

REVIEWS OF BOOKS ON FORECASTING

Principles of Forecasting Web Site

Daniel Kahneman, Paul Slovic, and Amos Tversky (eds.), *Judgment Under Uncertainty: Heuristics and Biases*, New York and Cambridge: Cambridge University Press, 1982.

Reviewed by: J. Scott Armstrong, The Wharton School, University of Pennsylvania; published in the *Journal of Forecasting*, 3, 1984, 236-239.

This book provides a convenient collection of important papers relevant to a subset of judgmental forecasting. My review discusses:

- (i) the scope of the readings
- (ii) the importance of the readings
- (iii) what is new
- (iv) how the book is organized
- (v) advice on using the book, and
- (vi) who should read the book.

It ends with a note on the use of judgmental research.

The Scope of the Readings

Assume the following problem: you must select a set of k items from a population of N , where the boundaries of N are ill-defined and no census of the population is available. How should you proceed? According to the research in *Judgment Under Uncertainty (JUU)*, decision-makers are prone to numerous errors in such tasks.

More specifically, the problem Kahneman, Slovic, and Tversky (KST) faced was to select, from a large number of existing papers, those that would be most useful to their potential audience. As nearly as I can tell, they made their selections by unaided intuition. As a result, the book suffers from the very problems that the book discusses (e.g., anchoring, availability and representativeness).

The preface of KST was vague about the criteria for selection. They did state, however, that (p. xii):

In recent years, a large body of research has been devoted to uncovering judgmental heuristics and explaining their effects. The present volume provides a comprehensive sample of this approach.

My understanding of the term “judgmental heuristic” proved to be broader than theirs. An unstated criterion used by KST was to include papers that were based on a series of experiments (Paul Slovic, personal communication). Beyond this, KST provided few clues as to the criteria. Also, KST provided little information on their decision making process. I must add

that the result is a collection of 35 papers that differed substantially from my expectations. It presents, primarily the pioneering work of Kahneman and Tversky along with some closely related research. Of the 35 papers, over 1/3 were written by the team of Kahneman and Tversky. This seems overly representative of their work. Contrast this with the fact that papers by these authors represent less than 2 per cent of the total references cited in *JUU*. Contrast it also with Hogarth (1980), where Kahneman and Tversky make up about 6 percent of the references.

My intuitive selections of research representative of heuristics and biases for judgments under uncertainty would have been somewhat different. I would probably have included researchers such as L. R. Goldberg, P. B. Meehl, C. R. Mynatt, W. A. Wagenaar, B.C. Webster, and others. Furthermore, sometimes my selection of the best work published by an author differed from the one reprinted by KST (e.g., I refer Chapman and Chapman (1969) to the *Psychology Today* version used by KST).

Although my selections would have differed, I believe the KST selections to be both valuable and exciting. These papers represent perhaps the most influential line of research in an important and rapidly expanding field. The growth rate of the field (as measured by the literature cited in *JUU*) over the last 30 years is in excess of 14 percent per year. This is substantially in excess of the growth rate for publications on forecasting which I estimated, on the basis of my literature review (Armstrong, 1978), to be about 8 percent per year over this time period. This, in turn, exceeds the growth rate for papers in the social sciences of about 6 per cent per year, based on data from the social science citation index from 1969-1979.

Importance

The selections in KST have had an immense impact on research in the judgmental area. The importance of these papers can be seen from an examination of the citation rates for the papers. I examined citations for 16 of the papers, including all journal articles, plus the oft-cited unpublished paper by Alpert and Raiffa. The source, the *Social Science Citation Index* (Institute for Scientific Information, 1970-1982), includes many, but not all of the references made in journal articles and in selected edited books. The average citation rate for these 10 papers was about 13 per year. The seven most frequently cited papers were;

	<i>Citations per year</i>
Tversky and Kahneman (1974)	56
Kahneman and Tversky (1973)	31
Tversky and Kahneman (1973)	24
Langer (1975)	8
Dawes (1979)	17
Kahneman and Tversky (1972)	16
Tversky and Kahneman (1971)	15

These strike me as impressive figures. Many papers are never cited in their life. Of those papers that *are* cited in a given year, the average number of citations for that year is 1.4 (Social Science Citation Index).

The preface to KST implied that the collection would examine methods to correct biases in judgment. To see if this was accomplished, I attempted to list the corrective steps from each paper. That is, what could one do to avoid a specified type of bias? My failure rate was high. Often, the authors did not provide enough advice for me to use their findings. However, many of the papers did imply action steps. For example:

- a) “Judgment of and by representativeness,” by Tversky and Kahneman (new contribution). suggests that scenarios provide a poor way to predict the likelihood of events.
- b) “Popular induction,” by Nisbett *et al.* (1976), suggests that the use of vivid examples may unduly influence perceived probability.
- c) Fischhoff’s chapter on “Debiasing” implies a number of action steps.

