Reverse Engineering Chinese Censorship

Gary King

Institute for Quantitative Social Science
Harvard University

(Talk at Harvard IT Summit, 6/5/2014)

1GaryKing.org
Papers

- An Observational Study:
  

- Experimental and Participatory Studies:
  
  *Reverse Engineering Chinese Censorship* (Under review)

Copies at GaryKing.org
Chinese Censorship

The largest selective suppression of human expression in history: implemented manually (within a few hours of posting), by ≈200,000 workers, located in government and inside social media firms.

A huge censorship organization: (obviously) designed to suppress information (paradoxically) very revealing about the goals, intentions, and actions of the Chinese leadership.

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Chinese Social Media: Fractured over 1,400+ sites
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(Plus 59% from Sina Blog)
The Goals of Censorship make Social Media Actionable

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

Thus, we can use criticism & censorship to predict:
- Officials in trouble, likely to be replaced
- Policies that generate dissent (& interest of leaders)
- Government action outside the Internet
- Dissidents to be arrested; peace treaties to sign; emerging scandals
- Disagreements between central and local leaders

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A big prize, but payable only
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1. Monitor 85 content areas over 6 months
2. Download each social media post, the instant it appears
3. Revisit each later to check if it was censored (carefully, from computers all over the world)
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Censorship is not Ambiguous: Example Error Page

Sorry, the host you were looking for does not exist, has been deleted, or is being investigated
Censorship is not Ambiguous: BBS Error Page

The page you requested is temporarily down. How about you go look at another page.

Jingjing, one of China’s cartoon internet police
The Censors are Fast; Our Automated Methods are Faster
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Example: Shanghai Subway Crash
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Post Volume & Censorship are “Bursty”
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Collective Support for Environmental Lottery

Found 87 volume bursts in our 85 topic areas
Identified real world event associated with each burst
Our hypothesis: The government censors all posts in volume bursts associated with events with collective action potential (regardless of how critical or supportive of the state)
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Event classification (each category can be +, −, or neutral comments about the state)

1. protest or organized crowd formation outside the Internet
2. individuals who have organized or incited collective action on the ground in the past;
3. topics related to nationalism or nationalist sentiment that have incited protest or collective action in the past.

(Inter-coder reliability: 98.9%)
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What Types of Events Are Censored?

The diagram shows the distribution of censorship events across different types of news and policies. The x-axis represents the censorship magnitude, while the y-axis shows the density. Different types of events are represented by different colors:

- Red: Collective Action
- Orange: Criticism of Censors
- Yellow: Pornography

The data suggests that censorship is more common in policy news compared to collective action events.
What Types of Events Are Censored?

- Protests in Inner Mongolia
- Pornography Disguised as News
- Baidu Copyright Lawsuit
- Zengcheng Protests
- Pornography Mentioning Popular Book
- Ai Weiwei Arrested
- Collective Anger At Lead Poisoning in Jiangsu
- Google is Hacked
- Localized Advocacy for Environment Lottery
- Fuzhou Bombing
- Students Throw Shoes at Fang BinXing
- Rush to Buy Salt After Earthquake
- New Laws on Fifty Cent Party
- U.S. Military Intervention in Libya
- Food Prices Rise
- Education Reform for Migrant Children
- Popular Video Game Released
- Indoor Smoking Ban Takes Effect
- News About Iran Nuclear Program
- Jon Hunstman Steps Down as Ambassador to China
- Gov't Increases Power Prices
- China Puts Nuclear Program on Hold
- Chinese Solar Company Announces Earnings
- EPA Issues New Rules on Lead
- Disney Announced Theme Park
- Disney Announced Theme Park
- Popular Book Published in Audio Format

Censorship Magnitude

- Collective Action
- Criticism of Censors
- Pornography

-0.2 0 0.1 0.3 0.5 0.7
Censoring Collective Action: Riots in Zencheng

[Chart showing the count of published versus censored incidents from January to July, with a peak in June for both categories.]
Censoring Collective Action: Ai Weiwei’s Arrest

Ai Weiwei arrested

Count Published
Count Censored
Low Censorship on Policy: One Child

Speculation of Policy Reversal at NPC

Count

Count Published

Count Censored

Jan Feb Mar Apr May Jun Jul
Low Censorship on News: Power Prices

Power shortages
Gov't raises
power prices
to curb demand
<table>
<thead>
<tr>
<th>Percent Censored</th>
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</tr>
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<tbody>
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One Child Policy
Corruption Policy
Food Prices Rise
Uncensored: Non-Collective Action Posts

