

## Chapter 1 : Introduction to Social Statistics – Department of Sociology

*Introduction to Social Statistics is a basic statistics text with a focus on the use of models for thinking through statistical problems, an accessible and consistent structure with ongoing examples across chapters, and an emphasis on the tools most commonly used in contemporary research.*

Sign up for free to view: Vincent Kang Fu Office: Statistics is a set of tools and techniques researchers use to describe and draw conclusions about the world. We begin by studying descriptive statistics including frequency distributions, and measures of central tendency and variability. We next study ways to describe relationships between variables, including measures of association and bivariate regression. Finally we study basic inferential statistics and learn how to use sample data to draw well-reasoned conclusions about the population. Course requirements and grading Class and lab attendance are important to success in this course. Failure to attend lectures or labs will result in a lower grade. To encourage class attendance, there will be several unannounced quizzes during the semester. You will also be graded on 3 exams. Prior approval is necessary to miss an exam and will only be given in extreme cases. Exams and quizzes are unique to each section of this course. You will receive no credit for taking quizzes or exams from the section in which you are not officially enrolled. Homework for each chapter posted on the class website will be due at the next class meeting after the lecture on each chapter is completed. Late homework will not be accepted, although you may miss one homework assignment without penalty. This course also includes a lab component where you will learn the mechanics of carrying out statistical analyses using a computer. Your final grade will be based on your homework assignments 10 percent , lab performance 15 percent , quizzes 15 percent , and 3 exams 60 percent. Contact the teaching assistants or me immediately if you are having difficulty with any aspect of this course. Do not wait until the day before an exam to ask for help! By then it may be too late! Social Statistics for a Diverse Society. Exploring Social Inequality With Statistics.

## Chapter 2 : Introduction to Social Statistics: The Logic of Statistical Reasoning by Thomas Dietz

*An introduction to the rheology of polymers, with simple math Designed for practicing scientists and engineers interested in polymer rheology science, education, consulting, or research and development, Introduction to Polymer Rheology is a comprehensive yet accessible guide to the study of the deformation and flow.*

Jump to navigation Jump to search Social statistics is the application of statistical methods to social science data. Social statistics uses the same mathematical tools as any other form of statistical analyses but it uses them in different ways that take into account the distinct features of social science data. Nearly all data used in the social sciences are observational, not experimental, which means that social scientists must use statistical methods to control for outside influences on the relationships of interest, since experimental controls are not available. The observational character of social science data also makes it difficult in most circumstances to perform formal hypothesis tests, since hypotheses are almost always conditioned on prior knowledge of the data to be used in testing them. These and other challenges make the practice of social statistics different from the practice of statistics in the physical, biological, and psychological sciences. This book presents and explains the use of conventional statistical techniques in the social sciences. Instead of following the standard approach used in social statistics textbooks, this book focuses on statistical concepts and techniques as they are actually used in the social sciences. Thus for example the very commonly used linear regression model is introduced early, while mathematically simpler but less commonly used means and standard deviations are introduced later as logical derivatives of regression. A conceptual approach is taken throughout the book. The use of mathematics is kept to a minimum. Mathematical definitions for all of the techniques used in this book are readily available on the Internet, including Wikipedia. Chapters 1–4 of this book lay out the basic model that underlies nearly all contemporary social statistics: The linear regression model expresses a dependent variable  $Y$  as the linear function of an independent variable  $X$  plus error. Linear regression is especially important in the social sciences because nearly all advanced models used in the social science literatures are elaborations of the simple linear regression model. Even univariate descriptive statistics like the mean and standard deviation can be understood as deriving from the special degenerate case of linear regression with no independent variables. Though regression is difficult to explain mathematically to students who have no knowledge of matrix algebra, it is very easy to explain graphically. Thus this book takes a graphical approach to understanding linear regression and, by extension, univariate statistics. Chapters 5–8 of this book expand the simple linear regression model with a single independent variable into the multiple linear regression model with multiple independent variables. Multiple linear regression is introduced as a method for including statistical controls in social science settings where it is impossible to impose experimental controls. Thus multiple regression is tied to the problem of inference in statistical models: A key tool for statistical inference is the  $t$  statistic, to which an entire chapter is devoted. The  $t$  statistic is used in determining the statistical significance of a given regression coefficient. In the multiple regression framework  $t$  statistics can also be used to compare the relative significance of different independent variables. Another tool for these comparisons, the standardized regression coefficient, is also given its own chapter. Chapters 9–11 of this book focus on different model configurations that can be estimated using the same basic tool of multiple linear regression. These chapters apply the statistics introduced in Chapters 1–8 to specific, very commonly used types of regression models, including ANOVA and interaction models. Future chapters of this book may introduce other model types as well.

