

Next Steps in Field Experimentation

(SOC 412)

Week 13 Lectures 10-11

Sherrerd Hall 306



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DEPARTMENT OF
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What Can You Do
With a Little Knowledge?

What You Can Do With A Starting Knowledge



Alexander Macgillivray

Took a class in behavioral
research with Daniel
Kahneman (Princeton)

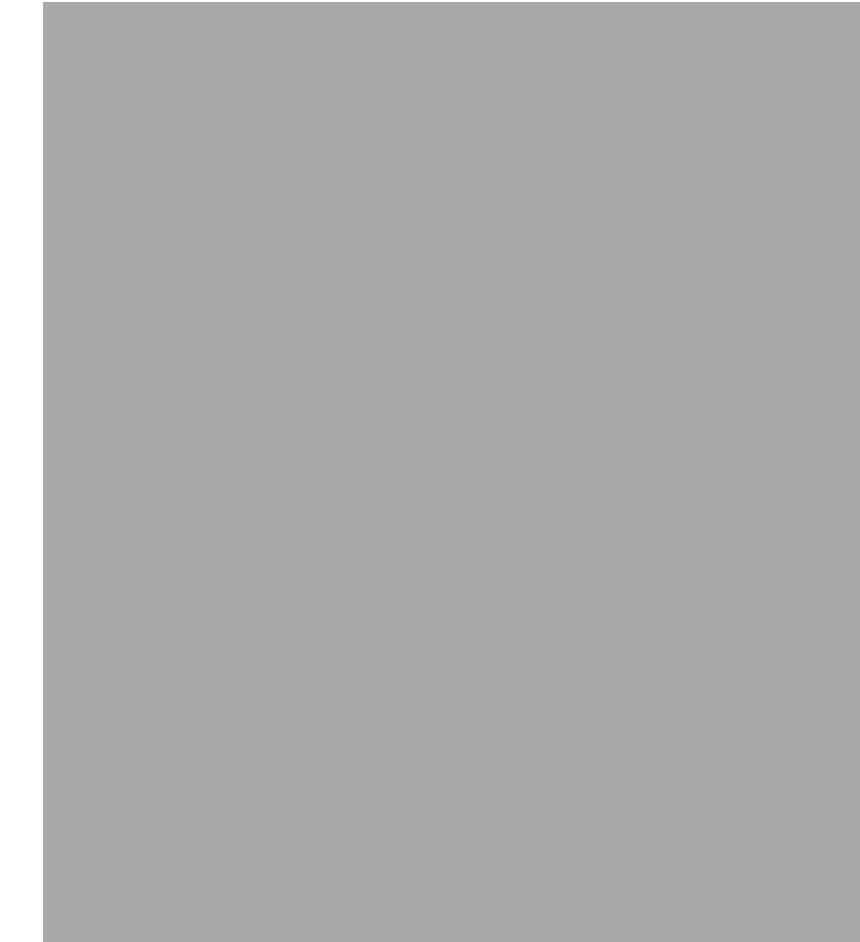
General Counsel of Google
General Counsel of Twitter
Deputy U.S.
Chief Technology Officer



Maggie Koerth Baker

Studied Journalism &
Anthropology at the
University of Kansas

Science Writer for the
New York Times
now Senior Science Editor
FiveThirtyEight



J.C.

Studied natural sciences
in university

Leading a multi-million
dollar fund for broadening
diversity in a \$500m a year
organization.

What You Can Do With A Starting Knowledge



Matt Wallaert

Studied Psychology & Education @ Swarthmore

Dropped out of Cornell PhD in Social Psych

Microsoft's first Behavioral Scientist

Chief Behavioral Officer at Clover Health

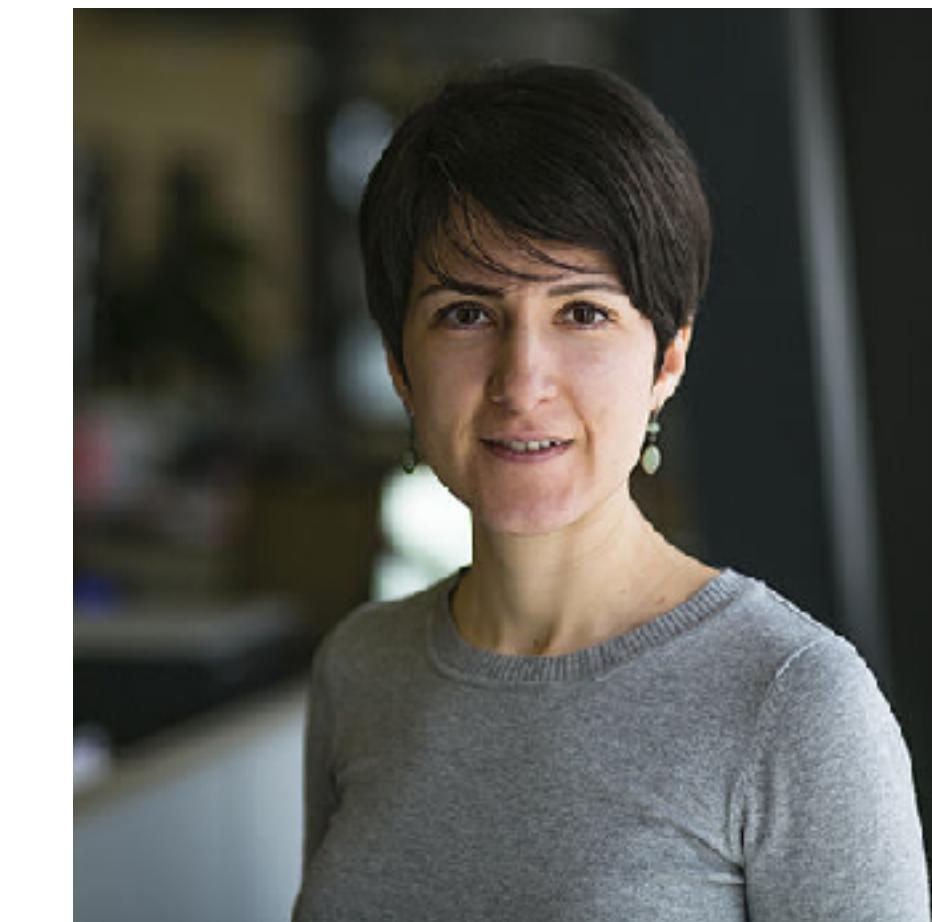


Esther Duflo

Studied History & Economics @ Ecole Normale Supérieure
PhD in Economics

MIT Economics Professor

Director, J-PAL Poverty Action Lab



Leila Zia

Studied Industrial Engineering, Sharif University of Technology

PhD at Stanford in Management Science

Senior Research Scientist Wikimedia Foundation

Next Steps in Field Experimentation

Current Career Directions

(tend to require grad degrees)

- **Tech industry** (high salary, low autonomy)
- Marketing / political **campaigning** (high salary, low autonomy)
- **Academia** (low salary, high autonomy)
 - Great positions as staff researchers
 - **Policy evaluation** / analyst (low salary, low autonomy) (higher salary if there's a tech angle)

Future Career Directions

(may tend to require at least a M.A.)

- **Behavioral Product Design**
- **Behavioral Consumer Protection**
- **Tech industry policy & regulation**

Public Understanding of Science

- Reading journalism and participating in the democratic process
- Helping your local institutions (schools, churches, community associations) by conducting experiments
- Broadening understanding of scientific research



