Empowering Social Science to Understand and Ameliorate Major Challenges of Human Society

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1GaryKing.org
How to Empower the Social Sciences?

Connections: Sharing data, people, expertise

Methods: Big data is not about the data!

Questions: Stay flexible; let data suggest new questions
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- Connections
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Connections: Sharing data, people, expertise

Methods: Big data is not about the data!

Questions: Stay flexible; let data suggest new questions
Mexico

China

United States

Italy

Global
Mexican Universal Health Insurance Evaluation

How'd we get to do this?

The government asked: how can one democratically elected government tie the hands of the next?

Answer: Commission an independent evaluation

Our Study

Randomized to communities: hospitals, doctors, medicines, insurance, $, etc. ⇝ the largest health policy experiment ever

Problem: Politicians intervene; most large evaluations fail!

Solution: M "Politically Robust" Fail-Safe Design: randomization survives political interventions

Design: Matched pair ≫ complete randomization

Lower bias, model dependence, research costs, & SEs (by 600%!)

Results

Health Care Impoverishment: drastically reduced

States qualify for federal funding by automatically signing up the poor, but only 66% of the poor were aware they had health care! ⇝ immediately corrected

Externalities: design implemented around the world
Mexican Universal Health Insurance Evaluation

“Seguro Popular”: first health care for 50M Mexicans

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Problem: Politicians intervene; most large evaluations fail!

Solution: 

- **Politically Robust** Fail-Safe Design: randomization survives political interventions

- **Design:** Matched pair $\gg$ complete randomization
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Global
Reverse Engineering Censorship in China

• How'd we get to do this?

• Previous approach: watch a few posts; see what's removed

• Data: Download all posts before the Chinese censor them

• What Could be the Goal?

  1. Stop collective action

• Implications: Social Media is Actionable!

• Chinese leaders:

  • measure criticism: to judge local officials
  • censor: to stop events with collective action potential

• We can predict:

  • Officials in trouble, likely to be replaced
  • Dissident arrests; new peace treaties; emerging scandals
  • Disagreements between central and local leaders
Reverse Engineering Censorship in China

• How’d we get to do this?
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• How’d we get to do this? trying ①,

China 6/18
Reverse Engineering Censorship in China

• How’d we get to do this? trying 𪵯, with 𪵯,
Reverse Engineering Censorship in China

• How’d we get to do this? trying ⚡, with ⚡, ↦ ?
Reverse Engineering Censorship in China

- How’d we get to do this? trying $\mathcal{M}$, with $\mathcal{R}$, $\rightsquigarrow$ ?
- Previous approach: watch a few posts; see what’s removed
Reverse Engineering Censorship in China

• How’d we get to do this? trying ¥, with ☞, ⇔ ؟
• Previous approach: watch a few posts; see what’s removed
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Reverse Engineering Censorship in China

- How’d we get to do this? trying \( M \), with \( \mathcal{S} \), \( \rightsquigarrow ? \)
- Previous approach: watch a few posts; see what’s removed
- Data: Download all posts before the Chinese censor them
- Everyone knows the Goal:
Reverse Engineering Censorship in China

• How’d we get to do this? trying 🤔, with 💭, ⇛❓
• Previous approach: watch a few posts; see what’s removed
• Data: Download all posts before the Chinese censor them
• Everyone knows the Goal:
  Stop criticism and protest about the state, its leaders, and their policies
Reverse Engineering Censorship in China

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• Previous approach: watch a few posts; see what’s removed
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• Everyone knows the Goal:
  Stop criticism and protest about the state, its leaders, and their policies Wrong
Reverse Engineering Censorship in China

- How’d we get to do this? trying ( ), with ( ), ~⇒ ?
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- How’d we get to do this? trying \( \text{ élevé, with } \text{ sorter, } \sim \Rightarrow ? \)
- Previous approach: watch a few posts; see what’s removed
- Data: Download all posts before the Chinese censor them
- Everyone knows the Goal:
  Stop criticism and protest about the state, its leaders, and their policies *Wrong*
- What Could be the Goal?
  1. Stop criticism of the state
Reverse Engineering Censorship in China

• How’d we get to do this? trying 🔄, with 🔄, ⇝ ❓

• Previous approach: watch a few posts; see what’s removed

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• Everyone knows the Goal:
  Stop criticism and protest about the state, its leaders, and their policies Wrong

• What Could be the Goal?
  1. Stop criticism of the state
  2. Stop collective action
Reverse Engineering Censorship in China

