The Mathematical Sociologist

Newsletter of the Mathematical Sociology Section of the American Sociological Association

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Greetings from the Chair...Diane Felmlee

We have two exciting sessions planned for the 2008 Annual Meeting of the ASA in Boston. Gene Johnsen has organized one session, as described on p. 10 . The other session, which I am in the process of arranging, will precede the Business meeting. I am inviting scholars involved in innovative modeling at three different career stages: Beginning (Pamela Emanuelson, University of South Carolina), Mid-Life (James Moody, Duke University), and Senior Scholar (to be arranged). Pam's talk is titled: "Network Exchange Theory: A Decade of Growth." Jim will present: "Epidemic Potential in Networks with Diverse Degree Distributions." Check these sessions out on our Section Day, which is Saturday, Aug. 2. Also, don't miss our regular session organized by John Skvoretz.

We will have a *Mathematical Sociology Section Reception* on Sat., Aug. 2, at the ASA. Don't miss it! It will be a particularly appealing function.

I will be arranging an informal Council meeting that will take place at breakfast on Sat. morning from 7:30 to 8:30. I will get back to Council members with more details later. One item of business, for example: There is confusion around the title of our Dissertation Award, and we need to consider renaming the award. Some potential applicants believe that the dissertation needs to be finished before applying, which is not the case. The award can only be given to a graduate student who is working on the thesis.

The Fourth Joint Japan-North America Mathematical Sociology Conference, May 29-June1, takes place at Redondo Beach, CA (see p. 8-9). The conference offers an opportunity to learn more about international developments in our field and enjoy some sun in southern CA. I hope to see many of you there.

If anyone has other business items for the Council or Business meeting, please let me know. Other business to note: Committees are working on four awards that will be given from our section. Results for those awards will be forthcoming shortly and listed in Footnotes. Our election process for next year's section officer vacancies also is underway. Enjoy your Spring, and see you in Boston

Diane

Inside this issue:

Book Highlight on:
David Willer
University of South Carolina
And
Henry A. Walker
University of Arizona

BUILDING EXPERIMENTS TO TEST SOCIAL THEORY

Today many find it difficult to comprehend the place of mathematics in social scientific research. That difficulty is not an accident. More than 150 years ago J. S. Mill misunderstood science and his work remains influential. A glance at mainstream methodology texts shows Mill's influence and the problems it causes. For example, the experiment is uniformly described as a way of discovering findings. A typical finding takes the form, "If A, sometimes B." Findings like that are discovered by the method of difference, introduced by Mill and revised by R. A. Fisher.

To Mill's method of difference, Fisher added random assignment and statistical procedures like t-tests and ANOVA. Apart from the statistical analysis of data, it seems that mathematics has no role whatsoever in experiments. If mathematics has such a limited role in sociological experiments, how can it have a role in other research methods where observation and measurement are less optimal and control less precise?

In our new book, *Building Experiments: Testing Social Theory*, we show that there are two distinct kinds of experiments—empiricist of the Mill and Fisher kind and theory-driven. Only in theory-driven experiments does mathematics have a crucial role. Mathematics has been central to the design of theory-driven experiments in the exact sciences at least since Galileo. Indeed, we show that the use of theory-driven experiments and the application of mathematically formulated theory are the reasons why those sciences are exact. So, what is theory-driven experimentation and how does it work?

The starting point of any theory-driven experiment is the theory to be tested. By "theory," we

do not mean orienting perspectives like "conflict theory" or functionalism. By theory we mean an abstract formalism that builds theoretic models for testing. It is from that foundation that the exact sciences build experiments. With a theory in hand, one grinds out a new derivation. That derivation generates a model that, for all of its abstract qualities, has crucial similarities to the phenomena to be investigated. For example, an experiment testing a derivation from the gas laws could begin with a theoretic container—perhaps similar to a can like those on grocery shelves—containing gas particles. The theoretic particles have mass but no dimension. The distribution and average velocity of the particles is their temperature while pressure is the result of the particles bouncing off the can's walls. Since the particles have no dimension, they cannot bounce off each other. Therefore, pressure must increase with temperature and density—or so the theory hypothesizes. It is the task of the experiment to test that hypothesis.

