senck argues that this suggests the genetic superiority of the European. Here he gives entirely too much credit to genetics. For example, Lemos found that on conservation of quantity, 53% of the part aboriginals and only 12% of the full aboriginals passed. Even with very high heritability for conservation of quantity, given the small degree of race admixture, a difference of this magnitude is far beyond what one would expect if genes alone were responsible.

The book is dominated by a seductively Social Darwinist perspective. Nowhere are there currently depressed groups who give evidence of genetic intellectual superiority. One is reminded of Karl Pearson's (1925) comments after comparing teacher's ratings on intelligence of immigrant Jewish children with British schoolchildren. Besides finding the Jewish children dirtier, he concluded that the ". . . alien Jewish population is somewhat inferior physically and mentally to the native population." He then suggested that only immigrants demonstrating 25% superiority to native British be permitted entry into the country. Needless to say, there is nothing negative about Jews in Eysenck's book, but one wonders whether similar premature accusations have been applied to the Negroes.

FOR those interested in reading on this topic, Jensen's monograph is to be preferred. Eysenck's book covers much the same territory, and what is added is less judiciously chosen. There are two excellent reviews of Eysenck's book that have already appeared (Atkinson, *Race,* 1972; Scarr-Salapatek, *Science,* 1971), which the content of this review is meant to complement.

Psychometric Methods in the Study of Meaning

Samuel Fillenbaum and **Amnon Rapoport**
Structures in the Subjective Lexicon. New York: Academic Press, 1971
Pp. viii + 266. $11.50.

Reviewed by WILLEM J. M. LEVELT

Samuel Fillenbaum, the first author, is Professor of Psychology at the University of North Carolina. After receiving his PhD from the University of California at Berkeley, he was first a Research Associate at McGill University. He spent a year as Visiting Fellow at the Harvard Center for Cognitive Studies. He has published several experimental studies in psycholinguistics and was author of the chapter on psycholinguistics that appeared in the 1971 Annual Review of Psychology. *The second author, Amnon Rapoport, is Fillenbaum's colleague and is also Associate Professor of Psychology. His PhD was obtained from the University of North Carolina. Prior to his present appointment he held appointments in the MHRI at the University of Michigan, and at the Hebrew University. His main area of research has been decision making, and he was author of the chapter on that subject for the* 1971 Annual Review of Psychology.

The reviewer, Willem J. M. Levelt, is Professor of Psychology at Nijmegen University. He received his PhD from Leyden University, and the year following he was Research Fellow at the Center for Cognitive Studies, Harvard. Levelt has taught at the University of Illinois, the University of Groningen, and the University of Louvain. During the 1971–72 he was a Fellow at the Institute for Advanced Study, Princeton. He is the author of On Binocular Rivalry *and coeditor (with G. B. Flores d'Arcais) of* Advances in Psycholinguistics.

THIS experimental study has a double objective. In terms of *substance* it aims at discovering and representing structural properties of lexical meaning on the basis of similarity judgments. From the *methodological* point of view it is concerned with developing and validating techniques for gathering and analyzing similarity data and relating these to substantive psychological theory. The latter concern gives the book a distinctly psychometric flavor. According to the authors, the study should be specifically pertinent to psychologists, anthropologists, and linguists interested in the empirical study of semantic structures.

In an introductory chapter they present their three main data gathering techniques. The first, Rapoport's (earlier) invention, is called *tree construction:* the subject is required to 'build trees' by successively connecting the words in a set on the basis of meaning similarity. The other two techniques are George Miller's *sorting method,* and the *complete rank-ordering* of all pairs of words according to within-pair similarity of meaning. This chapter is followed by one on the methodology of data analysis, which is excellent but so compact that it will initially deter most anthropologists and linguists and many psychologists with little background in psychometrics. The chapter contains a fundamental analysis of some statistical properties of graphs, and it treats statistical issues in multidimensional scaling and cluster analysis.

In the next nine chapters these techniques of data gathering and analysis are applied to a wide variety of lexical domains: color names, kinship terms, pronouns, emotion names, prepositions, conjunctions, HAVE-verbs, verbs of judging and good-bad terms. A general assessment is given in a final chapter.

From the substantive point of view the main trend in the findings seems to be the following: For lexical domains for which there exists substantive theory already, similarity experiments can add new insights; but, where theory is lacking, the methods are not very helpful as mere discovery procedures. Examples of the former are kinship terms and pronouns. Instances of the latter are emotion names and good-bad terms.

In the case of kinship terms the authors assemble convincing evidence for one theory (Romney and D'Andrade) as against another (Wallace and Atkins). For pronouns their findings sub-

stantiate Lyons's proposals as opposed to alternative views. In both cases the authors are able to enrich the validated theory by a weighing of the semantic features involved. So for instance for kinship: the distinction between 'direct' and 'collateral' seems to be more salient than the sex-feature.