Regardless of whether Supportive or Critical
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Selected 100 top social media sites (≈87% of blogs, >500M Users, geographically diverse)
Created 2 accounts on each (from inside China all over the country)
Wrote 1,200 unique social media posts (CA/not CA, Pro/Anti)
Submitted posts randomly assigned to type
Checked on censorship (from computers in many countries)

Participatory Study (for descriptive inferences)

Current method of learning how they censor: ask (carefully!)
Our goal: change our sources' incentives
Procedure: create our own social media website in China
Bought URL; contracted with firms for servers & software; posted and censored ourselves
To learn: we tried every software option, read the documentation, and called customer support(!)
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1. Randomized Experiment (for causal inferences)
   - Selected 100 top social media sites (~87% of blogs, >500M Users, geographically diverse)
   - Created 2 accounts on each (from inside China all over the country)
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   - Submitted posts randomly assigned to type
   - Checked on censorship (from computers in many countries)

2 Participatory Study (for descriptive inferences)

   Current method of learning how they censor: ask (carefully!)
   Our goal: change our sources' incentives
   Procedure: create our own social media website in China
   Bought URL; contracted with firms for servers & software; posted and censored ourselves
   To learn: we tried every software option, read the documentation, and called customer support(!)
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Mechanisms of Censorship
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Submit text for posting

- Publish immediately
  - Post remains online
  - Publish immediately
    - Post is removed (within 24 hours)
  - Immediately held for review before publication
    - Administrator has set up review for new topics, your post will be shown after it has passed review.
  - Post published after review
  - Post deleted during review
    - (Post reviewed then deleted)
  - Account blocked
    - You have been silenced by the administrator, the type of silence is forever!
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Account blocked

The government goes on about anti-corruption everyday, but is it doing anything? Today, it’s Guo Yongxiang from Sichuan...All officials are corrupt, it’s only those who have offended someone that are investigated...

Sorry, the host you were looking for does not exist, has been deleted, or is being investigated

By 2020 China will have 30 million bare branches (extra men), this is a critical situation. Behind it is the fact that every year more boys than girls are born, which is due to the one-child policy. Over the years, the one-child policy has created many social problems...

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Observational study

64% of websites review some content

40% of all submissions reviewed
Posts For v. Against Government: Zero Causal Effect
Posts For v. Against Government: Zero Causal Effect
Posts For v. Against Government: Zero Causal Effect

Panxu Protest

Censorship Difference (Pro − Anti)
Posts For v. Against Government: Zero Causal Effect

Panxu
Protest
Posts For v. Against Government: Zero Causal Effect

Censorship Difference (Pro − Anti)

Panxu Protest

Tibetan Self-Immolations
Posts For v. Against Government: Zero Causal Effect
Posts for vs. against government: zero causal effect

Panxu protest
Tibetan self-immolations
Ai Weiwei album
Protests in Xinjiang
Posts For v. Against Government: Zero Causal Effect

Censorship Difference (Pro − Anti)

-0.5 0.0 0.5 1.0

Panxu Protest
Tibetan Self-Immolations
Ai Weiwei Album
Protests in Xinjiang
Corruption Policy
Posts For v. Against Government: Zero Causal Effect

Censorship Difference (Pro − Anti)

Panxu Protest
Ai Weiwei Album
Corruption Policy
Tibetan Self-Immolations
Protests in Xinjiang
Eliminate Golden Week

22/26
Posts For v. Against Government: Zero Causal Effect

Panxu Protest
Ai Weiwei Album
Corruption Policy
Tibetan Self-Immolations
Protests in Xinjiang
Eliminate Golden Week
Rental Tax
Posts For v. Against Government: Zero Causal Effect
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Panxu Protest
Ai Weiwei Album
Corruption Policy
Protests in Xinjiang
Eliminate Golden Week
Yellow Light Fines
Rental Tax
Stock Market Crash
Investigation of Sichuan Vice Governor
Gender Imbalance

Censorship Difference (Pro − Anti)
Posts For v. Against Government: Zero Causal Effect

Censorship Difference (Pro − Anti)