As we show in *Building Experiments*, the most important contribution of theory is not the hypotheses to be tested. *Theory's most important contribution is designing the experiment.* After a researcher uses theory to design and build the experiment, deriving the hypotheses to be tested is trivial. How is this possible? Look back to the gas law example. To begin the experiment there must be a container and a gas in that container each corresponding as closely as possible to the theoretic model. For a given amount of gas, density can be varied by controlling the can's volume. Thus the container should be one for which we can control the volume while measuring pressure and temperature. What we cannot provide is an "ideal gas" whose particles are dimensionless. The relations of the equation $PV/T = K$—that pressure varies directly with temperature and inversely with volume—follows directly from the model, but holds only for a gas with dimensionless particles. Nevertheless, we can infer from our model that, as encounters between particles are more frequent, which they will be when density increases, the behavior of the gas will depart more and more from that of the ideal gas.

Precisely the same theoretic logic is deployed in the theory-driven experiments of sociology. To illustrate, there are currently ten theories of exchange that predict exchange ratios from initial structural conditions. All ten are stated mathematically. To test any of these theories, the first step is to design and build models of exchange structures to which all ten theories apply. To compare theories, structures are selected where predictions of the theories are

distinct.   Experiments testing ten theories have recently been run and predictions from Elementary Theory have been found most precise (Willer and Emanuelson: forthcoming).

The application of mathematically formulated theory is, needless to say, not limited to experiments. In *Building Experiments* we discuss "controlled investigations," a term we borrow from Nagel (1961). Controlled investigations have the logical structure of theory-driven experiments but lack the control that allows experiments to be made similar to theoretic models. By "logical structure" we mean that the whole of the research process, from its design to the hypotheses tested and the measurement procedures it uses, is governed by theory. There is only one difference. For experiments, the experimental system is built to be similar to the theoretic model. Lacking experimental control, the models in controlled investigations are made to be similar to cases found in the empirical world.

We could write much more about experiments and controlled investigations but we are nearing the end of our allocated space. In any case, much more is said in our book. If you are interested in how mathematics is used in social research, a look at *Building Experiments: Testing Social Theory* will be time well spent.

Bibliography:

Willer, David and Pamela Emanuelson. 2008. "Testing Ten Theories." *Journal of Mathematical Sociology* (forthcoming).

Willer, David and Henry Walker. 2007. *Building Experiments: Testing Social Theory*. Stanford CA: Stanford University Press

Graduate Student Highlight
on
Matt Brashears
University of Arizona

Matt Brashears earned B.A. degrees in both Psychology and Sociology from Emory University in 2000 and joined the graduate program in Sociology at the University of Arizona in 2001. He completed his Master's degree in 2003 and will complete his dissertation in the Fall of 2008. Since his arrival in Tucson he has concentrated on social network analysis with secondary interests in quantitative methodology and social psychology. In particular Matt is interested in how information moves through, and is transformed by, social networks. He is currently serving as the graduate student representative to the section council.

His previous work, with Miller McPherson and Lynn Smith-Lovin, examines changes in American discussion networks over the past twenty years using the General Social Survey networks modules. This research, published in the American Sociological Review (2006), suggests that the size of close discussion networks may be declining. Moreover, it appears that a larger percentage of Americans than ever before do not discuss important matters with anyone. A description of this research will be featured in an upcoming article in Contexts. In related solo-authored work forthcoming in Social Science Research, Matt uses log-multiplicative models to study sex-based differences in perceived social distance. He finds that while tendencies to associate with similar others are identical for males and females, preferences among dissimilar others are not.

In a second solo-authored paper forthcoming in Social Psychology Quarterly (March 2008), he uses the International Social Survey Program networks data to evaluate status construction theory at a cross-national level. Using the tendency to choose a female best friend as an indicator of female status, he finds support for the macro-level predictions of this micro-level social psychological theory.

Matt's dissertation research focuses on the homophily principle, or the tendency for individuals to associate with those like themselves or for "birds of a feather flock together." While homophily is one of the most robust findings in modern social science the extent to which it is the result of selection (association with those like oneself) or harmonization (becoming like those with whom one associates) is unclear. Both processes play a role in determining our associations but to a different extent in different circumstances. The consequences of such differences for the ability of new ideas (e.g. public health information) to spread through a network can be significant. For example, networks dominated by selection may segregate various pools of ideas from one another, effectively preventing idea spread. Networks dominated by harmonization, on the other hand, may be much more susceptible to fads and rumors. To disentangle the influence of selection and harmonization Matt uses the Siena longitudinal network analysis techniques with the data contained in the National Longitudinal Study of Adolescent Health. Particularly, he focuses on the co-evolution of friendship networks with weight beliefs and behaviors as well as with religious attitudes and practices.

After completing his dissertation, Matt will join the sociology department at Cornell University in July of 2008 as an Assistant Professor.