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• What Could be the Goal?
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  2. Stop collective action
Reverse Engineering Censorship in China

• How’d we get to do this? trying (redicate), with (predicate), \( \sim \rightarrow ? \)

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  Stop criticism and protest about the state, its leaders, and their policies \textit{Wrong}

• What Could be the Goal?
  1. Stop criticism of the state \textit{Wrong}  \textit{Wrong}
  2. Stop collective action \textit{Right}
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- Everyone knows the Goal:
  Stop criticism and protest about the state, its leaders, and their policies  *Wrong*
- What Could be the Goal?
  1. Stop criticism of the state  *Wrong*
  2. Stop collective action  *Right*

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  - Chinese leaders:
    - We can predict:
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- How’d we get to do this? trying \( \mathcal{M} \), with \( \mathcal{K} \), \( \rightsquigarrow \) ?
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Reverse Engineering China’s 50c Party
The Government Surreptitiously Fabricating Social Media Posts
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• Prevailing view of scholars, activists, journalists, social media participants:
Reverse Engineering China’s 50c Party
The Government Surreptitiously Fabricating Social Media Posts

• Prevailing view of scholars, activists, journalists, social media participants: 50c party argues against those who criticize the government, its leaders, and their policies
Reverse Engineering China’s 50c Party
The Government Surreptitiously Fabricating Social Media Posts

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Existing evidence?
Reverse Engineering China’s 50c Party
The Government Surreptitiously Fabricating Social Media Posts

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The Government Surreptitiously Fabricating Social Media Posts

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Reverse Engineering China’s 50c Party
The Government Surreptitiously Fabricating Social Media Posts

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Our evidence:
• with journalists who found leaked archive in 1 county
• from fact of leak to reason for 50c
• to systematize messy text, image, email archive
Reverse Engineering China’s 50c Party
The Government Surreptitiously Fabricating Social Media Posts

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Existing evidence? A few anecdotes; “no ground truth”; “no successful attempts to quantify” 50c party activity; even several analyses with made up dependent variables!

Our evidence:
• ⏰ with journalists who found leaked archive in 1 county
• 🔍 from fact of leak to reason for 50c
• ⏤ to systematize messy text, image, email archive
• extrapolated results to all of China
Revise Engineering China’s 50c Party
The Government Surreptitiously Fabricating Social Media Posts

• Prevailing view of scholars, activists, journalists, social media participants: 50c party argues against those who criticize the government, its leaders, and their policies

Existing evidence? A few anecdotes; “no ground truth”; “no successful attempts to quantify” 50c party activity; even several analyses with made up dependent variables!

Our evidence:
• 📄 with journalists who found leaked archive in 1 county
• 🎨 from fact of leak to reason for 50c
• 📚 to systematize messy text, image, email archive
• extrapolated results to all of China
• In a poll(!), convinced 50c to acknowledge behavior
Reverse Engineering China’s 50c Party
The Government Surreptitiously Fabricating Social Media Posts

- Prevailing view of scholars, activists, journalists, social media participants: 50c party argues against those who criticize the government, its leaders, and their policies **Wrong**
Reverse Engineering China’s 50c Party
The Government Surreptitiously Fabricating Social Media Posts

• Prevailing view of scholars, activists, journalists, social media participants: 50c party argues against those who criticize the government, its leaders, and their policies **Wrong**
• Fabricates 450M social media posts a year!
Reverse Engineering China’s 50c Party
The Government Surreptitiously Fabricating Social Media Posts

• Prevailing view of scholars, activists, journalists, social media participants: 50c party argues against those who criticize the government, its leaders, and their policies *Wrong*

• Fabricates 450M social media posts a year!

• Does not argue; does not engage on controversial issues
Reverse Engineering China’s 50c Party
The Government Surreptitiously Fabricating Social Media Posts

- Prevailing view of scholars, activists, journalists, social media participants: 50c party argues against those who criticize the government, its leaders, and their policies **Wrong**
- Fabricates 450M social media posts a year!
- Does not argue; does not engage on controversial issues
- Distracts; redirects public attention from criticism and central issues to **cheerleading** and positive discussions of valence issues
Externalities: Finding Those Hiding in Plain Sight

Censors can’t follow the conversation; with M we can.

1. Analysts,
2. eDiscovery,
3. Long tail search,
4. Language drift (#BostonBombings ⇝ #BostonStrong),
5. Look-alike modeling, etc.