-0.5 0.0 0.5 1.0

Panxu Protest
Ai Weiwei Album
Corruption Policy
Eliminate Golden Week
Yellow Light Fines
Stock Market Crash
Gender Imbalance
Investigation of Sichuan Vice Governor
Li Tianyi Scandal
Rental Tax
Protests in Xinjiang
Tibetan Self-Immolations
Collective Action Events: Large Causal Effect
Collective Action Events: Large Causal Effect
Collective Action Events: Large Causal Effect

Panxu Protest

Censorship Difference (CA Event − Non-CA Event)
Collective Action Events: Large Causal Effect

Panxu Protest

Censorship Difference (CA Event − Non−CA Event)
Collective Action Events: Large Causal Effect

- Panxu Protest
- Tibetan Self-Immolations

Censorship Difference (CA Event − Non-CA Event)
Collective Action Events: Large Causal Effect

![Graph showing the censorship difference between CA events and non-CA events for different events: Panxu Protest, Tibetan Self-Immolations, and Ai Weiwei Album.](image-url)
Collective Action Events: Large Causal Effect

Panxu Protest
Tibetan Self-Immolations
Ai Weiwei Album
Protests in Xinjiang
Evading Automated Review

Example Substitution 1: Homograph
自
自由
"Freedom"
目
田
"Eye field" (nonsensical)

Example Substitution 2: Homophone (both sound like "hexie")
和
谐
"Harmonious [Society]" (official slogan)
河
蟹
"River crab" (irrelevant)

They can’t follow the conversation; our new keyword methods can!

The same task:
(1) the intelligence analyst’s job (need massively better keyword recommender),
(2) language drift (#BostonBombings ⇝ #BostonStrong),
(3) People hiding in plain sight,
(4) Look-alike modeling,
(5) Starting point for sophisticated automated text analysis
Evading Automated Review

Example Substitution 1:

They can't follow the conversation; our new keyword methods can!
Evading Automated Review

Example Substitution 1:

自由

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“Freedom”
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Evading Automated Review

Example Substitution 1:

自由 自由 “Freedom”
目 田 目つ “Eye field” (nonsensical)
Evading Automated Review

Example Substitution 1: Homograph

自由 自由
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Example Substitution 1: Homograph

自由
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目田
目田
“Eye field” (nonsensical)
Evading Automated Review

Example Substitution 1: Homograph

自由
自
自由
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目田
目
眼
“Eye field” (nonsensical)

Example Substitution 2:
Evading Automated Review

Example Substitution 1: Homograph

自由
目田
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Example Substitution 2:

和谐
Evading Automated Review

Example Substitution 1: Homograph

自由
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目田
目田
“Eye field” (nonsensical)

Example Substitution 2:

和諧
和谐
“Harmonious [Society]” (official slogan)
Evading Automated Review

Example Substitution 1: Homograph

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目田 “Eye field” (nonsensical)

Example Substitution 2:

和谐 “Harmonious [Society]” (official slogan)
Evading Automated Review

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自由
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“Freedom”
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Conclusions

The Goals of Chinese Censorship: Individually free, Collectively in Chains

Unambiguous evidence from: observational study, participant observation, & randomized experiments

Makes Social Media Actionable for us:

- Enables detailed, continuous, predictive monitoring of every Chinese government, leader, policy, dissident, scandal, company, etc.
- Predicts state actions when other sources are silent
- Applicable to some other countries

New methods developed for:

- Following conversations when people try to evade censors
- Automated keyword recommender for government analysts
- Predicting action on the ground from censorship
- Understanding large volumes of unstructured text
Conclusions

- The Goals of Chinese Censorship:
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For more information

GaryKing.org

j.mp/JenPan

j.mp/MollyRoberts
Censorship to Preempt Collective Action: Ai Weiwei’s Arrest

<table>
<thead>
<tr>
<th>Date</th>
<th>% of Posts Censored</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar 19</td>
<td>0.0</td>
</tr>
<tr>
<td>Mar 29</td>
<td>0.2</td>
</tr>
<tr>
<td>Apr 08</td>
<td>0.4</td>
</tr>
<tr>
<td>Apr 18</td>
<td>0.6</td>
</tr>
<tr>
<td>Mar 29, 5 days prior</td>
<td>0.8</td>
</tr>
<tr>
<td>Apr 3, Ai Weiwei Arrested</td>
<td>1.0</td>
</tr>
</tbody>
</table>