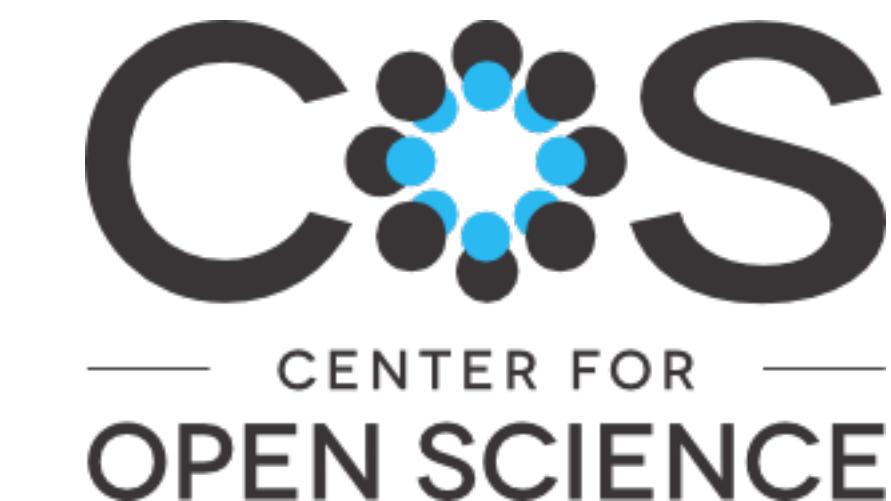
Communities of Experimentation



tech industry &
infrastructure



policy
evaluation

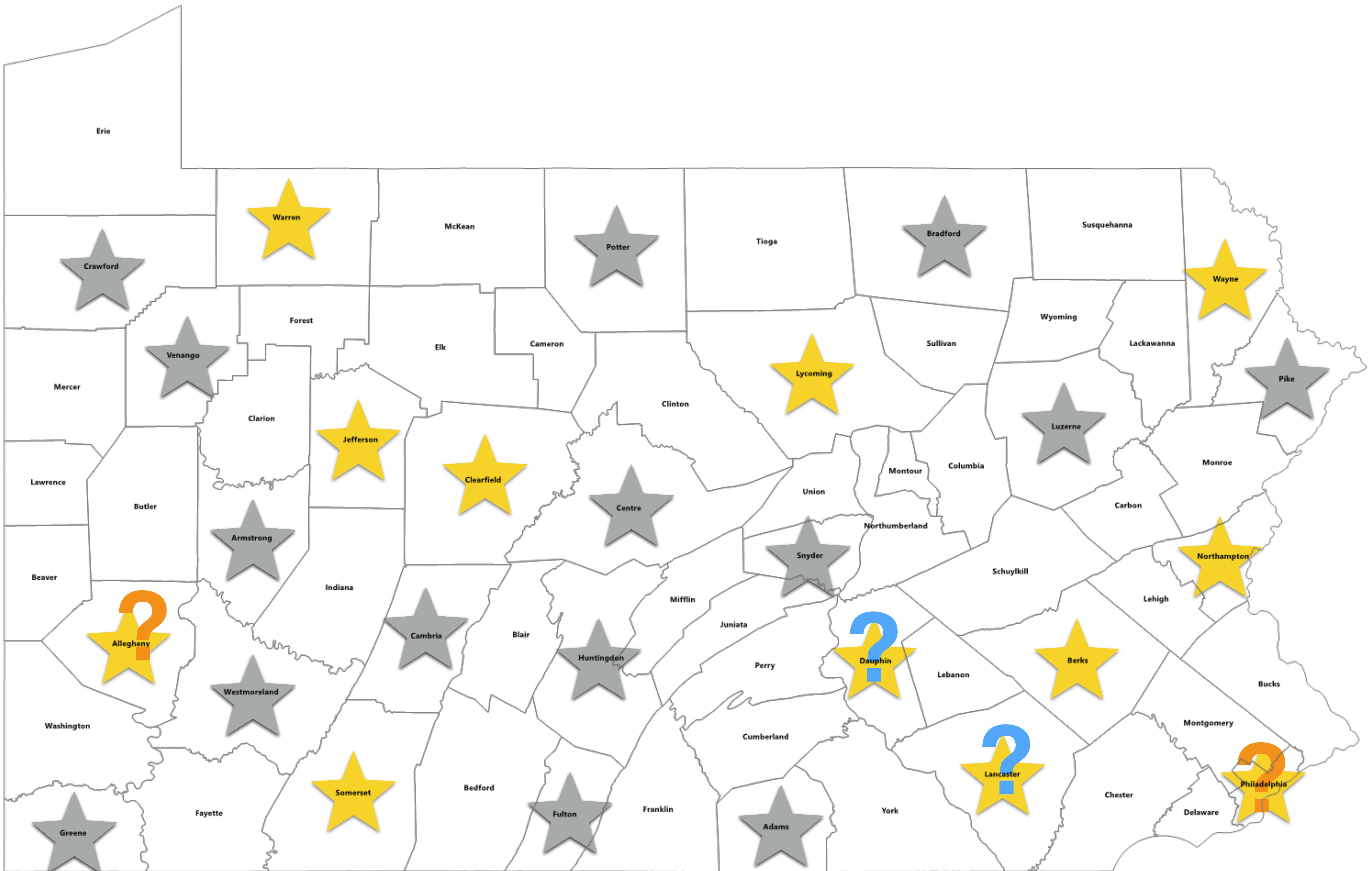


open science



Areas to Grow

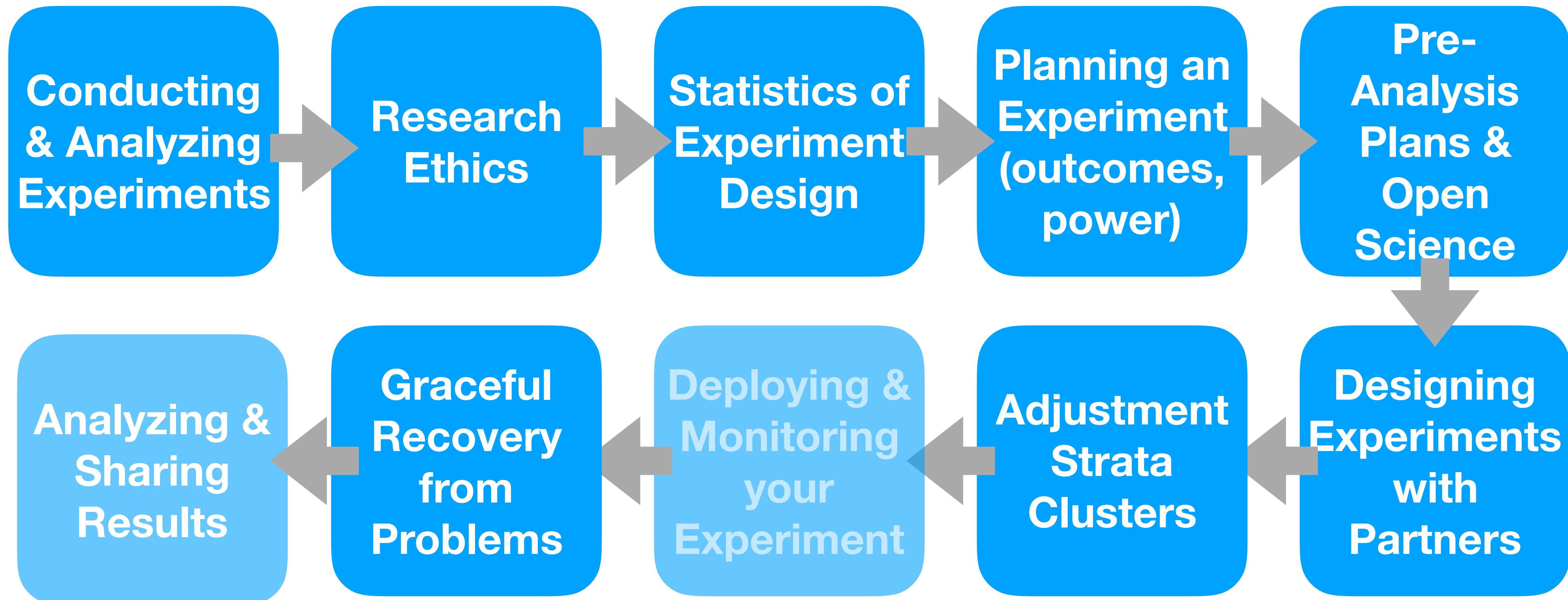
- Growing in the **craft & science** of experimentation
- **Asking better questions**
- Working on the **ethics & politics** of
experimentation
- Participating in public understanding of science



