

Background and Executive Summary

I. BACKGROUND

On July 9th and 10th, 2001, the Political Science Program of the National Science Foundation (NSF) convened a Workshop to seek ways to improve technical-analytical proficiency in Political Science by bridging the divide between formal and empirical analysis. The participants in the Workshop were senior scholars with research experience in various technical-analytical areas and proven track records in activities that have improved the technical-analytical expertise in various sciences. They have been editors and have served on editorial boards of leading journals. Participants were primarily from political science, but economics and mathematics were represented as well (see Appendix B).¹

Formal analysis—or formal modeling—includes, among other things, deductive modeling in a theorem and proof presentation or computational modeling which requires the assistance of simulation. Empirical analysis—or empirical modeling—usually (but not always) involves data analysis using statistical tools. Both approaches provide significant scientific benefit to political science. At a most basic level, formal modeling assists in the “construction of valid arguments such that the fact or facts to be explained can be derived from the premises that constitute the explanation.”² In contrast, empirical modeling shows the researcher where their model went wrong and leaves open the possibility that a more accurate model can be constructed.

A schism has developed between those who engage in formal modeling that is highly mathematical, and those who employ empirical modeling which emphasizes applied statistics. As a consequence, a good deal of research in political science is competent in one technical area, but lacking in another, that is, a formal approach with substandard (or no) empirical tests or an empirical approach without formal clarity. Such impaired competency contributes to a failure to identify the proximate causes explicated in a theory and, in turn, increases the difficulty of achieving a meaningful increase in scientific knowledge.

If one were to summarize in one word what bridging the divide between formal and empirical modeling means for the political and social sciences, that word would be *identification*. The ability of a researcher to **identify** or parse out specific causal linkages among the many factors is fundamental to the scientific enterprise. Specifying a model

¹The EITM Workshop was recorded and transcribed. The written transcript is available on the Political Science Program Web Site: <http://www.nsf.gov/sbe/ses/polisci>.

²R. Harrison Wagner, “Who’s Afraid of Rational Choice Theory?” Typescript. (October, 2001), page 3. <http://www.la.utexas.edu/~hw>.

that links both formal and empirical approaches alerts researchers to outcomes *when specific conditions are in place*—and is also one of the best ways to determine an **identified** relationship.

The Empirical Implications of Theoretical Models (hereafter EITM) Workshop was conducted to suggest constructive approaches that the Political Science Program at the NSF could employ to foster identification in formal and empirical modeling. To these ends, EITM Workshop participants were asked to provide, prior to the workshop, a short commentary on the following issues:

1. Consider the factors contributing to the split between formal theory and empirical modeling. (This included the current status of the American, Comparative, International Relations, and Methods/Formal fields and subfields as well as other disciplines).
2. Discuss the need to bridge formal theory and empirical modeling and viable strategies for doing so in the discipline.
3. Discuss interdisciplinary avenues and extensions, which include academic and non-academic examples. These might include the work at academic institutions such as California Institute of Technology, and Carnegie-Mellon, and at non-academic institutions such as The Brookings Institution and The Santa Fe Institute.
4. Explore the role that NSF funding opportunities can play to advance the linkage of formal modeling and empirical modeling. What has proven effective in the past? Are there best practices in other disciplines?
5. Develop a coherent strategy for implementing the initiatives via a “Dear Colleague” letter from the NSF to the political science community. Modes of implementation might include:
 - i) Infrastructure opportunities.
 - ii) Annual meetings.
 - iii) Graduate and/or undergraduate student opportunities.
 - iv) Junior and senior faculty opportunities.
 - v) Inter/multidisciplinary opportunities.
 - vi) Other considerations.

II. EXECUTIVE SUMMARY

In both written or spoken commentaries, EITM Workshop participants recommended that the Political Science Program at the NSF address the technical-analytical divide between formal and empirical approaches in three priority areas:

- Education: Training and Retraining
- Dissemination of Knowledge: Conferences and Workshops
- Research: Establishment of Research Work Groups

Key suggestions concerning these priority areas were as follows:

Education: Summer Training Institutes

- Participants eligible to receive training and retraining should include graduate students, post-docs, untenured faculty, and tenured faculty.
- In the event there is more than one summer institute under operation, it is expected that linkages should be established between the various institutes to further the dissemination of knowledge to all participants and to the scholarly community at large.

Knowledge Dissemination: Conferences and Workshops

- Each individual workshop or seminar **must have a specific theme or problem** that allows for a variety of analyses which link formal and empirical approaches.
- Participants in these workshops and seminars may include a mix of graduate students, post-docs, untenured faculty, and tenured faculty.
- Where practicable workshop and seminar organizers are encouraged to establish linkages with the summer institutes and the possibility of organizing joint ventures.

Research: Establishment of Research Work Groups

- Each individual research work group **must have a specific theme or problem** that allows for a variety of analyses which link formal and empirical approaches.
- Participants in these workshops may include a mix of graduate students, post-docs, untenured faculty, and tenured faculty. That number shall not exceed 12 total members.
- Upon completion of the workshop, participants are eligible (as a team) to compete in the regular Political Science funding competition or future EITM research funding competitions.

More generally:

- The Political Science Program should fund up to \$1,000,000 for these activities for fiscal year 2002.
- The Political Science Program must stipulate that all EITM proposals contain a **formal and empirical component**.

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- The formal component and empirical component must be explicitly outlined. Formal components include (but are not limited to) game theory and dynamic stochastic modeling. Empirical components include (but are not limited to) applied statistical procedures and experiments. “Hybrid” techniques such as agent-based modeling are also welcome.
- The Political Science Program should encourage, when practicable, incorporating scholars and students from recognized and respected programs and institutions outside the United States in EITM activities.
- The Political Science Program should encourage, when practicable, interdisciplinary linkages.