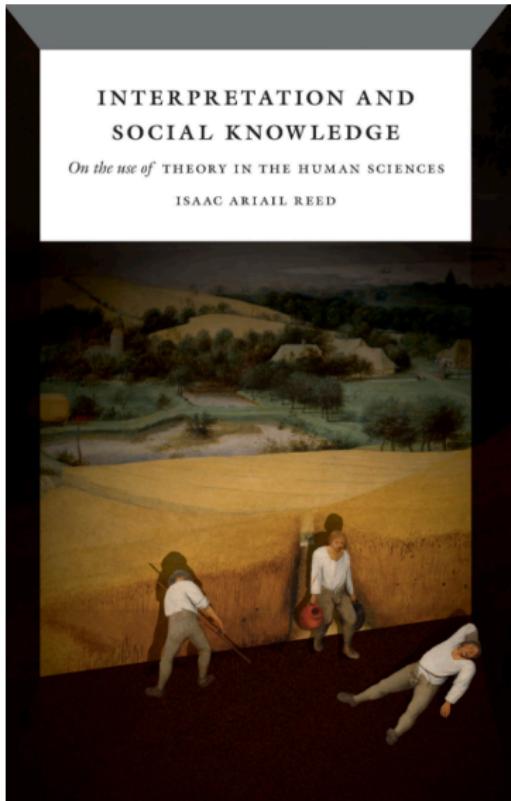


Foundations of Research in Practice (FRIP 2025)

Dr Chao-Yo Cheng

Session 5: Using Numbers to Study the Social World





"We have disagreements, that is, not only about **how we establish the sheer existence** of this or that social phenomenon, but also about **how we can claim to correctly and effectively explain, criticize, or interpret** it. In my view it is these latter disagreements [...] at the core of controversies about social knowledge."

Recap: Producing “knowledge” about the social world(s)

- ▶ Using theory in social research
 - The claims can **have different objectives**: Interpretation and/or explanation
 - The claims can **take different forms**: Verbal, formal (mathematical), and combined
- ▶ Connecting theoretical claims with (empirical) observations
 - Induction: Using observations to **generate** theoretical possibilities
 - Deduction: Using observations to **evaluate** theoretical predictions
 - Abduction: Using observations to **challenge** existing theories
- ▶ Thinking through epistemology: Positivism v constructivism

	<i>A positivist approach</i>	<i>A constructivist approach</i>
What is ‘reality’?	A definable ‘reality’ or ‘truth’ exists and is observable	There is no ‘reality’ or ‘truth’ beyond our experiences
What is the goal of academic enquiry?	Acquisition of the ‘truth’	A more informed construction of the world
How are the researcher and the ‘researched’ related?	The researcher is independent of the ‘researched’	The researcher is not independent of the ‘researched’
What should be the role for values?	None - objectivity sought	Part of ‘reality’ - subjectivity celebrated
What kind of approach?	Predominantly based on observability or measurability and with the aim of seeking ‘evidence’	Predominantly based on discourse and meaning with the aim of seeking a more informed understanding of the world
What kind of data is preferred?	Predominantly quantitative	Traditionally associated with a predominantly qualitative approach
Examples of such studies in Development Studies	Dollar and Kraay (2002) <i>Growth is Good for the Poor</i>	Narayan <i>et al.</i> , (2002) <i>Voices of the Poor</i>



"Quantitative and qualitative approaches are only different in style, not in the fundamentals of scientific research. All research must be systematic and scientific. This book aims to show researchers (especially social scientists) how to approach studying phenomena and answering questions. Inference (descriptive or causal) is vitally important in defining social science research. There are four main components of research design: the research question, the theory, the data, and the use of the data."