Graduate Student Highlight
on
Kyle Irwin
University of South Carolina

Follow-up studies are currently underway to tease apart various explanations for the observed relationship between social identity and cooperation.

Kyle Irwin is a Ph.D. candidate in sociology at the University of South Carolina. His research focuses on solutions to collective action problems, including norms, social identity, and trust. His NSF funded dissertation research, entitled "Norm Conformity and Social Identity in Collective Action Groups," spans two of these foci by examining the relationship between conformity to group norms and social identity, and the resulting effects on cooperation.

While the relationship between social identity and cooperation is well established, less clear is why members of certain groups experience higher levels of identification than members of other groups. Bridging sociological and social psychological literatures, Kyle suggests that groups with strong behavioral norms will have higher levels of social identification than groups with weak or no norms. He further predicts that social identification will be higher in normative versus non-normative groups regardless of whether norms prescribe selfishness or generosity. This is because when individuals conform to perceived norms, they feel similar to other conformers. Perceived similarity, in turn, is sufficient to produce social identification.

Consistent with his argument, experiments with public goods games show that members of normative groups reported significantly higher levels of identification than members of non-normative groups. This was true whether the norm prescribed selfishness or generosity. This suggests that as long as strong norms exist in a group (regardless of what these norms prescribe); social identification will likely be high.

The results also have important implications for the relationship between social identity and cooperation. Specifically, Kyle found that higher levels of social identity did not necessarily generate more cooperation in a subsequent social dilemma. Members of normative groups contributed more than those without norms (because they had higher levels of identification). But this effect only held for those groups with unselfish norms. Groups with selfish norms did not produce successful collective actions (despite having high levels of identification). This suggests that social identity leads people to conform to group expectations, which may or may not entail cooperation.

In related work, along with Brent Simpson and Peter Lawrence, Kyle has recently published a paper on the so-called "norm of self-interest" in *Social Psychology Quarterly*. The norm of self interest argues that people want to act on compassionate feelings (e.g., by donating to charities) but are reluctant to do so if they cannot justify their behavior as being in line with their own self-interest. In this paper the authors critically evaluate the evidence for this line of reasoning and offer an alternative explanation for that evidence based on cognitive dissonance theory. Results of a field experiment support the dissonance theory approach over the norm of self-interest account.

Aside from norms and identity, Kyle's research also centers on trust. In a recent paper published in *Social Forces*, Brent Simpson, Tucker McGrimmon, and Kyle address whether there are differences in trust levels across race-categories. Previous research suggests that African Americans are less likely to trust others than are whites. The authors question this conclusion and draw on social identity theory to argue that blacks are not less trusting than whites, predicting instead that trust is lower between race-categories than within race-categories. Consistent with this argument, experimental results show that blacks trust other blacks more than whites, and whites trust other whites more than blacks. They also found that blacks are more trustworthy (the propensity to honor another's trust) than whites, regardless of the partner's race.

General Announcements

Sessions for the Mathematical Sociology Section of the ASAs will be meeting on Saturday, August 2, 2008. In addition, council members are invited to attend an informal breakfast on Saturday to plan activities for the following year. More information will be sent out when plans have been finalized. Also, please consider being a member of one of the sections committees next year. The current committees include the Harrison White Outstanding Book Award, Outstanding Article Publication, Outstanding Graduate Student Paper Award, and Mathematical Sociology Dissertation Award

Research and Education in Complexity Science

Neil Johnson and Mike Mesterton-Gibbons are starting a Flordia based network of academics for research and education in complexity science, to share expertise across disciplinary boundaries and exploit potential for synergy among the social and natural sciences. So they would like to hear from any sociologist in Flordia with an interest in complexity science. If you know of or are an interested individual, please contact Mike Mesterton-Gibbons mesterto@math.fsu.edu.
The following sites are availabel.
(http://www.physics.miami.edu/~njohnson)
(http://www.math.fsu.edu/~mesterto)

Teaching/Learning Materials in Modeling Social Dynamics

If you have developed teaching or learning materials in the area of Modeling Social Dynamics, please consider contributing to a forthcoming manual (to be distributed through ASA) and online resource center. We are collecting course syllabi, hands-on labs, cases, or exercises, simulation applications, source code, and other materials. If you may have materials to
contribute, please contact James Kitts at

jak2190@columbia.edu for more information.