Rather than corrective action, the emphasis was on clever experiments that show what is wrong with unaided judgments. My failure to find specific steps occurred even in the section of the book labeled “Corrective procedures.” This lack of practical solutions may be distressing to practicing forecasters, especially those who believe the findings of some research indicating that awareness of shortcomings often fails to prevent the problem.

I expect that this research will lead to further research on how to avoid the problems. In fact, such research is appearing in journals currently (e.g. see Gregory, Cialdini and Carpenter, 1984).

Newness

Eight of the 35 papers in KST were new, six were revised for this book, and ten abridged. What is the value of the new contributions?

I rated each paper in the collection on overall importance (my subjective rating). The rating was either “good” or “fair.” I then counted the percentage of “good” papers for new vs. previously published papers. Only 25 percent of the eight new papers were rated “good” whereas 74 percent of the previously published papers were rated “good.” (My ratings had construct validity, as they were later found to be correlated with citations. For the older papers, each of the 12 most frequently-cited papers had been rated “good,” whereas only one of the four least-cited papers had been rated “good.”) Some of the new papers gave the appearance of having been written hastily. The new papers I rated as “good” were Tversky and Kahneman’s “Judgments of and by representativeness,” and Fischhoff’s “Debiasing.”

It was not easy to evaluate the revisions that had been made in the papers because the nature and extent of the revisions were not described. A note from the editors, or a different typeface, would have been helpful for those readers who had read the earlier versions.

The editors did show where papers were abridged, although no summary was provided on what was missing. The abridgement often occurred in the “conclusions” section of the papers. and

perhaps this is why I often felt that the papers were weak on advice. To make things worse, all abstracts had been removed.

Organization

The book is organized for researchers who are divergent thinkers. I expect this organization will make little sense to a practicing forecaster. Rather than being organized to show how to select or train suitable experts, pose questions, and obtain forecasts, the major sections of the book are labeled:

- (i) Representativeness (the probability of an event is assessed by the extent that it is similar to its parent population even in cases where this provides no relevant information).
- (ii) Causality and attribution (e.g. frequently, people are not influenced by knowledge or how others behave in a given situation which they predict their own responses to the situation).
- (iii) Availability (the probability of events that are easier to remember is overestimated).
- (iv) Covariation and control (e.g. people's predictions are influenced by their actions even when they clearly have no control over the event).
- (v) Overconfidence (experts are typically overconfident, especially when feedback is poor).
- (vi) Multistage evaluation (e.g., people tend to add probabilities, rather than multiply, in situations involving compound probabilities).
- (vii) Corrective procedures (e.g., asking people to think of reasons why a prediction may be wrong helps them to assess the likelihood of an event).
- (viii) Risk perception (e.g., the way in which information is presented has a strong influence on the perception of risk).

A short introduction to each section would have been useful. A glossary at the end of the book would have helped. Fortunately, the index does indicate where some of the terms are defined.

The references are assembled in a single list at the end of the book and are cross-referenced to the chapters in which they are cited; this is a convenient arrangement. A brief index is provided that I found to be useful.

Advice on Using this Book

The organization of the book leaves the reader with flexibility as to how to use it. In view of its historical importance, I suggest you start with Part I (which consists of Tversky and Kahneman,

1974). After that the parts can be read in any order. Within parts, I suggest that the papers be read in chronological order. (I was unable to infer the reason for the existing order.) Because the abstracts have been removed, I suggest that you first read the last section of each paper to ensure that it is relevant to your needs.

Do not rush through this book. While the writing is good and, at times, exciting, you will find much that is thought-provoking and requires contemplation. Furthermore, it requires much effort to integrate the various materials, as the editors provided little assistance in this area.

Who Should Read This Book

Teachers of judgmental forecasting and decision-making will find this to be a useful reader. I cannot think of a reasonable competitor. I would recommend, however, that you provide guidance on the best way for your students to use the book.

Practicing forecasters will find that the cleverness of the papers often pales against the lack of practical advice. Borrow the book and read selectively. Researchers who are interested in judgmental forecasting but are unfamiliar with the area will find much of interest. Buy the book. At \$15 U.S., the paperback version provides a good way to start your collection, especially as some of the papers are difficult to obtain otherwise.

Researchers who try to stay current with this area may find, as I did, that they had overlooked a number of excellent papers. Ask your library to purchase the hardcover version and duplicate those previously published papers that you might have overlooked.

On the Use of Judgmental Research

I believe that the research in *JUU* is of great practical importance. It has implications even for such tasks as deciding what papers would be representative of the best work in an area. By using their own research, the editors could have produced an even more useful volume.

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