**Placebo Test:**

Most extreme of all effects 28/26
Censorship to Preempt Collective Action: Ai Weiwei's Arrest

Mar. 29, 5 days prior

Apr. 3, Ai Weiwei Arrested

Actual % censorship

Predicted % censorship trend based on 3/19–3/29 data

Placebo Test:
Most extreme of all effects

28/26
Censorship to Preempt Collective Action: Ai Weiwei’s Arrest

Mar. 29, 5 days prior

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% of Posts Censored

Actual % censorship

Predicted % censorship trend based on 3/19–3/29 data

Placebo Test:

Most extreme of all effects
Censorship to Preempt Collective Action: Ai Weiwei’s Arrest

Mar. 29, 5 days prior
Apr. 3, Ai Weiwei Arrested

Actual % censorship
Predicted % censorship trend based on 3/19–3/29 data

Placebo Test: Most extreme of all effects
Predicting the South China Sea Peace Agreement
Predicting the South China Sea Peace Agreement

Jun. 20, 5 days prior
Jun. 25, Peace Agreement

Predicted % censor trend based on 6/10–6/20 data

Actual % censorship

% of Posts Censored
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7
Jun 12 Jun 22 Jul 02
2011
Predicting the South China Sea Peace Agreement

% of Posts Censored

Jun. 20, 5 days prior

Jun. 25, Peace Agreement

Predicted % censor trend based on 6/10–6/20 data

Actual % censorship

Placebo Test:

Jun 12 Jun 22 Jul 02
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7
2011
Predicting the South China Sea Peace Agreement

Jun. 20, 5 days prior

Jun. 25, Peace Agreement

Predicted % censorship trend based on 6/10–6/20 data

Actual % censorship

Placebo Test: Most extreme of all effects
Censorship Pre-empting Collective Action: Wang Lijun’s Demotion
Censorship Pre-empting Collective Action: Wang Lijun’s Demotion

Jan. 28, 5 days prior
Feb. 2, Wang Lijun demoted

Actual % censorship

Jan 23 Jan 30 Feb 06 Feb 13
−0.2 0.0 0.2 0.4 0.6 0.8 1.0
2012
% of Posts Censored

Predicted % censorship trend based on 1/18–1/28 data

Placebo Test: Most extreme of all effects
Censorship Pre-empting Collective Action: Wang Lijun’s Demotion

Jan. 28, 5 days prior
Feb. 2, Wang Lijun demoted

Actual % censorship

Predicted % censorship trend based on 1/18–1/28 data

Placebo Test:
Censorship Pre-empting Collective Action: Wang Lijun’s Demotion

- Actual % censorship vs. predicted % censorship trend based on 1/18–1/28 data
- Placebo Test: Most extreme of all effects

Jan. 28, 5 days prior
Feb. 2, Wang Lijun demoted

Jan 23 Jan 30 Feb 06 Feb 13

% of Posts Censored

2012
Uncensored Posts (w/o Collective Action Potential)  
Critical of the State
Uncensored Posts (w/o Collective Action Potential)
Critical of the State

<table>
<thead>
<tr>
<th>State Critique</th>
<th>Collective Action</th>
</tr>
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<tbody>
<tr>
<td>yes</td>
<td>Free</td>
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This is a city government [Yulin City, Shaanxi] that treats life with contempt, this is government officials run amuck, a city government without justice, a city government that delights in that which is vulgar, a place where officials all have mistresses, a city government that is shameless with greed, a government that trades dignity for power, a government without humanity, a government that has no limits on immorality, a government that goes back on its word, a government that treats kindness with ingratitude, a government that cares nothing for posterity...
Censored Post (with Collective Action Potential)
Supporting the State
Censored Post (with Collective Action Potential)
Supporting the State

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<th>Collective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>yes (CENSORED)</td>
</tr>
<tr>
<td>no</td>
<td>no</td>
</tr>
</tbody>
</table>
The bombing led not only to the tragedy of his death but the death of many government workers. Even if we can verify what Qian Mingqi said on Weibo that the building demolition caused a great deal of personal damage, we should still condemn his extreme act of retribution... The government has continually put forth measures and laws to protect the interests of citizens in building demolition. And the media has called attention to the plight of those experiencing housing demolition. The rate at which compensation for housing demolition has increased exceeds inflation. In many places, this compensation can change the fate of an entire family.