China
Externalities: Finding Those Hiding in Plain Sight

Example Substitution 1:

自由
“Freedom”
目田
“Eye field”

Example Substitution 2:

Homophone (sound like “hexie”)
和谐
“Harmonious [Society]” (official slogan)
河蟹
“River crab”

Censors can’t follow the conversation; with M we can.

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Example Substitution 1:

自由

自由
Externalities: Finding Those Hiding in Plain Sight

Example Substitution 1:

自由 “Freedom”
Externalities: Finding Those Hiding in Plain Sight

Example Substitution 1:

自由 “Freedom”

China
Example Substitution 1:

自由
自由
“Freedom”

目田
目田
<table>
<thead>
<tr>
<th>Chinese</th>
<th>English</th>
<th>Censored</th>
</tr>
</thead>
<tbody>
<tr>
<td>自由</td>
<td>“Freedom”</td>
<td></td>
</tr>
<tr>
<td>目田</td>
<td>“Eye field”</td>
<td></td>
</tr>
</tbody>
</table>
Externalities: Finding Those Hiding in Plain Sight

Example Substitution 1:

自由  自由
目田  “Freedom”  “Eye field” (nonsensical)
**Example Substitution 1: Homograph**

<table>
<thead>
<tr>
<th>自由</th>
<th>“Freedom”</th>
</tr>
</thead>
<tbody>
<tr>
<td>目田</td>
<td>“Eye field” (nonsensical)</td>
</tr>
</tbody>
</table>
### Example Substitution 1: Homograph

<table>
<thead>
<tr>
<th>Chinese</th>
<th>English</th>
<th>(nonsensical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>自由</td>
<td>“Freedom”</td>
<td></td>
</tr>
<tr>
<td>目田</td>
<td>“Eye field”</td>
<td>(nonsensical)</td>
</tr>
</tbody>
</table>
Externalities: Finding Those Hiding in Plain Sight

<table>
<thead>
<tr>
<th>Example Substitution 1: Homograph</th>
</tr>
</thead>
<tbody>
<tr>
<td>自由</td>
</tr>
<tr>
<td>目田</td>
</tr>
</tbody>
</table>

Example Substitution 2:
Externalities: Finding Those Hiding in Plain Sight

Example Substitution 1: Homograph

自由
自由
自由
自由
自由
Freedom
“Freedom”
CENSORED

目田
目田
目田
目田
目田
“Eye field” (nonsensical)

Example Substitution 2:

和谐
和谐
和谐
和谐
和谐
和谐

China
8/18
### Externalities: Finding Those Hiding in Plain Sight

#### Example Substitution 1: Homograph

| 自由 | “Freedom” **[Censored]** |
| 目田 | “Eye field” (nonsensical) |

#### Example Substitution 2:

| 和谐 | “Harmonious [Society]” (official slogan) |
Externalities: Finding Those Hiding in Plain Sight

Example Substitution 1: Homograph

自由
自由
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和谐
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Externalities: Finding Those Hiding in Plain Sight

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“Freedom”

目田
“Eye field” (nonsensical)

Example Substitution 2:

和谐
“Harmonious [Society]” (official slogan)

河蟹

Externalities: Finding Those Hiding in Plain Sight

Example Substitution 1: Homograph

自由 “Freedom” (censored)
目田 “Eye field” (nonsensical)

Example Substitution 2:

和谐 “Harmonious [Society]” (official slogan) (censored)
河蟹 “River crab”
Externalities: Finding Those Hiding in Plain Sight

Example Substitution 1: Homograph

自由
目田
“Freedom”  “Eye field” (nonsensical)

Example Substitution 2:

和谐
河蟹
“Harmonious [Society]” (official slogan)
“River crab” (irrelevant)
# Externalities: Finding Those Hiding in Plain Sight

## Example Substitution 1: Homograph

<table>
<thead>
<tr>
<th>自由 (Freedom)</th>
<th>目田 (Eye field) (nonsensical)</th>
</tr>
</thead>
</table>

## Example Substitution 2: Homophone (sound like “hexie”)

<table>
<thead>
<tr>
<th>和谐 (Harmonious [Society]) (official slogan)</th>
<th>河蟹 (River crab) (irrelevant)</th>
</tr>
</thead>
</table>
Externalities: Finding Those Hiding in Plain Sight

Example Substitution 1: Homograph

自由 目田
“Freedom”
“Eye field” (nonsensical)

Example Substitution 2: Homophone (sound like “hexie”)