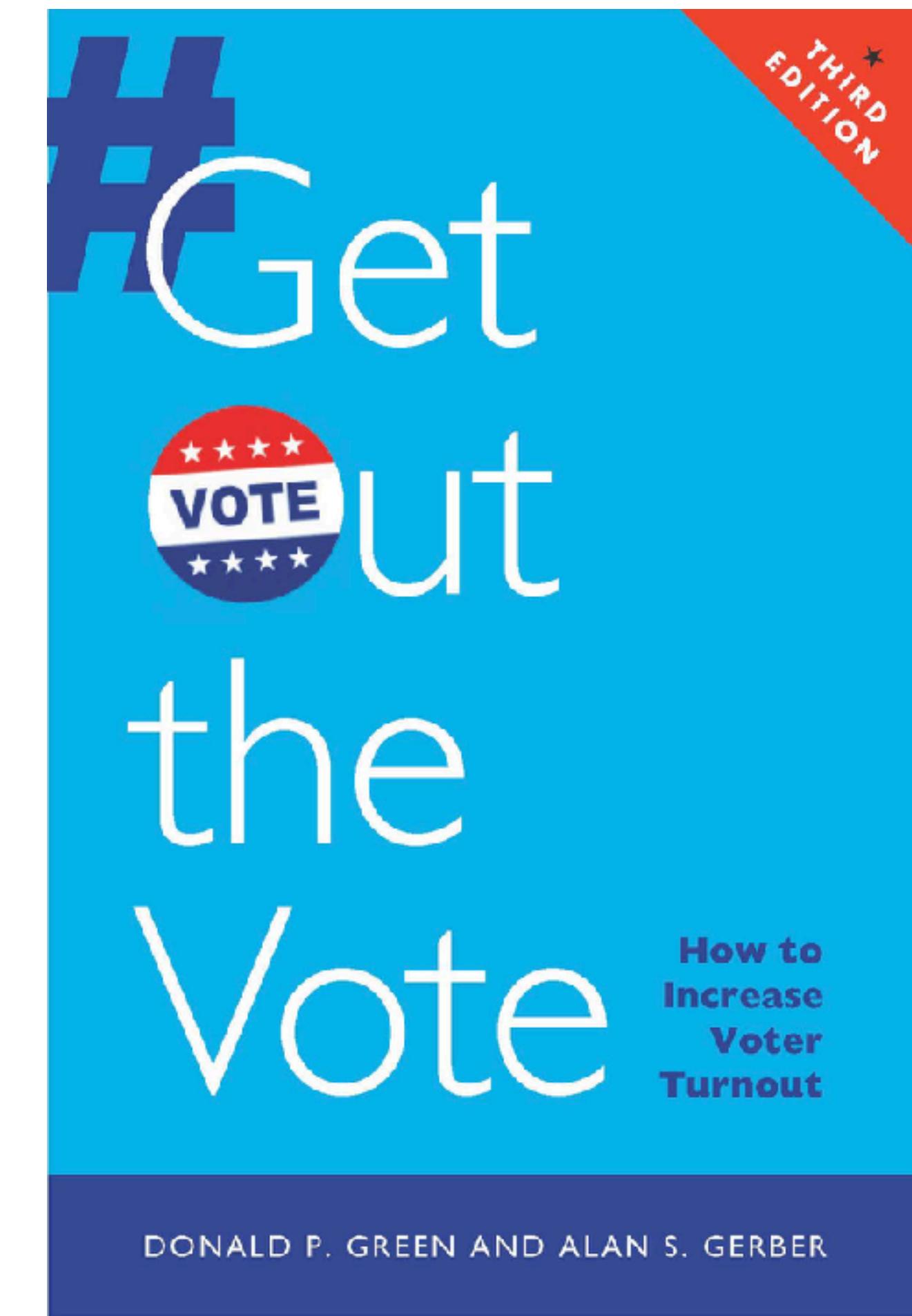
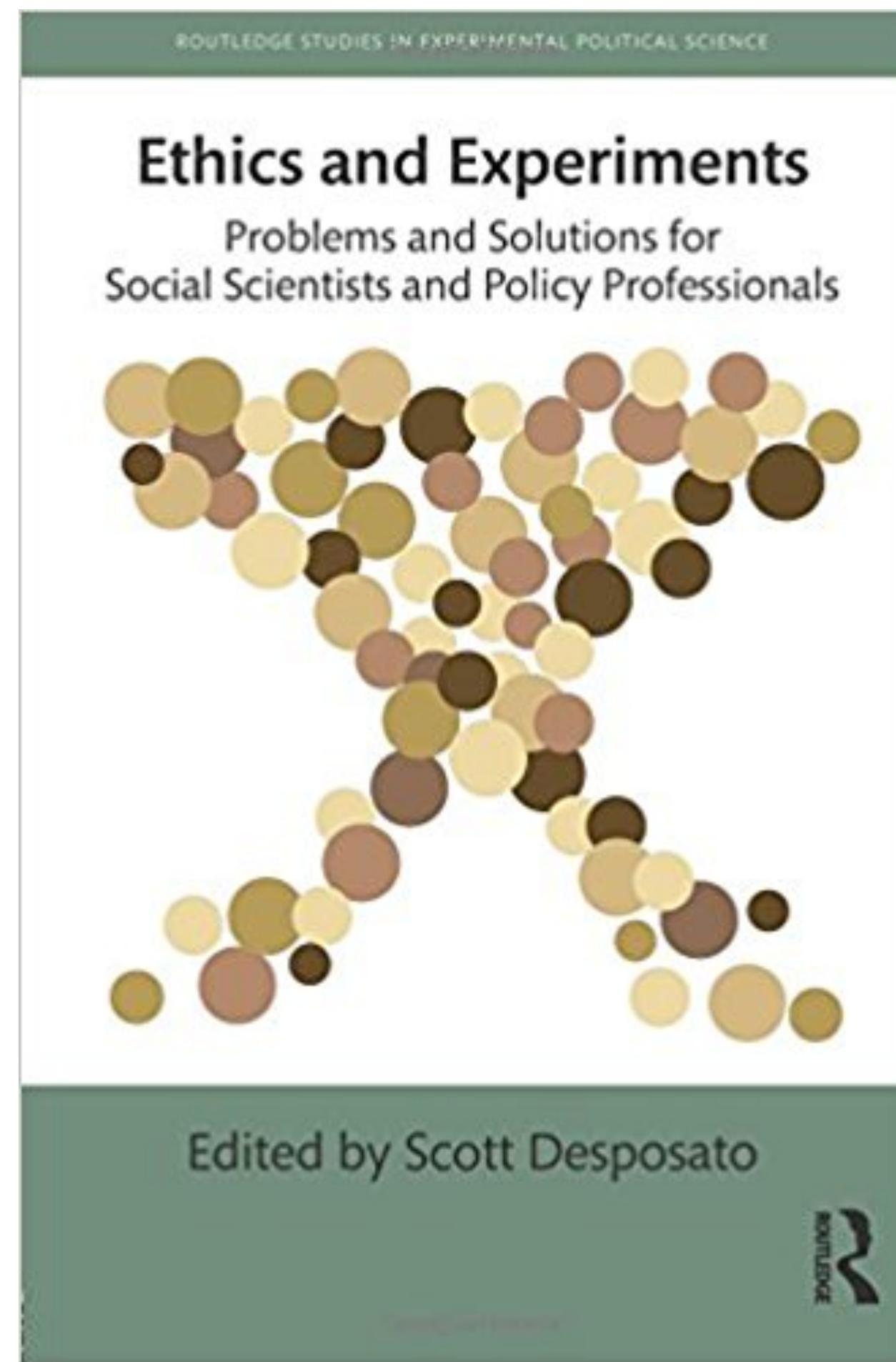
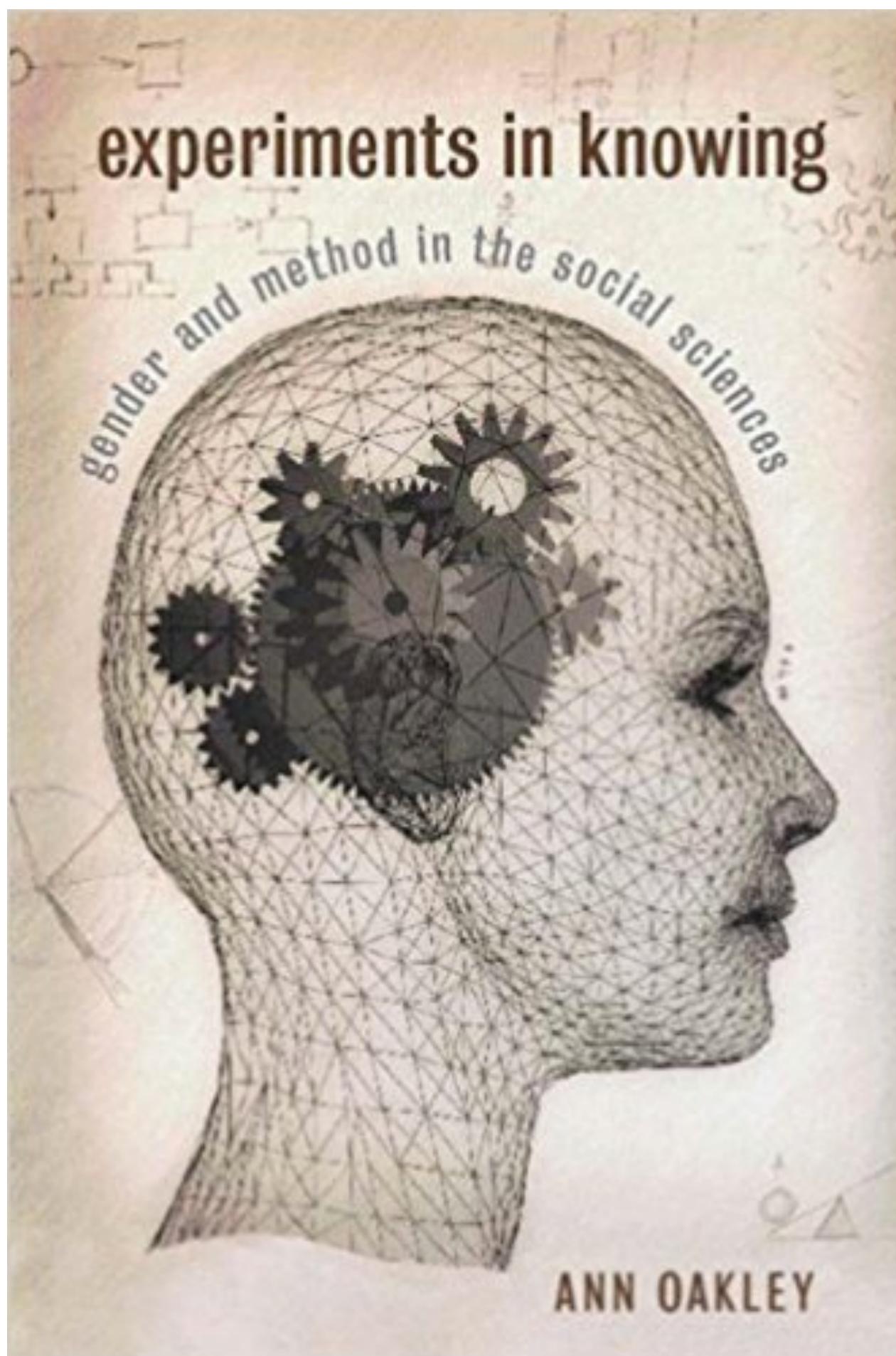
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