Nonreactive Measures & Crisis Informatics

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The art of measurement

• Direct
• Surveys
• Questionnaires
• Interviews
• Indirect
• Non-reactive/unobtrusive
Non-reactive measures

- Measuring without asking
- Using observed behavior
  - Accretion and Erosion
- Tied to what we actually want to observe

- Example: can you feel the earthquake?
The idea of non-reactivity*

- History in 3 minutes of examples...

*AKA unobtrusive measures, social sensing, etc.

Webb et al. Non-reactive Measures in the Social Sciences
How scary is the story?
How popular is a piece at a museum?
Who do I advertise to?

- “Z” Frank of Chicago, 1962 (Webb et al.)
What do people consume?

- Garbage Project  
  - (Rathje, 1975)
- Assessing citywide drug levels (1999-)
Where do tourists go?

http://www.flickr.com/photos/walkingsf/sets/72157624209158632/detail/
Where’s the traffic?

Real Traffic Data, At The Speed of Business.

Each second, Metro Traffic Engine collects and aggregates millions of GPS and mobile phone locations, creates road speeds, then paints a LIVE picture of traffic conditions in your area.
How’s Walmart doing?
Ok, but...
Bias?

- Population bias
- People who have phones/power
- People read the news
- Incentives to tweet
  - Highest benefit in being first
  - More generally → many social signals are preformed (not simply side-effect)
- Etc. etc.
Noise?

- Ecology
- Everything is signal
- What are you measuring?
#Japan

March 11, 2011
Individuals + Friends + Family

Japanese messages
Retweeted around the world

http://www.youtube.com/watch?v=SybWjN9pKQk
Workers in Japan are struggling to contain the crisis at the Fukushima Daiichi nuclear power plant, which was badly damaged by a devastating earthquake and tsunami on March 11.

How do reactors work, what's causing the problems and what's being done to get it under control?

EXPLORE THE INTERACTIVE

- Map: Nuclear plants, aftershocks, more
- Timeline: How the nuclear crisis unfolded
Fake map, attributed to Australian Radiation Services
Solutions to nuclear contamination spread from Japan:

Daily regime should include the following:

1. Shot of Organic Apple Cider Vinegar – helps to maintain optimal Alkalinity/Acidity balance in body
2. 1/2 teaspoon of Sodium Bicarbonate (Organic Baking Soda) – Cancer fighter, also protects Thyroid function
3. Seaweed/Kelp – Excellent natural sources of iodine (provides the body its optimal proportional levels, always preferable to supplements), also add Himalayan Salt to list – contains 78 trace minerals including iodine
4. Kale & Cilantro – excellent natural sources for chelation of heavy metal toxicity etc, also recommended Curcumin

Weekly regime should include the following:

1. Potassium Iodine (65 mg – 130 mg) – monitor body’s response to levels added. 130 mg/week should be sufficient for those living in the Pacific Northwest coastal regions. but again, more suppiemental boosting may be necessary as radiation fallout levels from Japan fluctuate/increase. A cautionary note, too much iodine taken into the body at once may trigger an over-abundance of free radicals – which it turn leads to Thyroid disfunction (Hyper/Hypo-thyroidism). Always best to get your iodine from a natural sources, mainly because the body can therefore process absorption proportionally/appropriately without the risk of tipping the scales & triggering more free radical action.
Greenpeace Response to Growing Troubles at Fukushima Nuclear Reactors
Crisis at Fukushima I/Daiichi and Fukushima II/Daini Plants

Press release - March 13, 2011

Tokyo, 13 March, 2011 – Reacting to ongoing reports of cooling problems and the continuing release of radioactive materials from the Fukushima I/Daiichi and Fukushima II/Daini Plants, Jan Beranek, Head of Greenpeace International’s Nuclear Campaign said:

“"Our thoughts remain with the Japanese people, who in the aftermath of the earthquake and tsunami are now faced with a dreadful situation, where instead of being able to plough all resources into rescue and relief efforts, the government is dealing with a crisis caused by the inherent and inescapable risks of nuclear power."

"Despite government statements, the crisis at Fukushima continues to be a race against time, and is clearly not under control. We hope a worst-case scenario will be avoided, and that authorities continue to take urgent steps to protect to people against the irradiation, while contamination apparently continues to be released into the atmosphere."

"Current reports suggest new emerging problems with the cooling of at least two reactors, units one and three, at Fukushima I-Daiichi, both of which apparently suffered some melting of the fuel rods, causing a release of radiation that has been detected outside. Unit three uses so-called MOX fuel that contains plutonium oxide and releases significantly more heat even after the reactor is shut. In
3/13 – Tsunami Video lifejacking scam

3/14 – 1.7M Pages SEO attack

3/14+ – Fake donation scams

The Japan crisis – an IT security timeline (SecureList)
#PrayForJapan

#PrayForJapan tweets as fraction of Japan related messages
WE PRAY FOR JAPAN 日本の為に祈りを。
#PrayForJapan

#PrayForJapan tweets as fraction of Japan related messages
Noise is Rare
but not everything is a signal for what you are measuring

See Webb & Weicke 1983 (Van Maanen, ed.)
Ethics?

- Sensitive populations
  - Even if they weren’t before
- Privacy
- Biased responses
Solutions
(and a few more problems)
Multiple of everything

- Multiple indices
- Multiple theories
- Multiple hypotheses
- Multiple instruments
Tweets containing terms (of all Japan related)

Scary

Scared
How a Fukushima-Level Disaster Would Affect You In New York, LA or Chicago
Wishlist to support multiples

• Multiple acquisition systems
  • Data comes/goes quickly

• Multiple/better models
  • Explanatory and Predictive
  • Better explanatory models
  • Adapting/adaptable predictive schemes

• Knowledge/mining systems
  • Support different ways to slice and dice

• Multiple, integrated instruments
To summarize...

- Non-reactive techniques are critical to understanding/action
  - But as part of a broader toolkit

- Need to leverage years of research on the topic
  - Signal and noise
  - Bias

- Also need to expand techniques to deal with today’s data (scale & scope)
Thanks...

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