

Quantitative Methods for Social Sciences, Public Policy and Humanities

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The Philosophy and Techniques for Quantitative Analysis



Basics of quantitative investigation, Research Design

Simply focussing statistics and techniques: Miss the forest for the trees

Introduction to Data and exploring it with R

thinking clearly with data is very important ,once thinking is focused, techniques will follow

Learning R for making sense of data: real data based case studies

UN Voting data, Punjab Tax data (Messy vs tidy), WHO, Gapminder, nycflights, bikes, cia_factbook...



UN Voting Data

Data visualization of UN voting data

Correlation doesn't imply causation

Most politicians facing scandals win reelection

Shallow men believe in luck, believe in circumstances. Strong men believe in cause and effect. -Ralph Waldo Emerson, The Conduct of Life

Correlation : description, forecasting

Counterfactuals , Causal Inference

Learning R and R Markdown

STATA and Excel will also be used as per requirement of the participants

R is not only a statistical language but all documentation under one R

Word/pdf/html, powerpoint/ioslidy/beamer/html slides, CV, research paper, book writing and much more in R, Reproducibility

Exploratory Data Analysis to make sense of data

Basics of data visualization under ggplot2

R and ggplot2 : NYT, BBC, Google, Amazon, FB ,...

Exploratory Data Analysis : nycflights, bikes, cia, tax...

Probability Theory , Lab based on Kobe's golden hand

Probability Distributions, Sampling Distributions, CLT

Random and non-random sampling procedures

p-value, p-hacking, p-screening, publication bias

Statistical modeling : Linear Regression modeling (Simple and Multiple)

**Quantitative Methods are not something to
learn about but to do about**

Manual table

The randomized controlled double-blind experiment

	Size	Rate
Treatment	200,000	28
Control	200,000	71
No consent	350,000	46

The NFIP study

	Size	Rate
Grade 2 (vaccine)	225,000	25
Grade 1 and 3 (control)	725,000	54
Grade 2 (no consent)	125,000	44

Source: Tohmas Francis, Jr. "An evaluation of the 1954 poliomyelitis vaccine trials- summary report," American Journal of Public Health vol.45 (1945)pp.1-63

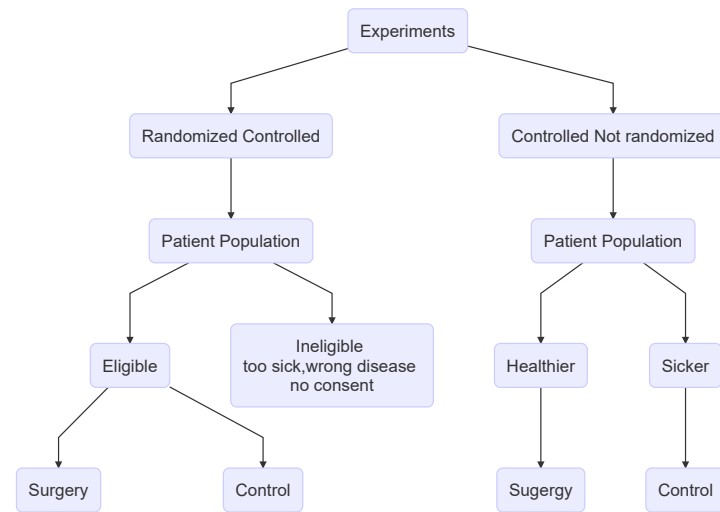


Table 3. Randomized controlled experiments vs. controlled experiments that not randomized: three-year survival rates in studies of the porta-caval shunt. (Percentage are rounded)

	Randomized	Not randomized
Surgery	60%	60%
Controls	60%	45%

Table 4. A Study of studies. Four therapies evaluated by RCTs and trials using historical controls. Conclusions of the study are summarized as positive about value of the therapy (+), or negative (-).

Therapy	Randomized controlled	Historically controlled		
			-	+ -
Coronary bypass surgery	1	7	16	5
5-FU	0	5	2	0
BCG	2	2	4	0
DES	0	3	5	0

Table 5: Randomized controlled experiments vs. studies with historical controls: three-year survival rates for surgery patients and controls in trials of coronary by surgery. Randomized trials differ from historical controls.

	Randomized	Historical
Surgery	87.6%	90.9%
Controls	83.2%	71.1%

Observational Studies

Controlled studies not the same as observational

- observational studies: it's the subjects who assign themselves to different groups: the investigator watches just what happens
- Controlled : investigator decides who to be in control group and who to be in treatment group

Control has two senses

- a control is a subject who did not get the treatment:
- a controlled experiment is a study where the investigators decide who will be in the treatment group and who will not.

Smoking and lung cancer

Examples

The Clofibrate trial

Pellagara

Cervical cancer and circumcision

Ultrasound and low birthweight

The Samaritan and suicide

5 Fast Facts

THE BROKEN WINDOWS THEORY

1

It was coined by Wilson & Kelling in 1982.

4

Neglected environments give the impression no one cares.

2

It's a metaphorical theory.

3

Crime & disorder flourish where small problems go unaddressed.

5

Long-term solutions require community buy-in & collaboration.



ABL : Always Be
Learning.



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