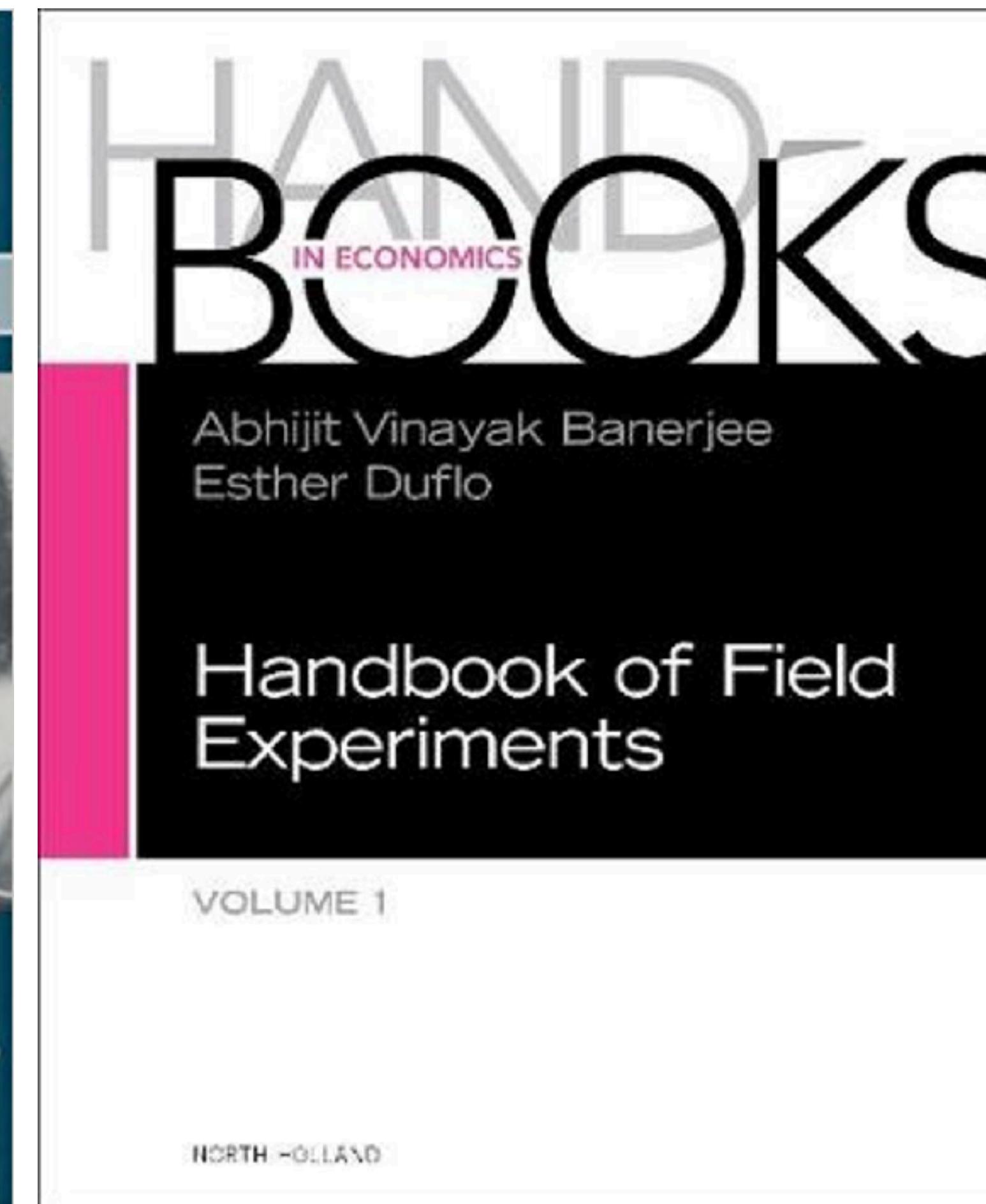
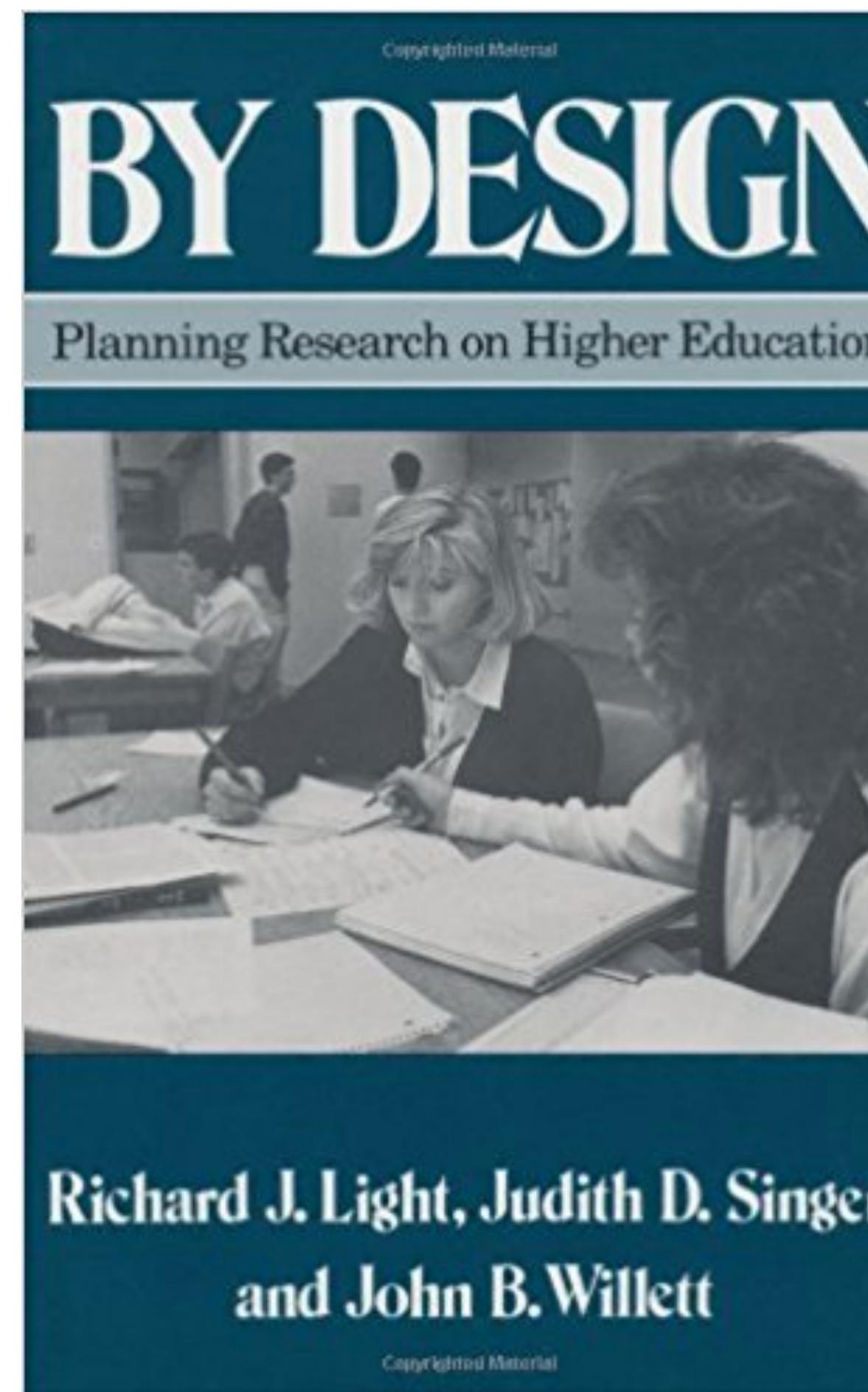
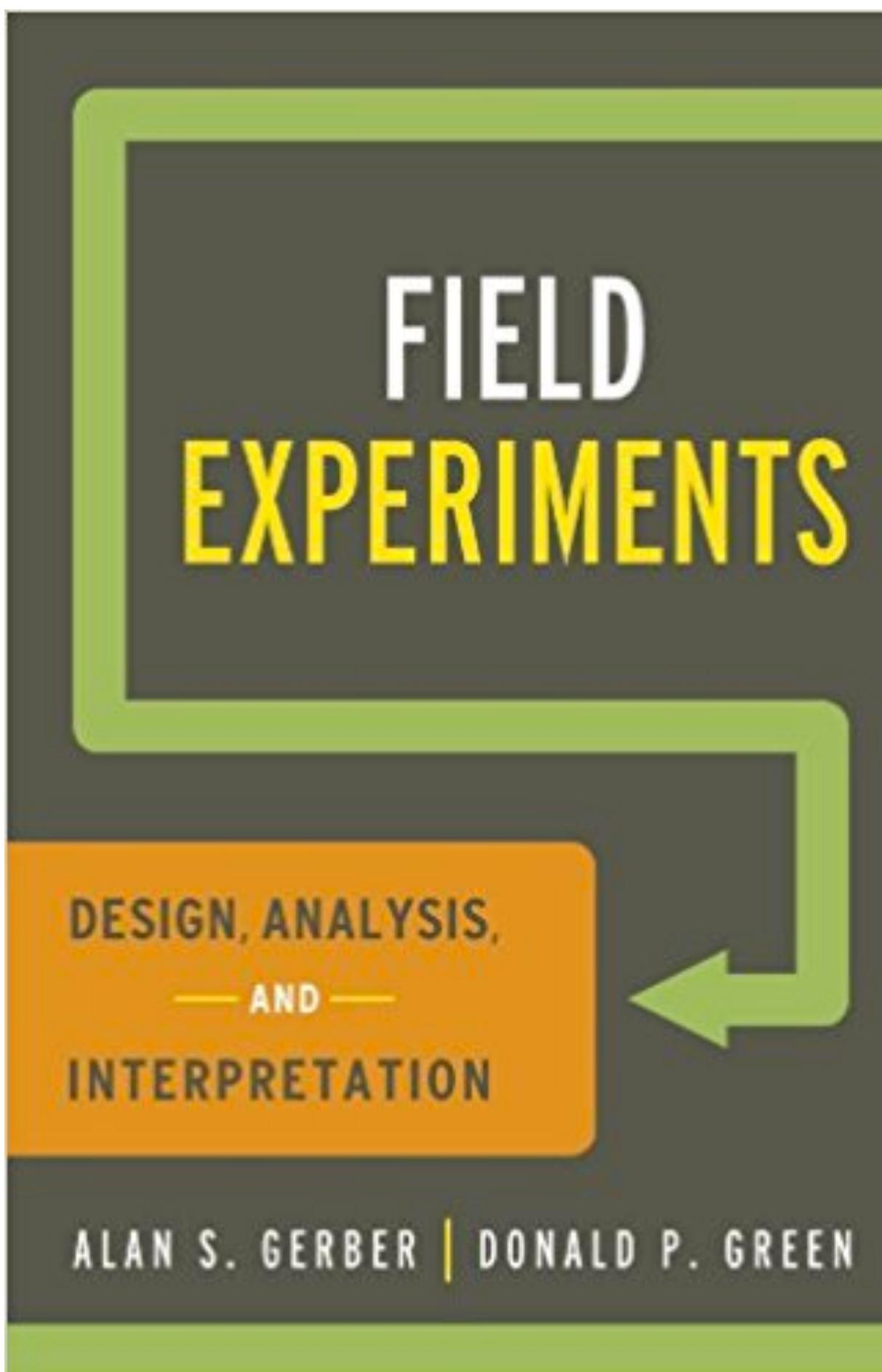
Next Steps in Your Experimenting Journey



