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A review of

An Introduction to Models in the Social Sciences

by Charles A. Lave and James G. March

by

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An Introduction to Models in the Social Sciences, by Charles A. Lave and James G. March is an excellent textbook.¹ It introduces the pleasures and challenges of analytical thinking in general, and four basic models in specific: individual choice under certainty, exchange, adaptation and diffusion. It does this with a minimum of stress, a nice amount of cleverness and wit, and just about the most readable prose West of the New Journalism. I am thankful that the readability does not detract in any way from the intellectual quality of the book -- in fact it complements it. Social scientists who write about mathematical or formal analyses are warned: Lave and March have set a new standard of readability that the rest of us have no excuse, any longer, for not meeting.

The focus of the book is not so much to develop competence in any particular model as to stimulate interest, and hopefully excitement, about the challenge of explaining observed behavior with the tools of precise thought and imagination. The approach is surprisingly inductive considering that it deals with mathematical models. This is one of Lave and March's real strengths -- they embed the delights of deductive model building in concrete real world human situations. People who may think that it is perverse, or worse, to take delight in formal models may find themselves seduced as they read and work through the problems.

Before I continue I should say that the book is refreshingly free from pedantic detail. Thus no elaborate, buttoned-down definition of models is presented. Models are introduced as simplified pictures of the real world in the form of systematized sets of conjectures about empirical observations. Thereafter, the reader is immediately guided into the business (or game) of

analyzing reality with models.

Basically, the book follows a four-step process of model-building:

- 1) Observe a set of facts you would like to explain. This step includes casual observation as well as structured data collection.
- 2) Speculate about, or create a model that is deductively sufficient to account for ("produce") the facts, and that is intellectually coherent and sensible.
- 3) Then test the validity of the model by deducing other results from the same set of assumptions. Lave and March stress that this process of deducing interesting implications from one's model is often the most rewarding part of the process. The analyst's ingenuity is really challenged here since the implication should go beyond the bounds of the original situation yet be consistent with its underlying structure. This will become clear in the example given below.
- 4) The final step is to test the model by matching the new predictions or implications created in step 3 against data drawn from the original empirical situation.

How does this work out in practice? The introduction begins with a simplistic discussion about why the residents of a hypothetical college dormitory would tend to cluster in friendship, so that students in adjacent rooms are friends. The first model hypothesized contains the assumption that friends meet during the year and choose their rooms for the next year on that basis. This implies that friendship groups will not exist on the freshman level. Assuming that such groups do exist, another model is

created based on the assumption that contact forms friendship, so that students rooming near each other become friends. This would be contradicted if the size of friendship groups were stable over time, since it implies that each student should have more friends as his history of contact with people becomes longer, etc. The example ends with the following statement:

Most people have enough experiences, problems, and values in common that they are capable of being friends. At the same time, most people have enough experience, problems, and values that differ that they are capable of being enemies. Pairs of people discover their common and differing characteristics through communication. (15)

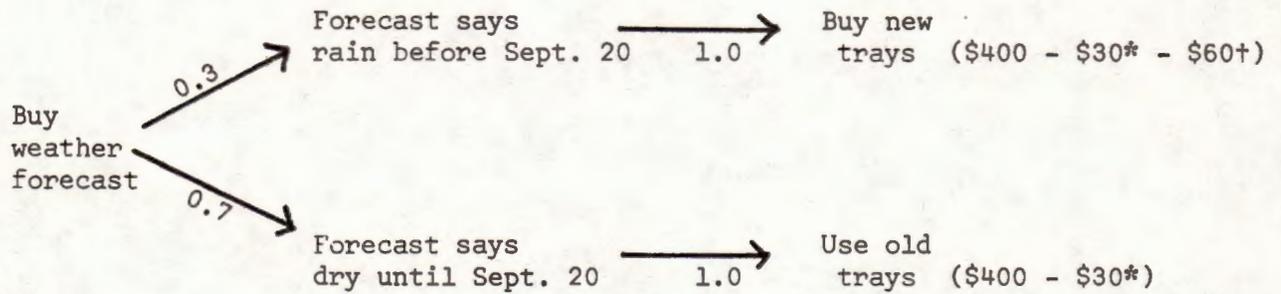
The authors then go on to discuss what can determine the pattern of communication, and thus the friendliness or hostility of the relationship. From a simplistic, restricted beginning a general model of potential significance is evolved.

The problem of validation is discussed in terms of the "truth" (empirical validity), "beauty" (intellectual elegance, force, and fertility), and "justice" (contribution to the quality of life) of models. Other texts discuss empirical validity, with a nod toward elegance. Lave and March are noteworthy for their stress on the heuristic value of surprises in formal modelling, and for their explicit discussion of justice.