- ▶ Positivism and quantitative social research
- ▶ What we do with numbers
- ▶ Challenges and potential/tentative solutions

Positivism and quantitative social research

- ▶ Epistemology is about **how we perceive the world, what we seek to gain from our enquirers, and how we relate to the "researched."**
 - One reality v multiple realities? Is reality independent of our thoughts?
 - Single, generalizable, and universal truth?
 - Are we independent of what we are studying – the research "objects?"
- ▶ We may not be able to find a common ground, but in reality we are usually "somewhere in between"
 - The contrast between positivism and constructivism may **NOT** have much to do with the contrast between quantitative and qualitative
 - The "rigor" of your research depends on how aware you are of what you attempt to do
 - Quant research is neither (more) scientific nor (more) objective

	Economics	Politics	Sociology	Social Anthropology
What is reality?	One reality exists; reality is <i>independent</i> of our thoughts; what is observable is real	One reality exists. reality is <i>independent</i> of our thoughts	One reality exists; reality is <i>independent</i> of our thoughts, but much of reality is unobservable	There are <i>different</i> realities associated with different standpoints and cultures
Goal of enquiry?	Acquisition of a <i>single</i> truth -- a universal, general law	We can establish truths or <i>generalizations</i> about human beings	Truth needs to be understood in terms of <i>practical adequacy</i>	<i>Interpretation</i> of local meanings; there is <i>no universal truth</i>
How are the researcher (you) and the "researched" related?	The researcher is <i>objective</i> and is <i>independent</i> of the "researched"	The researcher is <i>subjective</i> and is <i>not independent</i> of the "researched"	The researcher is <i>subjective</i> and is <i>not independent</i> of the "researched"	The researcher is <i>subjective</i> and is <i>not independent</i> of the "researched"



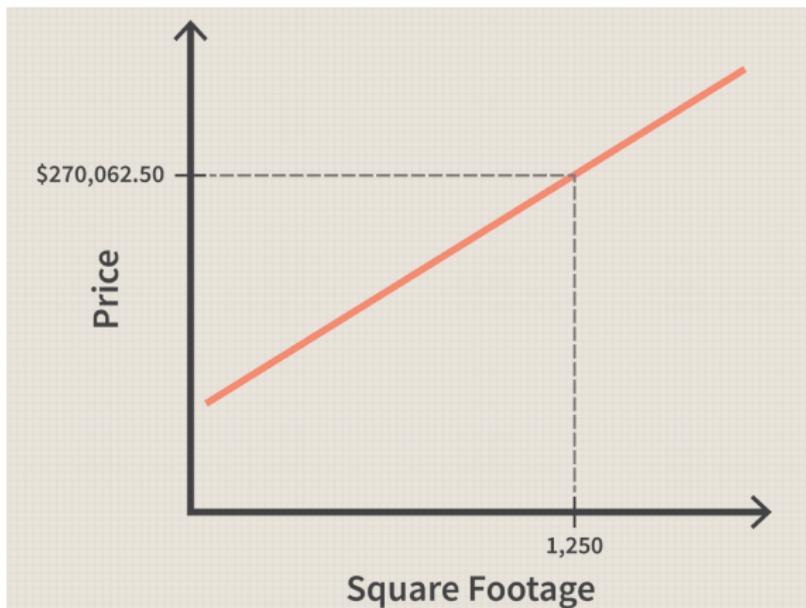
Positivist

Constructivist

What we do with numbers

- ▶ According to **Edward Tufte**, statistics or quantitative methods are "techniques" that help us
 - answer the substantive questions
 - squeeze the relevant information out of the (quantitative) data
 - learn something new about the social world
- ▶ According to **KKV**, the goal of statistics or quantitative methods is **inference**.
 - **Descriptive** statistics: Use basic statistics (e.g., mean, median, and standard deviations) to describe noticeable patterns in the data
 - **Inferential** statistics: Use statistical model (e.g., linear/non-linear regression) to assess the relationship between **explanatory** (or "independent") and **outcome** (or "dependent") variables