Epistemology, Ethics, Examples



Research Methods



**Modeling
Outcomes**

**Measure-
ment**

**Qualitative
Experiments**

Interference

Compliance

**Bandit
Algorithms**

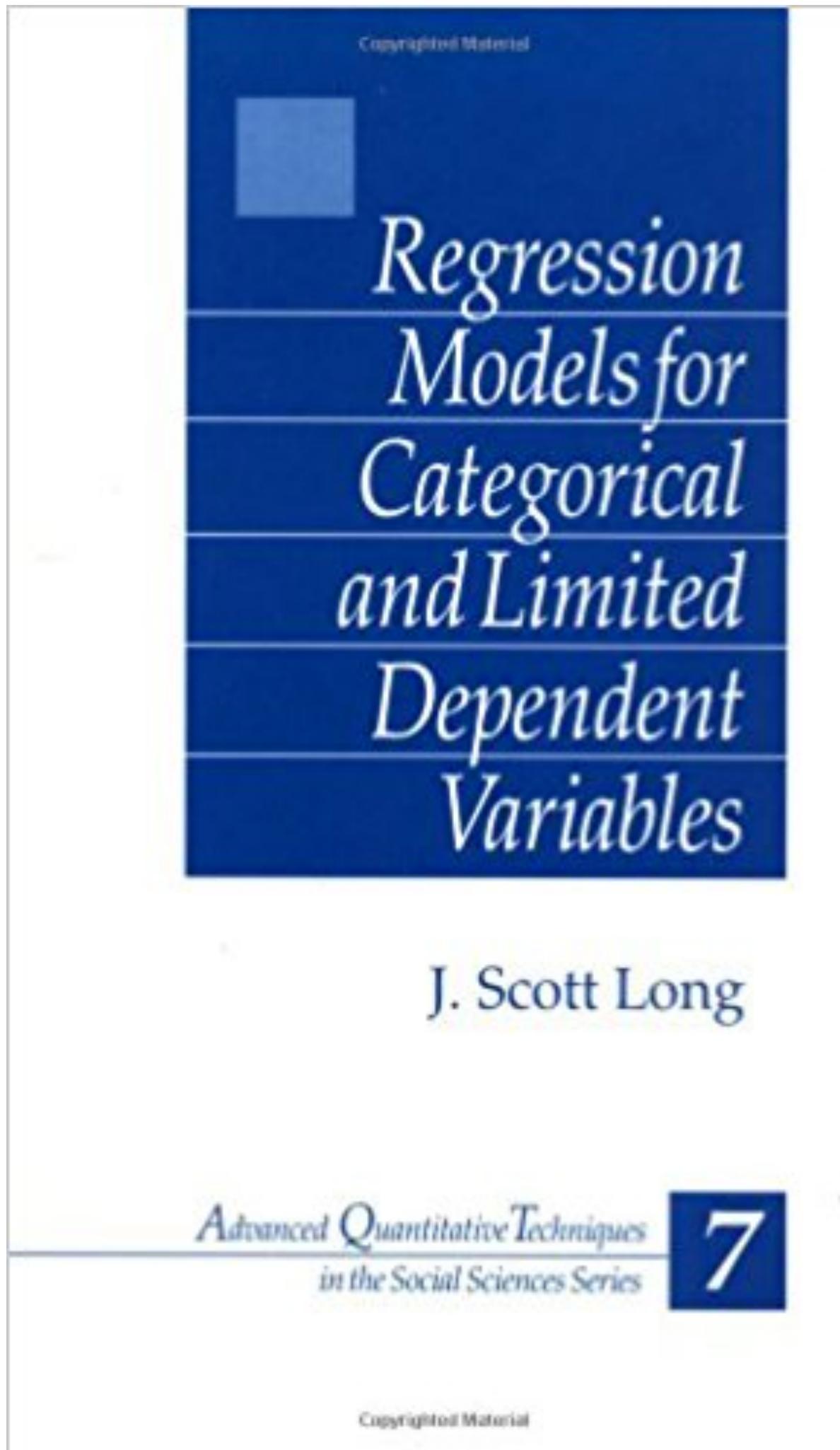
**Bayesian
Inference**

**Meta-
Analysis**

**Thinking in
Populations
of Research**

**Different
Treatment
Effects**

Modeling Outcomes: Count Variables



Incidence rates: distribution of occurrences
in a period of time:

- Poisson
- Negative binomial

...

Long, J. Scott. 1997. *Regression Models for Categorical and Limited Dependent Variables*. 1 edition.
Thousand Oaks: SAGE Publications, Inc.