Fordham Council on Applied Psychometrics (FCAP) Conference

This is a reminder that the Conference on Applied Psychometrics is scheduled for June 26-27. The location is Fordham University, Bronx, New York, USA. The Fordham Council on Applied Psychometrics (FCAP) Conference will focus on defining psychometrics and its applications, the lack of adequate training, and the need for expertise. There will be a mixture of paper and poster sessions aiming to expose the many facets of psychometrics and its applications. The conference will be preceded by a day of technical workshops on R, SAS and Winbugs. Keynote speakers include Paul Holland (ETS, retired) and David Rindskopf (CUNY). Invited speakers include Charles Lewis (Fordham/ETS) and Michael Edwards (Ohio State University) For more information see http://www.fordham.edu/fcap/conference .

Duane Library, Fordham University

Fourth Joint Japan-North America Mathematical
Sociology Conference

Final Announcement and Registration Form

May 29 - June 1, 2008
Crowne Plaza Hotel, Redondo Beach, California, U.S.A.

CONTACT INFORMATION
Web site: http://
usjapan2008.mathematicalsociology.org/.
Email: usjapan2008@mathematicalsociology.org

POSSIBLE LATE SUBMISSION OF AB-
STRACTS:
For a limited period of time up to April 30 late Ab-
stracts may be accepted, depending on how the con-
ference schedule falls into place. For those willing
to try, Abstracts of 250-300 words with a title,
names and affiliations of authors, and a communi-
cating e-mail address should be submitted by e-mail
directly to Eugene Johnsen at john-
sen@math.ucsb.edu.

CONFERENCE REGISTRATION:
All presenting authors, and all others who plan to
attend but not present a paper, who are from outside
Japan should mail their completed Registration
Form below, together with a check for the Registra-
tion Fee of US$345.00
made out to Eugene C. Johnsen with the notation
"For JJNAMSC4", to:

> Eugene C. Johnsen
> Department of Mathematics
> University of California
> Santa Barbara, CA 93106-3080
> U.S.A.

to arrive by April 30, 2008 or very soon thereafter.

The Registration Fee covers all the stan-
dard costs of the conference, including the
Welcoming Reception on Thursday eve-
ning, May 29, the Conference Dinner and
Program on Friday evening, May 30, and
all refreshment breaks in the Friday, Sat-
urday and Sunday sessions.

CONFERENCE SCHEDULE
The main sessions of the conference will
occur Friday morning, Friday afternoon,
Saturday morning, Saturday afternoon,
and Sunday morning, ending at approxi-
mately 12:00 noon on Sunday, June 1.
More details about the schedule will be
available later. If you wish earlier infor-
mation about the schedule please e-mail
Eugene Johnsen at john-
sen@math.ucsb.edu.

EQUIPMENT FOR PAPER PRESENTA-
TIONS
The conference room will have an over-
head projector and screen for projection of
transparencies. Any needed projection
equipment other than this (such as for
power point presentations) should be
brought by the individual presenters.

Fourth Joint Japan-North America Mathematical
Sociology Conference Continued

Final Announcement and Registration Form

May 29 - June 1, 2008
Crowne Plaza Hotel, Redondo Beach, California, U.S.A.

TRAVEL AND ACCOMMODATIONS:

The 2008 Joint Conference on Mathematical Sociology will be held at the Crowne Plaza Redondo Beach and Marina Hotel, in Redondo Beach, CA. General hotel information, including location relative to the Los Angeles airport (LAX), is available at this website.

http://www.crowneplaza.com/redondobeach.

The special conference hotel rate is US$184.00 per night, single or double, plus taxes and fees, and must be booked by April 30, 2008 in order to obtain the special hotel conference rate.

Statement of participation in the conference is necessary at the time of hotel reservation in order to receive the special conference rate. The hotel reservation telephone number within the U.S. and Canada is **1 (888) 444 0401** and the on-line booking web address for the conference is

http://www.ichotelsgroup.com/h/d/CP/1/en/cwshome/DPRD-7D5TT7/REDCP

POSSIBLE POST-CONFERENCE TOUR OF LOS ANGELES

Those who are interested in taking a bus tour of some parts of the Los Angeles area on Sunday afternoon, June 1, 2008, should state their interest on their completed Registration Form. The Registration form is included on the last page of this newsletter.

Regular Session. Mathematical Sociology.

Organizer: *John Skvoretz*, University of South Flordia; Presider: *Michael Lovaglia*, University of Iowa

How Do Terrorist Cells Self-Assemble? Insights from an Agent Based Model. *Michael Genkin*, Cornell University; *Alexander Gutfraind*, Cornell University.

Local Convergence and Global Diversity: From Interpersonal to Global Influence. *Andreas Flache*; University of Groningen; *Michael W. Macy*, Cornell University.

