A course in Ten Lectures:
Quantitative Techniques for
Social Science Research

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Prologue
This Course Is About How to Think about Social Science Research
What is Social Science?

• Social science is the field of study concerned with society and human behaviors.
• "Social science" is commonly used as an umbrella term to refer to a plurality of fields outside of the natural sciences. These include: anthropology, archaeology, criminology, economics, education, history, linguistics, communication studies, political science and international relations, sociology, geography, law, and psychology.
Modern Social Science

• The “science of society” established in 19th century sociology (Latin: socius, "companion"; -ology, "the study of", and Greek λόγος, lógos, "word", "knowledge").

• Émile Durkheim, Karl Marx and Max Weber are typically cited as the principal architects of modern social science by this definition.
Founders of Modern Social Science

Émile Durkheim  
(1858-1917)

Karl Marx  
(1818-1883)

Max Weber  
(1864-1920)
Thinking about the Social Sciences

• Because Social Sciences study human societies and human behaviors, we are concerned with complex issues and subtle problems.
From Community to Compassion...
It is all about humans
Human Motivations are many and complex
Our societies can be very complex
Sometimes, we feel that artists capture and express society’s issues and people’s problems much better than social scientists.
Edvard Munch
(1863 – 1944)
M. C. Escher
(1899-1972)

M. C. Escher
(Self-Portrait 1929)
Their contributions are immense and essential…
But to design policies we need to analyze and study…
Trying to understand these issues requires thinking.
Thinking about quantifying things in the social sciences requires even more thinking.
But we have tools...
Origins of Statistics

• The original idea of "statistics" was the collection of information about and for the "state". The word statistics derives directly, not from any classical Greek or Latin roots, but from the Italian word for state.

• The *Doomsday Book* of William the Conqueror (11th C) is an excellent surviving example. It was used to establish the tax base.

Source: http://home.ubalt.edu/ntsbarsh/Business-stat/opre504.htm#rapplIndexnu,p.9
Probability Came in the mid 17th C

- Blaise Pascal and Pierre de Fermat, in France, were the pioneers of probability theory.

Modern Statistics also Came in the mid 17th C


Source: http://home.ubalt.edu/ntsbarsh/Business-stat/opre504.htm#rapplIndexnu,p.9
Origin of Statistics in mid-17th century

- John Graunt, a native of London, began reviewing a weekly church publication issued by the local parish clerk that listed the number of births, christenings, and deaths in each parish. These so called *Bills of Mortality* also listed the causes of death.

- Graunt who was a shopkeeper organized this data in the form we call descriptive statistics, which was published as *Natural and Political Observations Made upon the Bills of Mortality*.

- Shortly thereafter he was elected as a member of Royal Society.

Source: http://home.ubalt.edu/ntsbarsh/Business-stat/opre504.htm#rapplIndexnu,p.9
Statistics has become an essential Science

• During the 20th Century statistical thinking and methodology have become the scientific framework for literally dozens of fields including education, agriculture, economics, biology, and medicine, and with increasing influence recently on the hard sciences such as astronomy, geology, and physics. In other words, we have grown from a small obscure field into a big obscure field.

-- Professor Bradley Efron

Source: http://home.ubalt.edu/ntsbarsh/Business-stat/opre504.htm#apperIndexnu,p.9
We want to make this less obscure…
But this course is not to master the tools, it is to master thinking about what you need for your analysis... It is about thinking clearly about the social sciences.
Hence, as you take this Course, remember...
It is about Thinking!
It Is About Thinking Through Complex Issues
Do **NOT** worry about the math!
Ultimately, Doing Calculations is not that difficult
Where is the textbook for this course?
There are no textbooks assigned for this course...
There are so many good ones, you can look things up at your leisure later..
For now: just think!
Just Use Your Brain ... And...
THINK
So ...

Let us start on a journey of thinking through the fundamental concepts from the basics to the frontiers of current work...
Let’s start on that journey together
It will be a course in Ten Lectures
Outline

1. Science, Method & Measurement
2. On Building An Index
3. Correlation & Causality
4. Probability & Statistics
5. Samples & Surveys
6. Experimental & Quasi-experimental Designs
7. Conceptual Models
8. Quantitative Models
9. Complexity & Chaos
10. Recapitulation - Envoi