和谐 河蟹
“Harmonious [Society]” (official slogan)
“River crab” (irrelevant)

Censors can’t follow the conversation;
## Externalities: Finding Those Hiding in Plain Sight

### Example Substitution 1: Homograph

| 自由 | “Freedom” [CENSORED] |
| 目田 | “Eye field” (nonsensical) |

### Example Substitution 2: Homophone (sound like “hexie”)

| 和谐 | “Harmonious [Society]” (official slogan) [CENSORED] |
| 河蟹 | “River crab” (irrelevant) |

Censors can’t follow the conversation; with 🗨️ we can.
Externalities: Finding Those Hiding in Plain Sight

Example Substitution 1: Homograph

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Example Substitution 2: Homophone (sound like “hexie”)

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Externalities: Finding Those Hiding in Plain Sight

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Censors can’t follow the conversation; with ④ we can.

⑤: (1) Analysts,
Externalities: Finding Those Hiding in Plain Sight

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“Freedom”
“Eye field” (nonsensical)

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和谐河蟹
“Harmonious [Society]” (official slogan)
“River crab” (irrelevant)

Censors can’t follow the conversation; with  we can.

?: (1) Analysts, (2) eDiscovery,
Externalities: Finding Those Hiding in Plain Sight

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“River crab” (irrelevant)

Censors can’t follow the conversation; with ⑯ we can.

?: (1) Analysts, (2) eDiscovery, (3) Long tail search,
Externalities: Finding Those Hiding in Plain Sight

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Censors can’t follow the conversation; with M we can.

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Censors can’t follow the conversation; with M we can.

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(5) Look-alike modeling, etc.
The Effect of the News Media

• What's the evidence?
• We can't randomize!
• Clever alternatives:
  (1) New TV tower, behind a hill, in radio shadow;
  (2) Before/after studies of “surprise” events; etc.
• Better but ⇝ “Profound biases,” > 600% difference from truth
• Estimands: different, of sometimes questionable relevance
• Switch to the obvious (hard)?
• What's required to randomize
• Journalists: total control over what's published & when
• Scientists: total control over what's published & when

48 media outlets let us randomize:

United States 10/18
The Effect of the News Media

• What’s the evidence?
The Effect of the News Media

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The Effect of the News Media

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United States
The Effect of the News Media

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• 48 media outlets let us randomize:

United States
The Effect of the News Media

- We choose a policy area (1 of 11)
The Effect of the News Media

- We choose a *policy area* (1 of 11)
- Outlets volunteer for a *pack* of $\approx 3$ (with our approval), following “project manager” protocol (e.g., Panama Papers)
The Effect of the News Media

- We choose a *policy area* (1 of 11)
- Outlets volunteer for a *pack* of ≈ 3 (with our approval), following “project manager” protocol (e.g., Panama Papers)
- The pack chooses *subject* for articles
The Effect of the News Media

- **We choose a policy area** (1 of 11)
- **Outlets volunteer for a pack** of ≈ 3 (with our approval), following “project manager” protocol (e.g., Panama Papers)
- **The pack chooses subject** for articles
  - **We approve:** If rejected, outlets can still publish
The Effect of the News Media

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  - Requirement: No breaking news (so we can randomize timing)
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- Matched Pair Randomization

Matched Pair Randomization

Outlets Publish Simultaneously (following their procedures)

Statistical Methods

Sequential Hypothesis Testing: Saved $ millions & years

Automated Text Analysis: To measure national conversation

Results

Causal effects:
- 1st day: 19.4% increase,
- Total: 62.7% increase

Context:
- 3 small media outlets
  - national conversation
  - policy agenda
  - policy

United States

11/18
The Effect of the News Media

- **We choose a policy area** (1 of 11)
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- **Matched Pair Randomization**
  - Match weeks on similarly of predicted news

**United States | 11/18**
The Effect of the News Media

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  • **Requirement:** No breaking news (so we can randomize timing)
• **Matched Pair Randomization ($M$)**
  • Match weeks on similarly of predicted news
  • *One coin flip:* to choose weeks
The Effect of the News Media

- We choose a policy area (1 of 11)
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- The pack chooses subject for articles
  - We approve: If rejected, outlets can still publish
  - Requirement: No breaking news (so we can randomize timing)
- Matched Pair Randomization
  - Match weeks on similarly of predicted news
  - One coin flip: to choose weeks
    - Treatment week: publish & promote articles (usually Tuesday)
The Effect of the News Media