Modal Constructions in Sociological Arguments. *Michael Hannan*, Stanford University; *Greta Hsu*, UC Davis; *Laszlo Polos*.

New Measures of Relative Deprivation and the Societal Justice Index. *Jasso Guillermina*, New York University; *Samuel Kotz*, George Washington University.

Discussant: *Michael Lovaglia*, University of

Section on Mathematical Sociology Paper Session: Some Flavors of Work in Mathematical Sociology.

Organizer and Presider: *Eugene C. Johnsen*, University of California, Santa Barbara

How Concerns for Legitimacy Can Bias Assessments of Efficiency *Jerker Denrell*, Stanford University; *Gael Le Mens*, Stanford University

When Do Matthew Effects Occur? *Matthew S. Bothner*, University of Chicago; *Richard Haynes*, Credit Suisse First Boston; *Joel Podolny*, Harvard University

Efficiency and Strong Power: Testing Basic Assumptions of Theories of Exchange. *Marcel Van Assen*, Universiteit van Tilburg; *Pamela Emanuelson,* University of South Carolina; *David Willer*, University of South Carolina

Section on Mathematical Sociology Paper Session: Some Flavors of Work in Mathematical Sociology cont.

Cooperation and Reputation in Dynamic Networks *Rense Corten*, Utrecht University; *Karen S. Cook*, Stanford University

Spatial Analysis of Social Networks *Carter T. Butts*, University of California, Irvine; *Ryan M. Acton*, University of California, Irvine

Section on Mathematical Sociology Paper Session and Mathematical Sociology Business Meeting.

Organizer and Presider: *Diana Felmlee*

Network Exchange Theory: A Decade of Growth *Pamela Emanuelson,* University of South Carolina.

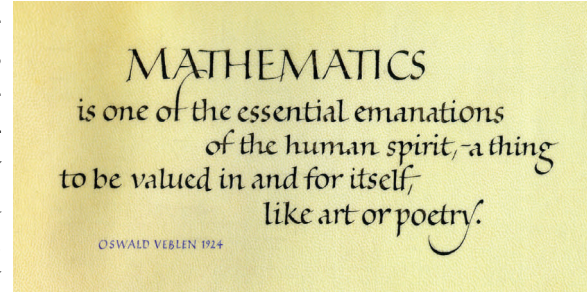Epidemic Potential in Networks with Diverse Degree Distributions *James Moody,* Duke University.

Third Presenter is Pending...

Hynes Convention Center in Boston, MA

Mission Statement of the
Mathematical Sociology Section

The purpose of the Mathematical Sociology Section of the American Sociological Association is to encourage, enhance and foster research, teaching and other professional activities in mathematical sociology, for the development of sociology and the benefit of society, through organized meetings, conferences, newsletters, publications, awards, and other means deemed appropriate by the Section Council. The Section seeks to promote communication, collaboration, and consultation among scholars in sociology in general, mathematical sociology, and allied scientific disciplines.

MATHEMATICS
is one of the essential emanations
of the human spirit, a thing
to be valued in and for itself,
like art or poetry.

OSWALD VEBLEN 1924

Mathematical Sociology Section Newsletter

Greetings From the Co-editors

Thank you all for your timely contributions to our Spring 2007/2008 Newsletter!

Please continue to send us your announcements, articles, book reviews, etc. The more you are involved with the newsletter, the better it will be!

Please feel free to send us your comments, concerns, corrections, or any ideas you have for the newsletter.

Have a great Spring, and watch your e-mails for future newsletter editor requests!

— *Alison Bianchi*

— *Pamela Emanuelson*

<u>**REGISTRATION FORM**</u>
(print this out, then complete it and mail it in)

**JOINT MATHEMATICAL SOCIOLOGY CONFERENCE
CROWNE PLAZA HOTEL, REDONDO BEACH, CALIFORNIA**

<u>**Note: This form is for participants from North America
and other countries outside of Japan**</u>

Participant Name: _____

**- - - - - - - -Institutional
Affiliation:** _____

Mailing Address: _____

_____

E-mail Address: _____

Are you presenting a paper at the conference?   _____

**Are you interested in taking a bus tour of some Los Angeles
areas on Sunday afternoon June 1, 2008?**   _____

**Please send this completed form, together with a check for your Registration Fee of
US$345.00 made out to Eugene C. Johnsen with the notation
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> **Eugene C. Johnsen
> Department of Mathematics
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0401 and the Registration site is**

http://www.ichotelsgroup.com/h/d/CP/1/en/cwshome/DPRD-7D5TT7/REDCP