METHODOLOGY AS IDÉOLOGY: SOME COMMENTS ON ROBERT AXELROD'S THE EVOLUTION OF COOPERATION

*di Andrew Gelman*

1. Introduction

Robert Axelrod's *The Evolution of Cooperation* (1984) is an extremely influential work in the application of game theory to political science. The book uses theory, computer experiments, and historical examples to identify the benefits of cooperative strategies in the iterated prisoner's dilemma. The book's longest historical example is a model of cooperative behavior among British and German soldiers in First World War trenches. The model is appealing both intellectually, as a solution to a behavioral puzzle, and emotionally, because it seems to bring some sense to a scary and confusing subject.

However, a closer look reveals serious problems with the application of the prisoner’s dilemma to this particular historical situation, which in turn calls into question the claims made about the importance of the prisoner’s
Recent challenges and developments in Bayesian modeling and computation (from a political and social science perspective)

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In collaboration with Yair Ghitza, Wei Wang, David Rothschild, Sharad Goel, Doug Rivers, Bob Carpenter, Daniel Lee, Michael Betancourt, Ben Goodrich, . . .

4 Mar 2015
Join the VP Debate
We're polling LIVE, 9 PM ET
If the election were held today, who would you vote for?

- Barack Obama
- Mitt Romney
- Other
- Not sure
“This week, the New York Times and CBS News published a story using, in part, information from a non-probability, opt-in survey sparking concern among many in the polling community. In general, these methods have little grounding in theory and the results can vary widely based on the particular method used.”
— Michael Link, President, American Association for Buggy-Whip Manufacture Public Opinion Research
Michael W. Link is Chief Methodologist for Research Methods at The Nielsen Company. With a base of experience in survey research, having worked in academia (University of South Carolina, 1999), not-for-profit research (RTI International, 1999-2004), government (Centers for Disease Control and Prevention, 2004-2007), and the private sector (Nielsen, 2007-present). He received his Ph.D. in Psychology and Social Science from the University of South Carolina. Michael’s research centers around developing methodologies for confronting some of the most pressing issues facing survey research, including techniques for improving survey participation and data quality (use of address-based sampling, call screening technologies), methodological issues involving use of multiple modes in data collection (mail, CATI, field, mobile, meters), and obtaining participation from hard-to-survey populations (children, isolated, racial and ethnic groups). His numerous research articles have appeared in *Public Opinion Quarterly* and other leading scientific journals.

An AAPOR member since 1993, Michael served as AAPOR Conference Chair in back-to-back years (2009 & 2010), a member of both the Cell Phone and Online task forces, an instructor for an AAPOR professional development short-course, a reviewer for the student paper competition on several occasions, and a regular reviewer for *Public Opinion Quarterly*. He is a member of SAPOR, serving from 2005 to 2006 as its President, Conference Chair, and Student Paper Competition Organizer and also a member of OPA.

In 2011 he, along with several research colleagues, received AAPOR’s Warren J. Mitofsky Award for their work on address based sampling designs. His current research focuses on new technologies, such as mobile and social platforms, as vehicles for measuring and understanding attitudes and behaviors. He will be teaching a short course on “The Role of New Technologies in Augmenting, or Replacing Traditional Surveys” at the 2012 AAPOR conference.
 Nielsen feels the heat of competition as it flubs its ratings of news broadcasts, putting ABC ahead of NBC

In spite of the goof, its global president took time to slam rival Rentrak, which collects different kind of data from viewers

NEW YORK DAILY NEWS / Sunday, October 19, 2014, 2:00 AM

TV Ratings by Nielsen Had Errors for Months

By BILL CARTER and EMILY STEEL  OCT. 10, 2014

Nielsen, the television research firm, acknowledged on Friday that it had been reporting inaccurate ratings for the broadcast networks for the last seven months, a mistake that raises questions about the company’s increasingly criticized system for measuring TV audiences.
Xbox estimates, adjusting for demographics:

Two-party Obama support

Sep. 24 Oct. 01 Oct. 08 Oct. 15 Oct. 22 Oct. 29 Nov. 05

40% 45% 50% 55% 60%

Nate Silver, *New York Times*, 6 Oct: “Mr. Romney has not only improved his own standing but also taken voters away from Mr. Obama’s column.”
Xbox estimates, adjusting for demographics and partisanship:
Jimmy Carter Republicans and George W. Bush Democrats:

Non-Monotonic Age Curve in 2008

<table>
<thead>
<tr>
<th>Age</th>
<th>Republican Vote</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>0.3</td>
</tr>
<tr>
<td>40</td>
<td>0.6</td>
</tr>
<tr>
<td>60</td>
<td>0.7</td>
</tr>
<tr>
<td>80</td>
<td>0.5</td>
</tr>
</tbody>
</table>
The Formative Years

Age-Specific Weights ($w$)

- **Posterior Mean**
- **50% C.I.**
- **95% C.I.**

Graph showing the trend of age-specific weights with confidence intervals.
Stan is a probabilistic programming language implementing full Bayesian statistical inference with

- MCMC sampling (NUTS, HMC)

and penalized maximum likelihood estimation with

- Optimization (BFGS)

Stan is coded in C++ and runs on all major platforms (Linux, Mac, Windows).

Stan is freedom-respecting, open-source software (new BSD core, GPLv3 interfaces).

Interfaces

Download and getting started instructions, organized by interface:

- RStan v2.5.0 (R)
- PyStan v2.5.0 (Python)
- CmdStan v2.5.0 (shell, command-line terminal)
- MatlabStan (MATLAB)
- Stan.jl (Julia)
Adjusting for known differences between sample and population:

- Include more predictors
- Multilevel regression
- Poststratification
Did you vote for McCain in 2008?

Income < $20,000  |  $20-40,000  |  $40-75,000  |  $75-150,000  |  > $150,000

All Voters

White

Black

Hispanic

Other races

When a category represents less than 1% of the voters in a state, the state is left blank.
2008 election: McCain share of the two-party vote in each income category within each state among all voters (black) and non-Hispanic whites (green)
Polarization on abortion by party

- Democrats
- Independents
- Republicans
G.O.P. Pursues Hispanic Votes With Abortion Stance

ADPTION
THE LOVING OPTION
Pro-Life Tendency of R's Compared to D's

Coef of Abortion Opinion on Party ID, fit with HLM

% Pro-Life, Repub minus Dem

Coefficient
Coef of Abortion Opinion on Party ID, fit with HLM

Coefficient


White
Other
Black
Hispanic
Big Data need Big Model:
Some Bayesian issues:

- Regression with lots of predictors
- Dense multilevel models
- Deep interactions
- Informative priors
- Computing
- Confidence building
- Understanding the models we’ve fit