- We choose a *policy area* (1 of 11)
- Outlets volunteer for a *pack* of \( \approx 3 \) (with our approval), following “project manager” protocol (e.g., Panama Papers)
- The pack chooses *subject* for articles
  - We approve: If rejected, outlets can still publish
  - Requirement: No breaking news (so we can randomize timing)
- **Matched Pair Randomization**
  - Match weeks on similarly of predicted news
  - *One coin flip*: to choose weeks
    - Treatment week: publish & promote articles (usually Tuesday)
    - Control week: no compensation or special actions

*Results*

- Causal effects: 1st day: 19.4% increase, Total: 62.7% increase
- Context: 3 small media outlets \( \Rightarrow \) national conversation \( \Rightarrow \) policy agenda \( \Rightarrow \) policy United States

11/18
The Effect of the News Media

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• Outlets Publish Simultaneously (following their procedures)
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• Statistical Methods \( \Box \)
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  - Outlets Publish Simultaneously (following their procedures)
- Statistical Methods \( \mathbb{M} \)
  - Sequential Hypothesis Testing: Saved $ millions & years
The Effect of the News Media

• We choose a policy area (1 of 11)
• Outlets volunteer for a pack of ≈ 3 (with our approval), following “project manager” protocol (e.g., Panama Papers)
• The pack chooses subject for articles
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  • Requirement: No breaking news (so we can randomize timing)

• Matched Pair Randomization
  • Match weeks on similarly of predicted news
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  - **Causal effects:**
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Early in the COVID crisis:

- Italian Government called for urgent need: messaging to follow public health advice.

- Side effect of COVID: in 5 days, signed up 20 academic collaborators, designed large scale experiment; pretest in multiple cities.
  - Ran nationally representative survey; randomized messaging.
  - Measured compliance.
  - Completed analyses, wrote academic paper, made public.

Results:

- Public health messaging was working.
- High compliance for all subgroups, even those who distrust government, or think they're lying.

Impact of quarantine on mental health; designed treatments.

Externalities:

- Day 7: Italy adopts our recommendations.
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Mexico

China

United States

Italy

Global
Dataverse: Automated Data Archiving

Problem:
Forced choice (rock or hard place)

- Put data in archive: get preservation, but credit
- Distribute data yourself: get credit, but preservation

Solution:
Dataverse: get credit & preservation

- Keep data on my website, branded as mine
- In fact really in the archive
- Managed by professionals, by 60 institutions around the world, in ways academics can't
- Open source: 100s of contributors, 1000s of dataverses, 100,000s of datasets, 10,000,000s of users

- M: data citations, UNFs, security, privacy, metadata, automated analytics, novel development, etc.

Every group here can participate!

Global 15/18
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Dataverse: Automated Data Archiving

- **Problem**: Forced choice (rock or hard place)
  - *Put data in archive*: get preservation, but credit
  - *Distribute data yourself*: get credit, but preservation

- **Solution** ¡ Dataverse: get credit & preservation
  - *Keep data on my website*, branded as mine
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- **Every group here can participate!**
Convincing Facebook to Make Data Available

• Gary visits Facebook to persuade them to share data

• In my hotel room packing, email arrives: “Hey what do we do about this?” This was Cambridge Analytica.

• 3 days later: “Could you do a study of the 2016 election?” I’d love to, but… I need 2 things & you’ll only give me 1:
  • Complete access to data, people, etc. (like employees)
  • No pre-publication approval (like NO employees ever)

• We iterate, and I propose a 2-part solution
  • Outside academics: send proposals, no company veto
  • Trusted 3rd party: Commission at Social Science One signs NDAs, agree not to publish from the data, chooses datasets, makes final decisions; can report publicly if Facebook reneges

• Problem solved, without balancing agreements, announcements, funding, 30+ people assigned at Facebook

• Just one issue: Facebook’s implementation plan was illegal!
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How to Share Data Without Giving Anyone Access

• No problem; we’ll de-identify!

• "differential privacy"
  - Add special noise: privacy guarantees & can still find patterns
  - Burgeoning literature; used in your cell & at US Census
  - Statistical properties: biased, no uncertainty ests.

• Facebook
  - Data access provided to >100 researchers around the globe
  - Massive dataset (17T numbers) on effects of social media
  - All sides achieve goals; no balancing necessary

• Next step
  - Need trusted open source software

• add Microsoft

• OpenDP initiative, hundreds around the globe joining effort
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Connections
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Connections
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Connections
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For more information
GaryKing.org