Simplistic models are trivial. The book goes on to introduce richer, more complex situations. My favorite is in the chapter on decision trees, concerning the creation of a normative decision model to maximize the expected income of a raisin farmer in California. This may sound drier than a raisin here, but in fact reads like a mystery novel. Only an extensive

quote can convey the charm of the book's prose style. This particular section was chosen from the middle of an analysis in which the reader is to assume that he or she is the social scientist offspring of a raisin farmer. By the use of decision theory and probability the student has already shown the farmer how to increase the farm's income by calculating probabilities and decision contingencies, one of which involved the use of a hypothetical improved grape drying tray:

Your younger sister has been going to college meanwhile and has had the wisdom and good sense to major in social sciences. In fact, she has been reading this book. She says, "The good book talks about overlooked alternatives as the most frequent case of bad decisions. I think we ought to take that advice seriously. Now you have devised a clever way to gain control over the variability on the weather and hence decided to throw away your old decision about yearly purchase of the forecast information." Then she proposes, "I think we can combine your new trays with the weather forecasting information and have an even more profitable alternative. Weather forecasts are relatively cheap, but the trays are relatively expensive. How about buying the weather forecasts first and then deciding about the new trays? That way you would only have to buy the expensive trays 30% of the time." She then draws a new decision tree like this:



* \$30 = cost of forecast

† \$60 = cost of new trays

$$\begin{aligned} \text{EV (sister's strategy)} &= 0.3(\$400 - \$30 - \$60) + 0.7(\$400 - \$30) \\ &= \$93 \qquad \qquad \qquad + \$259 \\ &= \$352 \end{aligned}$$

So her proposed alternative is \$12 per acre better than yours. As penance for your error, you agree to reread this book and loan her your Jaguar on weekends. (117)

Granted that the book is well-written, two questions remain: do students in fact benefit from it, and what in fact is the value of the substance of the book? I will discuss these questions in turn.

The book evolved out of a course that the authors taught over a period of years at the School of Social Sciences in the University of California-Irvine and other schools. Although nominally written for lower-level undergraduates, it has been used with upperclassmen and graduate students. Faculty members who have used it (myself included) report that they found it beneficial to their own education in formal modeling. I personally used the book with senior undergraduate anthropology majors and witnessed its use in a first year graduate seminar in anthropology. The reader will understand my enthusiasm for the book after this anecdote from my teaching experience:

One rainy Friday afternoon in early winter I met with the five undergraduate anthropology seniors in my "Theories" course. They had done between two and three problems from Lave and March per week for the previous two months. This Friday we were to have gone over another problem that had been assigned to them as homework. I was coming down with the flu and was not prepared. The students were in their customary Friday lethargy and also feeling sickly. A good new ethnographic film had just arrived in the department that no one had seen before. I didn't want to admit that I would rather watch the film than do the classwork, but I wouldn't have minded if the students had insisted. I mentioned the film to them and said that, while I thought it was wrong, since we were all so knocked out, maybe it would be a waste of time to break our heads over the problem. Perhaps our time would be better spent, in the end, if we watched the movie. The students agreed, since none of them had prepared the usual typed solution to the problems. Yet before we roused ourselves to leave the room one student mentioned a line of attack to the solution. He had read through the problem but had not solved it. We were about to go and watch the movie, yet his idea was interesting and I put it on the board just to look at. Another student mentioned a different approach -- and before anyone knew it, we were hot in pursuit of a solution. We spent the next hour solving the problem and discussing the solution. This was astonishing: a group of undergraduates (none of whom was going on to graduate school), when given the option to work out a difficult intellectual problem

or to see a good movie on a Friday afternoon, chose the former!

The problems and the many exhortations to "STOP READING AND THINK" are an integral part of the learning experience of the book. Many problems are given for each section, and as a whole they are the best set of exercises I have seen. They are not particularly anthropological but it is easy to recast most of them into a more ethnographic form. A pedagogical hint to other faculty: I found that generous praise and emotional support for students gave even more than the usual positive yield, as they struggled to overcome their fear of numbers and mistrust of technical details. The same students who later gobbled up the problem as if it were a cookie almost fainted on the first day of class when they realized that I expected them to turn in lots of problems.

What about the substance? No new ground is broken in this book, nor is it meant to introduce new empirical analyses or theoretical forms. The models covered are basic, traditional, and elementary, yet powerful enough to be interesting. I found the sections on decision making and exchange more valuable than the chapters on learning-adaptation and diffusion, yet this is probably due to personal taste; certainly diffusion is a traditional anthropological concern. I wish there were a section on simulation -- though the concept is implicit in many places in the book, it is never adequately discussed. In general, a student who masters this introductory material will have the self-confidence to tackle any other more complex model.

As an anthropologist I found the complete lack of discussion of values as constraints and determinants of behavior troublesome. Most faculty users will want to enrich the array of technical details with reminders

that the examples are based on a particular underlying structure of values, and that individuals in other cultures with the same processes of rational calculation would act differently. Critics of formal analysis in general will find the same economistic, quantitative bias underlying this work that they may object to in other mathematical work: the assumption that "if the phenomena is meaningful I can give it a number (i.e., describe it with a quantitative measure), if I can give it a number it (the number) must be meaningful." Lave and March have less of this fault than many other authors, yet people who are antagonistic to the use of formal models in anthropology will not be swayed by the presentation in the book. It is like a beautiful tool, for example, a powerful radial arm saw. Users of the tool can learn general principles of workmanship that will serve them in many other different crafts. If you have woodworking to do, this machine will help you do wonderful work. But if you only like to make pottery and despise woodworking its beauties will be lost to you.

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NOTES

1. I am indebted to Michael Burton for discussions about this book.