any given measure of SES may change over the life course without the latent SES changing at all, it is difficult to say anything about the impact SES has at one stage of life on an outcome (e.g., health) at another. Consider the theoretical aim of the CAPSES measure described above. Taking a snap-shot of SES at one point in time and using it to explain subsequent changes in a dynamic environment is difficult. Beyond the cohort effects of, say, the meaning of educational attainment across generations, the problem of SES over a given person's life course remains unsolved.

In sum, I urge the reader interested in measuring and studying SES to avoid the most fatal of inferential mistakes, which is to claim that SES has been "adjusted" for. Since SES is always mismeasured, residual confounding is always a problem. Inferences may be profoundly biased and/or misleading in such cases. It *is* fair to claim that, say, annual household income or highest level of familial education has been adjusted for, but this is far short of saying (all of) SES has been. Indeed, after nearly fifteen years of considering the issues, I close by wondering if scientists should drop the term socioeconomic status altogether. The term socioeconomic status is fun to learn about in seventh grade and certainly helpful in casual language, where shortcuts are expected. But as shown here, the construct is imprecise and debatable for fruitful scientific investigation. It is worth emphasizing that while I wonder if the construct SES should be dropped from scientific discussion, I do not think the construct should be dropped. In fact, I think more attention is needed and wish to state clearly that dropping the idea of SES would be tragic on many levels. Ultimately, I seek a more careful consideration of the all-important construct and a better scientific and policy basic for research and action with it.

8. Summary

What is Socioeconomic Status?

Socioeconomic status (SES) is a measure of one's access to collectively desired resources and is a fundamental construct in the social and health sciences.

Why SES Matters

Measures of SES, and statistics based on them such as variances, are necessary to quantify if not understand the level of stratification or inequality in or between societies.
Without sound measures of SES, it is impossible to capture and understand changes to the structure of a society.

Without sound measurement of SES it is impossible to understand the intergenerational change of social status over time.

Without an understanding and sound measurement of SES, the relationship between other important social variables, such as race or sex, can be masked by the evident and often dominant relationship between outcomes and SES.

Finally, SES matters because it has been related to health and life outcomes for as long as social groups existed.

How SES is Measured

Composite measures

- Duncan SEI & Nam-Powers OSS
- Household prestige scale
- CAPSES
- Cambridge scale
- NS-SEC

Univariate measures

- Income
- Wealth
- Educational Attainment

- Poverty
- Area/contextual level measures

How SES Should Be Measured

There are three major uses of SES, and how SES should be measured depends on which use is intended.

The first major use of SES is as an outcome measure;

The second major use of SES is as a primary exposure or risk factor for some (health) outcome; and

The third major use of SES is as a control or adjustment variable.

This chapter also provides recommendations for readers interested in measuring and studying SES.

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10. Author Biographies

Michael Oakes is an Associate Professor in the Division of Epidemiology & Community Health and co-Director of the University of Minnesota's US Census Research Data Center. He is an active researcher and frequent principal investigator on a wide variety of NIH, NSF, and RWJF funded studies addressing a vast array of methodological, health, social, and ethical topics. Dr. Oakes has authored over 80 papers exploring problems at the intersection of social and health sciences; his first book entitled *Methods in Social Epidemiology* was released in 2006. He is known for his work on how social stratification undermines causal inferences drawn from many common research designs and multilevel statistical models. His work on the identification of "neighborhood effects" is widely known. Dr. Oakes teaches several doctoral-level courses, including "Design and Analysis of Group Randomized Trials;" "Advanced Epidemiologic Methods;" and "Social Epidemiology." Among other honors, he was named a McKnight Presidential Fellow and recently won his school's highest teaching honor. Dr. Oakes is Associate Editor of *Health & Place*; on the editorial board of the *Journal of Causal Inference*; Senior Scientific Advisor to the Robert Wood Johnson Foundation's Healthy Eating Research program; Chair of one of UMN's IRB panels; and Vice Chair of its Conflict of Interest committee.