**Chapter 3 : Introduction to Social Statistics | CU Continuing Education**

*First, social statistics is one of several approaches that social scientists use to link social theory to data about the world (Section 1). It is impossible to perform meaningful statistical analyses without first having some kind of theoretical viewpoint about how the world works.*

Jump to navigation Jump to search An Introduction to Social Statistics[ edit ] The children of rich parents usually grow up to be rich adults, and the children of poor parents usually grow up to be poor adults. This seems like a fundamental fact of social life, but is it true? And just how true is it? Rich parents tend to have rich children, but not all the time, and poor parents tend to have poor children, but not all the time. This kind of result is very common in the social sciences. Social science can explain a lot of things about our world, but it never explains them perfectly. Persons might not even know for sure exactly how much money they made in any given year. On the other hand, most of the error in Figure probably has nothing to do with bad measurement. For example, potential sources of error include things like: Social statistics always involves trade-offs like this between complexity and error. Everything about the social world is determined by many different factors. Social statistics is all about coming up with ways to explain social reality reasonably well using just a few of these causes. This chapter lays out some of the basic building blocks of social statistics. First, social statistics is one of several approaches that social scientists use to link social theory to data about the world Section 1. It is impossible to perform meaningful statistical analyses without first having some kind of theoretical viewpoint about how the world works. Second, social statistics is based on the analysis of cases and variables Section 1. For any variable we want to study like income , we have to have at least a few cases available for analysisâ€”the more, the better. Third, social statistics almost always involves the use of models in which some variables are hypothesized to cause other variables Section 1. An optional section Section 1. Finally, this chapter ends with an applied case study of the relationship between spending on education and student performance across the 50 states of the United States Section 1. This case study illustrates how theory can be applied to data, how data are arranged into cases and variables, and how independent and dependent variables are causally related. By the end of this chapter, you should have all the tools you need to start modeling the social world using social statistics. Theory and Data[ edit ] Theories determine how we think about the social world. All of us have theories about how the world works. Most of these theories are based on personal experience. Isaac Newton is supposed to have developed the theory of gravity because he personally had an apple fall on his head. Generalization is the act of turning theories about specific situations into theories that apply to many situations. This theory about yourself could be generalized into a broader theory about persons in general: Sometimes theories come from observing others: Sometimes theories are developed based on other theories: Sometimes ideas just pop into your head: However it happens, somehow you conceive of a theory. Conceptualization is the process of developing a theory about some aspect of the social world. The main difference between the kinds of social commentary you might hear on radio or television and real social science is that in social science theories are scrutinized using formal statistical models. Statistical models are mathematical simplifications of the real world. The goal of statistical modeling is to explain complex social facts as simply as possible. A statistical model might be as simple as a graph showing that richer parents have richer children, as depicted in Figure Social scientists use statistical models to evaluate different theories about how the world works. Before social scientists accept a theory, they carefully evaluate it using data about the real world. Before they can be evaluated, theories have to be turned into specific hypotheses about specific data. Operationalization is the process of turning a social theory into specific hypotheses about real data. First it has to be operationalized into something much more specific. Operationalization means answering questions like: Which persons eat junk food? All persons in the world? Only salads and home-made dinners? Or do steaks count too? Is fresh-squeezed fruit juice a junk food high in sugar or a high-quality food fresh and nutritious? What does "afford" mean? Literally not having enough money to buy something? What about other expenses besides food? Whose behavior should we study? For example, one way to study the relationship between junk food consumption and the affordability of