Linear correlation: Larger houses are more expensive (duh)



$$\text{Market Price} = \text{Square Footage} * 207.65 + \$10,500$$

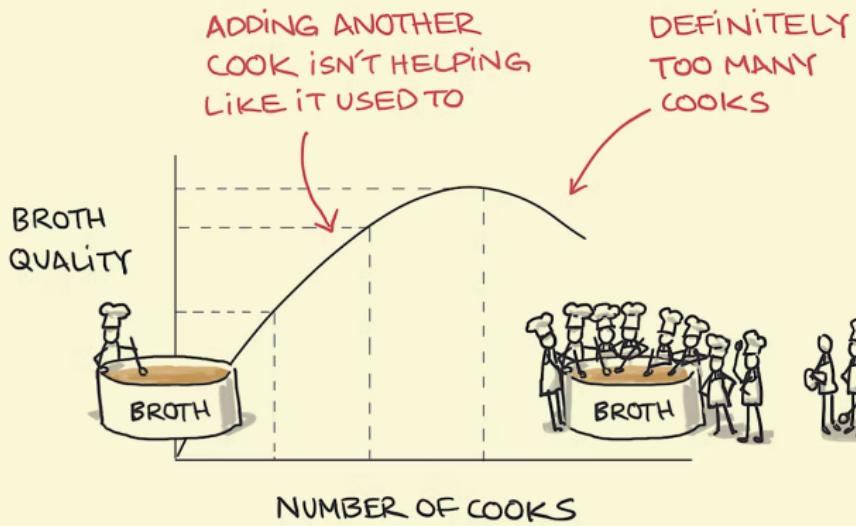
$$\text{Market Price} = 1,250 * 207.65 + \$10,500$$

$$\text{Market Price} = \$270,062.50$$

Non-linear correlation: Diminishing returns (oops)

LAW OF DIMINISHING RETURNS

AT SOME POINT MORE OF THE SAME STOPS PAYING OFF



Issues and challenges

- ▶ How we quantify the social world matters
- ▶ How we construct our data matters
- ▶ How we estimate matters

Issues and challenges

- ▶ How we quantify the social world matters
 - Building and maintaining consensus over conceptualization and operationalization is hard (e.g., GDP and infant mortality)
 - Existing measures may not be suitable for new political and socio-economic challenges/trends, such as development (Siegert, Sen, and Fitoussi 2010) and gender, sex and sexuality (Guyan 2022)
 - Measurement usually requires extensive contextual knowledge (Rukmini S 2021)
- ▶ How we construct and process our data matters
- ▶ How we estimate matters

AUGUST 1, 2020 | 16 MIN READ

GDP Is the Wrong Tool for Measuring What Matters

It's time to replace gross domestic product with real metrics of well-being and sustainability

BY JOSEPH E. STIGLITZ



"**GDP should be dethroned; ... each nation should select a dashboard, a limited set of metrics that would help steer it toward the future its citizens desired. ... the dashboard would include metrics for health, sustainability and any other values that the people of a nation aspired to**, as well as for inequality, insecurity and other harms that they sought to diminish" (Stiglitz 2020, *Scientific American*).

Issues and challenges

- ▶ How we quantify the social world matters
- ▶ How we construct and process our data matters
 - Data generation is not a neutral process
 - States and organizations vary in their **incentives** and **capacity** in producing data (Liu 2009; Jerven 2013)
 - Researchers may take explicit/implicit (or unreported) actions, such as sample selection, when they process their data prior to the analysis stage (Huntington-Klein et al 2020)
- ▶ How we estimate matters

The quality of China's GDP statistics[☆]

Carsten A. HOLZ*

Stanford Center for International Development, Stanford University, 366 Galvez Street, Stanford, CA 94305-6015, United States



ARTICLE INFO

Article history:

Received 3 December 2013

Received in revised form 18 June 2014

Accepted 19 June 2014

Available online 28 June 2014

JEL classification:

C82

R1

P27

O53

Keywords:

Accuracy of national statistics

National income accounting

Compilation of GDP and sectoral value-added

National statistical system

Benford's Law

ABSTRACT

Since the 1998 "wind of falsification and embellishment," Chinese official statistics on gross domestic product (GDP) have repeatedly come under scrutiny. This paper evaluates the quality of China's GDP statistics in four stages. First, it reviews past and ongoing suspicions of the quality of GDP data and examines the evidence. Second, it documents the institutional framework for data compilation and concludes on the implications for data quality. Third, it asks how the Chinese National Bureau of Statistics could possibly go about credibly falsifying GDP data without being found out. Fourth, it examines if the first- and second-digit distributions of official GDP data conform to established data regularities (Benford's Law). The findings are that the supposed evidence for GDP data falsification is not compelling, that the National Bureau of Statistics has much institutional scope for falsifying GDP data, and that certain manipulations of nominal and real data would be virtually undetectable. Official GDP data, however, exhibit few statistical anomalies (conform to Benford's Law) and the National Bureau of Statistics thus either makes no significant use of its scope to falsify data, or is aware of statistical data regularities when it falsifies data.

© 2014 Elsevier Inc. All rights reserved.

Is Democracy Good for the Poor?

Michael Ross University of California, Los Angeles

Many scholars claim that democracy improves the welfare of the poor. This article uses data on infant and child mortality to challenge this claim. Cross-national studies tend to exclude from their samples nondemocratic states that have performed well; this leads to the mistaken inference that nondemocracies have worse records than democracies. Once these and other flaws are corrected, democracy has little or no effect on infant and child mortality rates. Democracies spend more money on education and health than nondemocracies, but these benefits seem to accrue to middle- and upper-income groups.

Issues and challenges

- ▶ How we quantify the social world matters
- ▶ How we construct and process our data matters
- ▶ How we estimate the statistical relations matters
 - Careless research practice may create **biased** and **inefficient** results – that is, the inferred results are (1) drastically different from the "true" value in the population and (2) the results are "unstable" due to high variance
 - Linear or non-linear? Variable selection (garbage can)? Causality or correlation?



RESEARCH ARTICLE | SOCIAL SCIENCES | 8



Observing many researchers using the same data and hypothesis reveals a hidden universe of uncertainty

Nate Breznau , Eike Mark Rinke , Alexander Wuttke , +162, and Tomasz Żółtak [Authors Info & Affiliations](#)

Edited by Douglas Massey, Princeton University, Princeton, NJ; received March 6, 2022; accepted August 22, 2022

October 28, 2022 | 119 (44) e2203150119 | <https://doi.org/10.1073/pnas.2203150119>

Proceedings of the National Academy of Sciences (2022)

200
1823-2023



INTERSTATE PEACEKEEPING Causal Mechanisms and Empirical Effects

By VIRGINIA PAGE FORTNA*

Maintaining peace in the aftermath of war is a difficult endeavor, and the international community is often called on to help. Arguably the most important innovation in international conflict management since World War II is the practice of peacekeeping: the deployment of international personnel to monitor a cease-fire or to interpose themselves between belligerents to keep peace after a war.¹ During most of its history, peacekeeping was used to help maintain peace after interstate wars. Since the end of the cold war, the practice has been adapted to the context of civil wars, taking on new tasks such as election monitoring, police training, and even providing an interim administration. This article analyzes whether and how peacekeeping stabilizes peace in its traditional interstate setting.

"Previous studies find the UN has no effect on the likelihood that the [fighting] parties will experience another crisis within five years, but they do not consider the issue of **endogeneity**, namely, **that the UN tends to get involved in the most violent and extreme cases**" (Fortna 2004, *World Politics*).

Solutions: Better quantitative social research

- ▶ Replicability: Data and code sharing?
- ▶ Transparency: Pre-analysis plan (PAP)?
- ▶ Knowledge accumulation: Meta-analysis and systematic review?
- ▶ Triangulation: Mixed- and multi-method research?