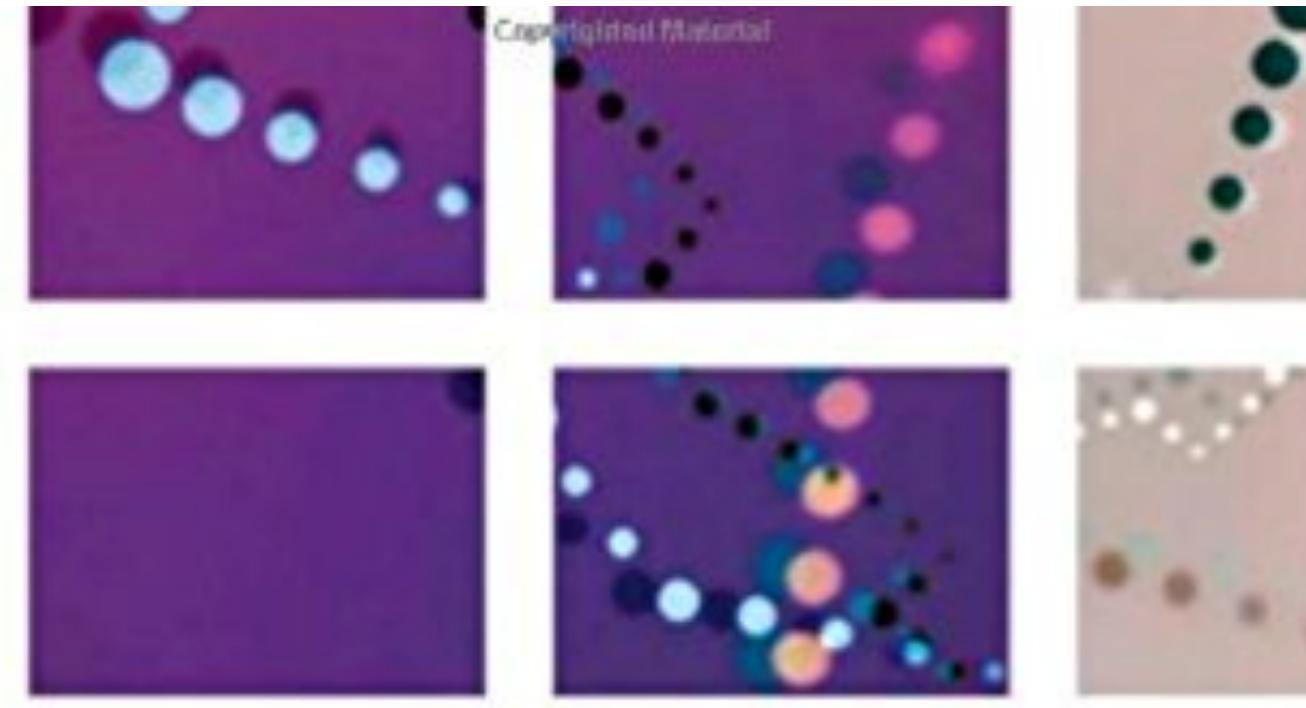
Modeling Outcomes Over Time



Longitudinal effects within a person's experience, between people, and between groups.

Singer, Judith D., and John B. Willett. 2003. *Applied Longitudinal Data Analysis: Modeling Change and Event Occurrence*. Oxford university press.

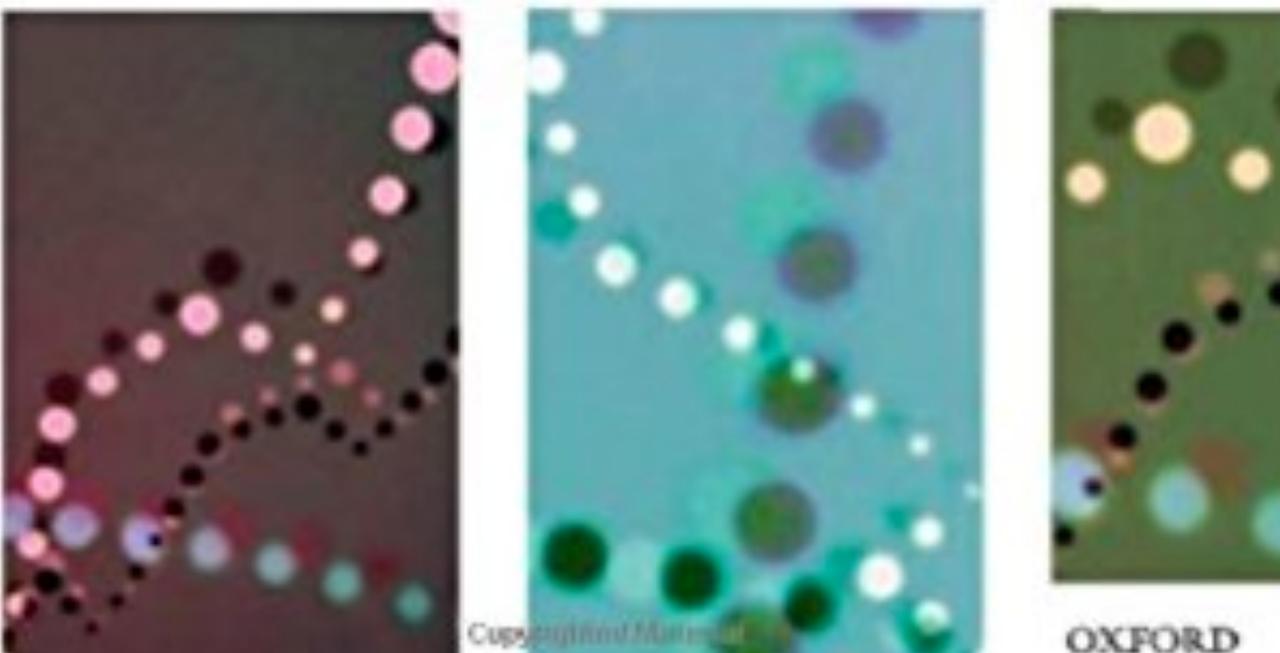
“Natural” Experiments



METHODS MATTER

Improving Causal Inference
in Educational and Social
Science Research

Richard J. Murnane
John B. Willett



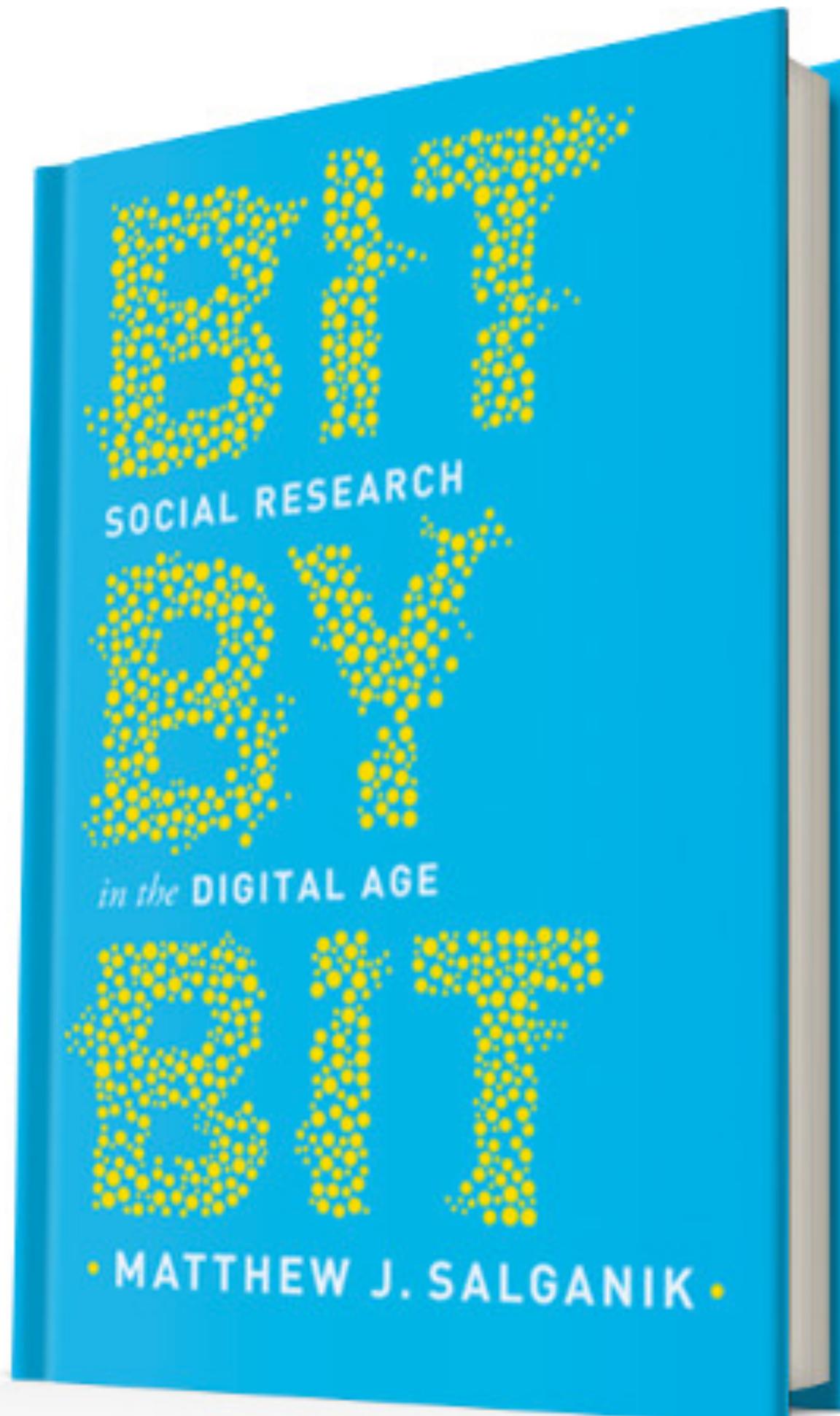
The relationship between theory and
application in field experiments.

Overview of RCTs in education

Comparison to “Natural Experiments”

Murnane, Richard J., and John B. Willett. 2010. **Methods Matter: Improving causal Inference in Educational and Social Science Research**, Oxford University Press.