high-quality food is to use state-level data. There is also a large amount of data available for US states that is collected and published by US government agencies. For example, junk food consumption can be operationalized as the amount of soft drinks or sweetened snacks consumed in the states both available from the US Department of Agriculture and affordability can be operationalized using state median income. Most persons living in states with high incomes should be able to afford to eat better-quality food. Data on state soft drink consumption per person and state median income are graphed in Figure . Each point in Figure represents a state. A few sample states are labeled on the graph. This graph is called a scatter plot. Scatter plots are very simple statistical models that depict data on a graph. The scatter plot can be used to determine whether soft drink consumption rises, falls, or stays the same across the range of state income levels. In the scatter plot graphed in Figure , soft drink consumption tends to fall as income rises. This is consistent with the theory that persons buy healthy food when they can afford it, but eat unhealthy food when they are poorer. The theory may or may not be correct. The scatter plot provides evidence in support of the theory, but it does not conclusively prove the theory. After all, there may be many other reasons why soft drink consumption tends to be higher in the poorer states. Soft drink consumption versus state median family income for 48 US states plus the District of Columbia Alaska and Hawaii excluded due to lack of data There is also a lot of error in the statistical model explaining soft drink consumption. There are many poor states that have very low levels of soft drink spending as well as many rich states that have very high levels of soft drink spending. So while the overall trend is that richer states have lower spending on soft drinks, there are many exceptions. This could be because the theory is wrong, but it also could be because there are many reasons why persons might consume soft drinks besides the fact that they are poor. For example, persons might consume soft drinks because: In Figure , junk food consumption is operationalized as consumption of sweetened snack foods cookies, snack cakes, candy bars, and the like. In other words, as state average income goes up, sweetened snack food consumption should go down. But the data tell a different story: Sweetened snack consumption versus state median family income for 48 US states plus the District of Columbia Alaska and Hawaii excluded due to lack of data What went wrong here? Why is there no relationship between state average income and sweetened snack consumption? There are many possible reasons. Second, it may have been wrong to conceptualize any relationship between affordability and junk food consumption at all maybe junk food is actually more expensive than high-quality food. Third, it may have been wrong to operationalize junk food consumption at the state level for example, it is possible that rich states actually contain lots of poor persons who eat lots of sweetened snacks. Fourth, it may have been wrong to use such a simple statistical model as a scatter plot later chapters in this book will present much more sophisticated statistical models. Because there are so many possible sources of error in social statistics, statistical analyses often lead to conflicting results like those reported in Figure and Figure Inconsistent, inconclusive, or downright meaningless results pop up all the time. The social world is incredibly complicated. Social theories are always far too simple to explain it all. Social statistics give us the opportunity to see just how well social theories perform out in the real world. Cases and Variables[ edit ] As the junk food example shows, when operationalizing theories into specific hypotheses in the social sciences the biggest obstacle is usually the difficulty of getting the right the data. Few quantitative social scientists are able to collect their own data, and even when they do they are often unable to collect the data they want. For example, social scientists who want to study whether or not persons can afford to buy high-quality food would ideally want to know all sorts of things to determine affordability. Such detailed information can be very difficult to collect, so researchers often make do with just income. It is even more difficult to find appropriate data when researchers have to rely on data collected by others. The collection of social data is often done on a very large scale. For example, most countries conduct a population census at regular intervals. In the United States, this involves distributing short census questionnaires to over million households every ten years. The longer, more detailed American Community Survey is sent to around , households every month. A further 60, households receive a detailed employment survey, the Current Population Survey. Other social data can also be very difficult and expensive to collect. The food consumption data used in Figures and come from barcode scans of products bought by 40, households across America. Obviously, no one person can collect these kinds of data on her own.

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*social statistics in the form of 'data mining' (see, for example, Hand, ). Other attempts at measuring association originated in the study of public health (see Macdonell, ; ) and.*

### Chapter 5 : Introduction to Social Statistics Syllabus - SOC - U of U - GradeBuddy

*Upon completion, you should be familiar with a variety of basic statistical techniques that allow examination of interesting social questions. We begin by learning to describe the characteristics of groups, followed by a discussion of how to collect data and how to examine and generalize about relationships between the characteristics of groups.*

### Chapter 6 : Introduction to Social Statistics | Penn Summer

*This class will help students in the social sciences to gain a basic understanding of statistics, whether to understand, critique, or conduct social research.*

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