As a discovery procedure the similarities approach is less than successful. Neither for emotion names, nor for good-bad terms anything insightful results. Good methods cannot compensate for bad theory. It is at this point that I want to take issue with the authors' view about validating the methods. They say (p. 97) that the clear cases, such as pronouns, are useful "in that they validate the techniques . . . and thus provide some warrant for the application of such techniques in other domains where the underlying relations are very far from clear." The result of this optimism is that when there are no substantive results in unclear cases, the authors do not blame the methods, but individual differences or the lexical structure itself. In discussing their lack of insightful findings in the case of emotion names, they write, "Perhaps it is not that people fail to distinguish among emotion names, but rather that the bases for such discriminations are more likely to be idiosyncratic [p. 123]." The reason for this may be that "their referents cannot be externalized [p. 124]." This, however, would argue against the possibility to communicate sensibly about internal states, contrary to our daily experience. The common lexical structure may be hard to discover, but communality itself is the last thing to be denied. For good-bad terms the authors even blame the lexical structure itself for their lack of significant results: "We shall argue that, in principle, there may not exist any coherent, definable domain of evaluative terms, and that, again, in principle, the only property shared by all evaluative terms is their positive or negative marking with regard to evaluation [p. 232]," and further "any structural analysis, whether using graph techniques, dimensional scaling techniques, dimension free clustering techniques, or any other technique whatsoever, may simply be inappropriate in that it can hardly reveal structure which is not there in the first place [pp. 233, 234]." This is like blaming the stars for one's bad luck. It, moreover, contradicts the statement on page 241: "Tacitly, throughout this monograph we have been taking what might be called a 'realist' or 'essentialist' position, assuming that there is a unique, correct structural solution for the relations obtained among a set of lexical items constituting or drawn from a particular semantic domain (certainly for a given individual subject)." Indeed, the obvious possibility of communicating by means of evaluative terms indicates that such a structure exists. Our present insight in that structure may, however, be so limited that an adequate experiment can hardly be designed.

The outcome of a similarities-experiment is strongly dependent on the selection of terms. For some domains the authors are well aware of this and take it into account at their interpretation of the results. But in other cases they do not seem to realize that they did in fact exclude quite critical terms. For the color names one looks in vain for *black* and *white,* these being the most primitive core colors in any color lexicon. In their absence, the principle experimental finding of hue dominance could be a complete artifact. For kinship terms one suspects that the results may have turned out so well, because the items were selected to be mutually exclusive. Confusing terms, such as *parent* or *sibling,* or *ego* for that matter, were not in the experimental set. Finally, the authors do not show sufficient awareness of the fact that semantic organization is often essentially asymmetric, especially in relational systems around core terms (e.g. *scarlet* is a kind of *red,* but not inversely), and will, therefore, never be revealed by similarity judgments, which are inherently symmetric.

With respect to the use of their analytic methods it should be said that the authors do an exemplary job—much better, in fact, than we are accustomed to in psycholinguistic experimentation. They take great pains, always, to precede their interpretation by a precise rejection of the nul-hypothesis (though one wonders whether the rejection of randomness is very informative from the substantive point of view), and multidimensional as well as clustering analyses are applied with great sensitivity and insight. There are only two general analytic points on which I have any reservations. (*a*) There is too little information on intra-subjective reliability. Only for color terms do the authors give any test-retest reliabilities. They are, for six subjects, Spearman rank-order correlations ranging from .43 to .91, which, for reasons that are unclear, are called "surprisingly high." No further data are given for the other domains, not even for emotion names, where, as has already been mentioned, the authors suggest that there are consistent but idiosyncratic judgments. (*b*) At various places (pp. 79, 92, 200, 223) the authors perform two different analyses (e.g. multidimensional and cluster) on the same data, and then conclude that the two analyses are "consistent," or "similar." What is never discussed, however, is how much of such a correspondence is a mathematical necessity, and how much is of empirical consequence.

A similarities approach to the study of lexical structure has been around in the literature for several years. But only a careful and perceptive all-out attack, such as is to be found in this book, could give us a feel for the possibilities and limits of this methodology. The authors deserve credit for having undertaken this major painstaking enterprise, whatever the results.

It is all vanity to be sure: but who will not own to liking a little of it? I should like to know what well-constituted mind, merely because it is transitory, dislikes roast-beef? That is a vanity; but may every man who reads this, have a wholesome portion of it through life, I beg: aye, though my readers were five hundred thousand. Sit down, gentlemen, and fall to, with a good hearty appetite; the fat, the lean, the gravy, the horse-radish as you like it—don't spare it. Another glass of wine, Jones, my boy—a little bit of the Sunday side. Yes, let us eat our fill of the vain thing, and be thankful therefor.

—William Makepeace Thackeray
Vanity Fair