Measuring Outcomes



- Benefits and limitations of “Big Data”
- Observing behavior
- Asking questions

Important questions:

- Validating measurements
- **Knowing what your measurement is good for and its limitations**

Salganik, M. J. (2017). *Bit by bit: social research in the digital age*. Princeton University Press. Chicago

Qualitative Experiments

Integrating qualitative and quantitative data within field experiments allows investigators to **move past simple average treatment effects** and explore mechanisms of the identified causal effect. A more novel proposal is to use field experimentation as the organizing methodological framework for archival, ethnographic, or interpretive work, and to use ethnographic methods as the primary source of measurement in “experimental ethnography.”

Paluck, E.L. (2010). **The promising integration of field experimentation and qualitative methods.** Annals of the American Academy of Political and Social Science, 628, 59-71.

Interference (SUTVA)

Stable Unit Treatment Value Assumption: the response of a particular unit depends only on the treatment. This is often violated in network situations.

Spillover: when the treatment affects the behavior of other people in the experiment, your estimate can be incorrect.

Taylor, S. J., & Eckles, D. (2017). Randomized experiments to detect and estimate social influence in networks. *arXiv preprint arXiv:1709.09636*.

Compliance

What do you do if not everyone takes the treatment?

Non-compliance is when someone doesn't receive or take up the treatment, and it can be addressed:

- in the **design** of the study (with things like placebos)
- in the **analysis** of the results (with analysis of complier-average treatment effect)

(see Gerber & Green on ways to understand compliance and non-compliance)

Heterogenous Treatment Effects

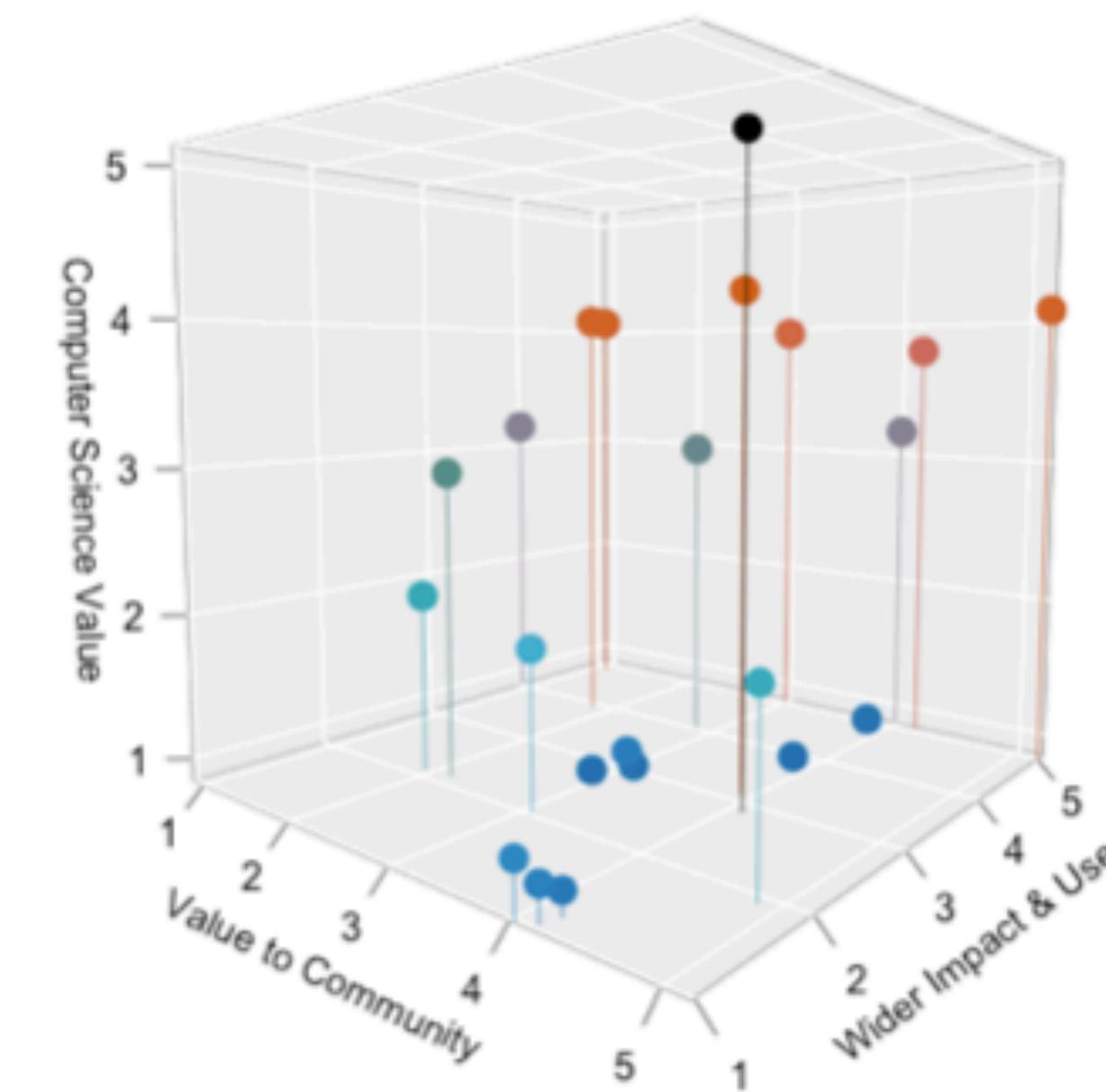
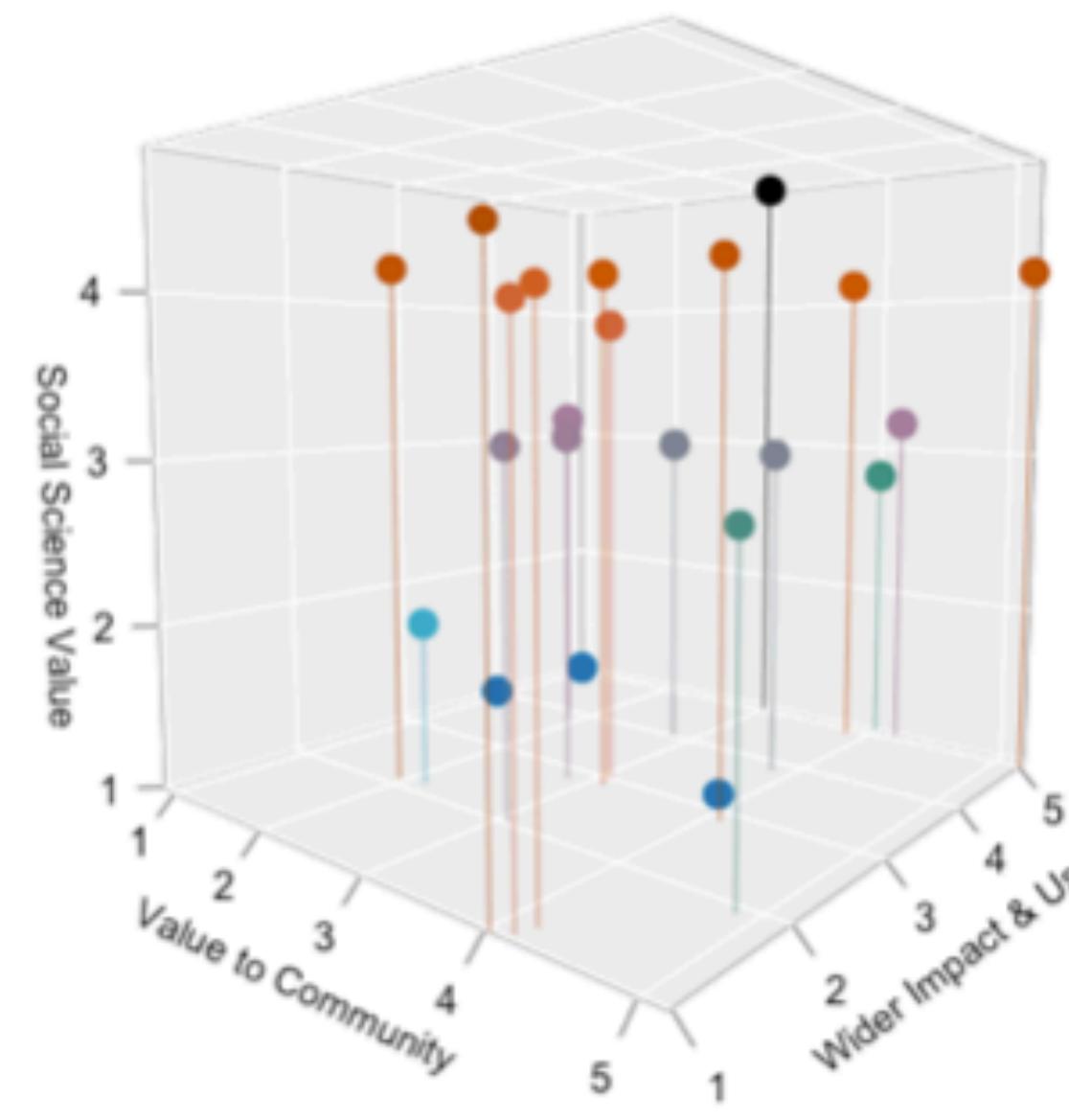
What if individuals or a minority experiences a *very* different effect from everyone else?