BITSS Open Research Seminar

Spring 2023 - Call for Speakers

Do you have a tool, project, or initiative on research transparency that you'd like to promote? Submit it to the **Open Research Seminar!**

Deadline: December 23



<https://www.bitss.org/>

Critical approaches to quantitative social research

- ▶ Incorporate "deep" (or "thick") qualitative knowledge into quantitative research (e.g., process tracing), such as **Poor Number** (Jerven 2013) and **Whole Numbers and Half Truths** (Rukmini S 2021)
- ▶ Work with quantitative scholars to advance progressive and reform-oriented causes, such as **Maya Sen** (Harvard)
- ▶ Question the underlying power dynamics of data generation, such as **The China Mirage** (Liu 2009) and **Data Feminism** (D'Ignazio and Klein 2020)
- ▶ Challenge the presumed conceptualization and categorization in quantitative research, such as **The Skeptical Environmentalist** (Lomborg 2001), **Mismeasuring Our Lives** (Stiglitz et al 2010) and **Queer Data** (Guyan 2022)



Is Justice Really Blind? Race and Reversal in US Courts

Maya Sen

ABSTRACT

I use two newly collected data sets to demonstrate that black federal district judges are consistently overturned on appeal more often than white district judges, with a gap in reversal rates of up to 10 percentage points. This gap is robust and persists after taking into account previous professional and judicial experience, educational background, qualification ratings assigned by the American Bar Association, and differences in appellate panel composition. In total, I find that approximately 2,800 additional cases authored by black judges have been reversed over the last 12 years. This study is among the first to explore how higher-court judges evaluate opinions written by judges of color, and it has clear implications: despite attempts to make the judiciary more reflective of the general population, racial disparities in the legal system appear to persist.

Black federal district judges are consistently overturned on appeal more often than their white colleagues, even after the analysis accounts for other factors, such as professional experiences, education, and ABA's qualification rankings (Sen 2015, *JLS*).

Concluding remarks

- ▶ Break the (positivist) (or scientific) myth of quantitative social research?
- ▶ No more "lone-wolf" academics and/or researchers – cross-border, multi-method and interdisciplinary knowledge co-production is key
- ▶ The rise of computational social sciences: What is big data and how is different from the traditional "small" data?

Group discussion: Quantification of ethnicities

- ▶ Can and should we measure identity?
- ▶ How have (quantitative) social researchers attempted to measure identity?
- ▶ Several methods/techniques are discussed in the article. Which one do you prefer (or agree with)? And why?
- ▶ Which scholar's comments do you find most compelling? And why?

[nature](#) > [editorials](#) > [article](#)

EDITORIAL | 01 July 2021

The powers and perils of using digital data to understand human behaviour

Computational social science is a powerful research tool. But it needs its different disciplines to find a common language.



<https://www.nature.com/collections/cadaddgige>

Evaluating the replicability of social science experiments in *Nature* and *Science* between 2010 and 2015

Colin F. Camerer^{1,16}, Anna Dreber^{2,16}, Felix Holzmeister¹⁶, Teck-Hua Ho^{4,16}, Jürgen Huber^{3,16}, Magnus Johannesson¹⁶, Michael Kirchler^{3,5,16}, Gideon Nave^{6,16}, Brian A. Nosek¹⁶, Thomas Pfeiffer¹⁶, Adam Altmejd¹⁶, Nick Buttrick^{7,8}, Taizan Chan¹⁰, Yiling Chen¹¹, Eskil Forsell¹², Anup Gampa^{7,8}, Emma Heikensten², Lily Hummer⁸, Taisuke Imai¹³, Siri Isaksson², Dylan Manfredi⁶, Julia Rose³, Eric-Jan Wagenmakers¹⁴ and Hang Wu¹⁵

Nature Human Behavior (2018)

"The Turing Way"



<https://the-turing-way.netlify.app/collaboration/collaboration>