How would you know?

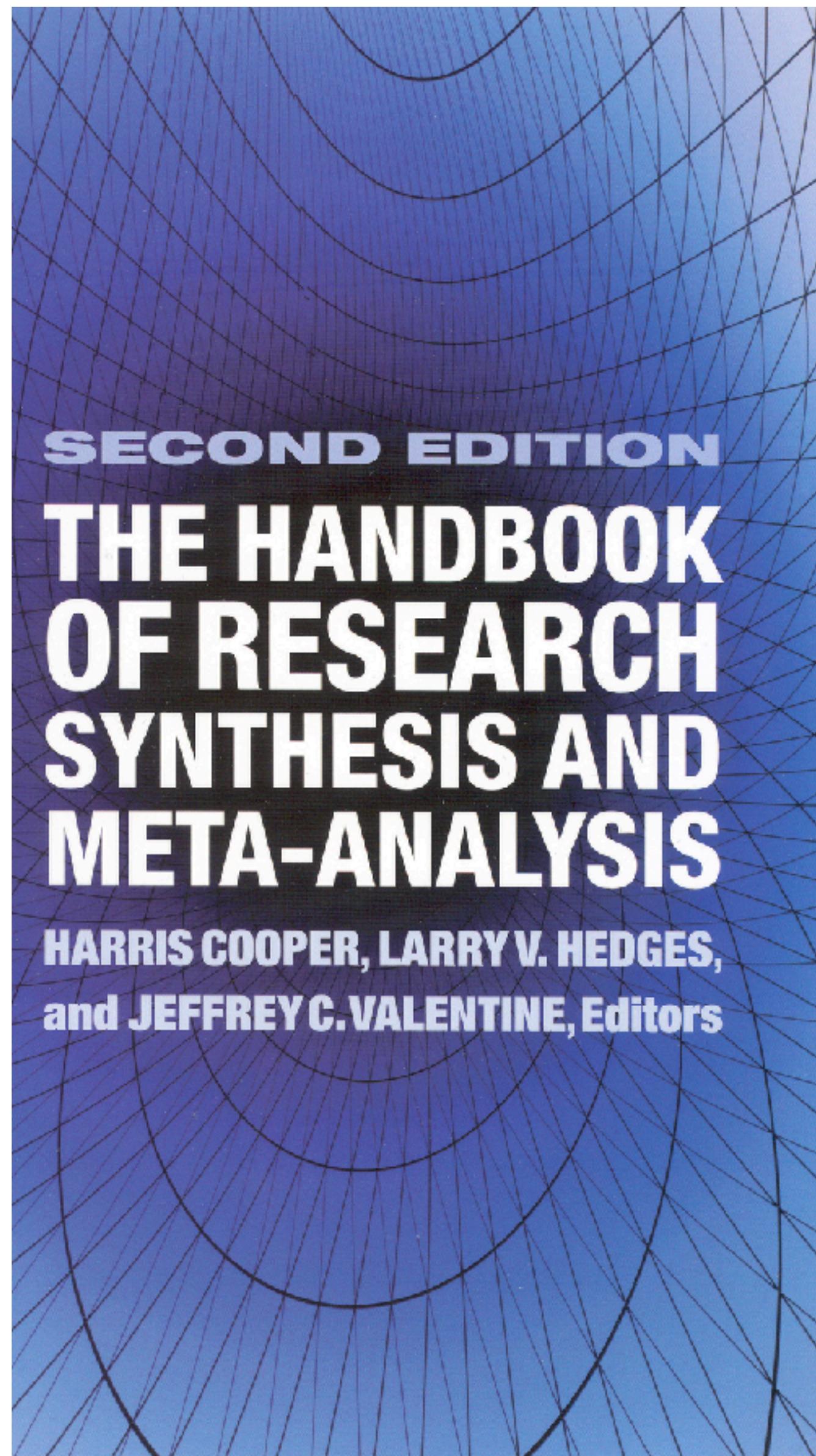
Wager, S., & Athey, S. (2017). **Estimation and inference of heterogeneous treatment effects using random forests**. Journal of the American Statistical Association.

Green, D. P., & Kern, H. L. (2012). **Modeling heterogeneous treatment effects in survey experiments with Bayesian additive regression trees**. Public opinion quarterly, 76(3), 491-511.

Thinking In Populations of Research



Source: J. Nathan Matias, CivilServant.io. n=22 studies proposed by moderators of 60 online communities, along with social scientists and computer scientists at the MIT Media Lab on Jan 28, 2018. If studies are replicated at the estimated rate, this research agenda could result in 155 new studies. Studies include research on online harassment, restorative justice, fact-checking, mental health, moderator training, community engagement, and platform compliance with their own policies. Ratings are based on a preliminary analysis of proposals generated at the summit.



Meta-Analysis & Systematic Review

Combining findings from many studies
into narrative and statistical advice
on the outcomes of an intervention:
adjusting for cultural/time variation,
different methods, and missing results

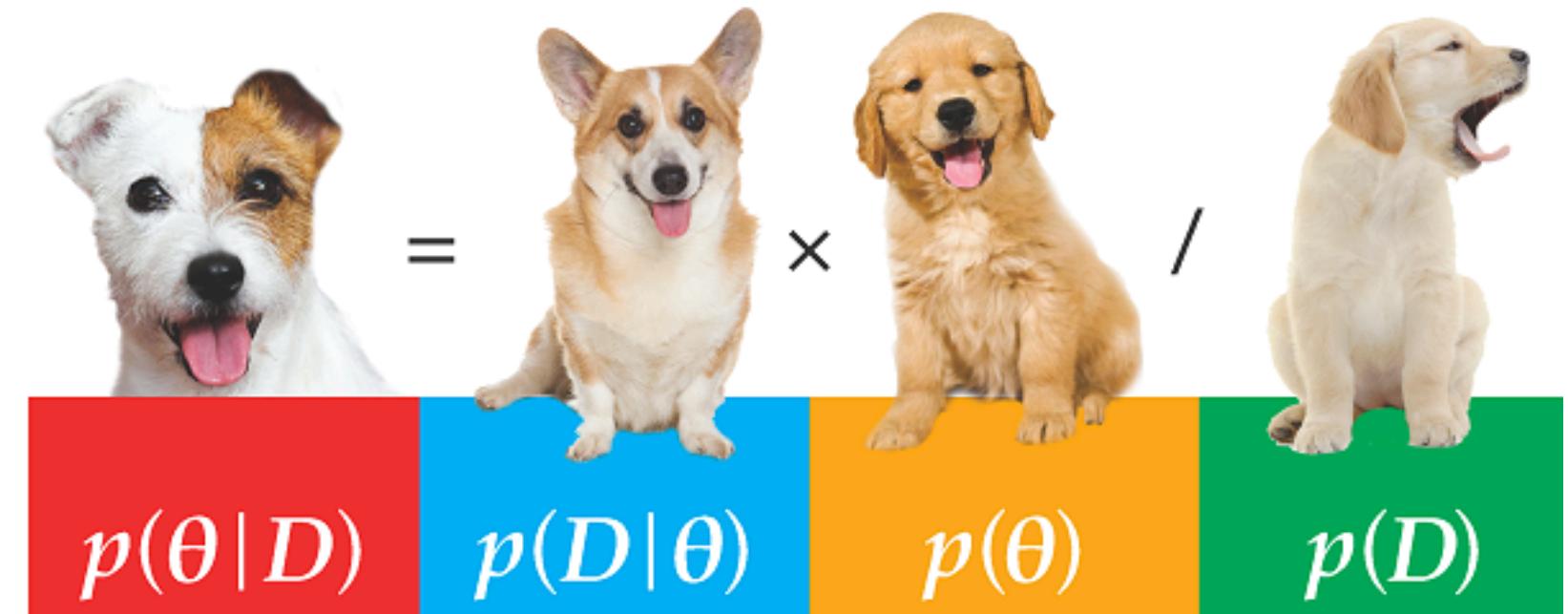
Cooper, H., Hedges, L. V., & Valentine, J. C. (Eds.). (2009). *The handbook of research synthesis and meta-analysis*. Russell Sage Foundation.

Bayesian Inference

Second Edition

Doing Bayesian Data Analysis

A Tutorial with R, JAGS, and Stan



John K. Kruschke



Kruschke, J. (2014). Doing Bayesian data analysis: A tutorial with R, JAGS, and Stan. Academic Press.

Bandit Algorithms



Dynamically choosing between exploration and exploitation:

Exploration: improve knowledge

Exploitation: maximize payoff from that knowledge

White, J. (2012). **Bandit algorithms for website optimization.** " O'Reilly Media, Inc.". Chicago

**Social
Theory**

**Information
Visualization**

Consent

**Tech
Account-
ability**

**Research
Trans-
parency**