Human information processing

Memory and Attention: An Introduction to Human Information Processing. (Series in Psychology.) Second edition. By D. A. Norman. Pp. xiii+262 (Wiley: London and New York, 1976.) Clothbound £8.45; $15.45; paperback £3.95; $7.20.

DONALD NORMAN'S set of seminars on *Memory and Attention* have been useful to university teachers since they were first published in 1969. It is a pleasure to have a second edition, so adapted and extended that it is now virtually a new book. It is arguably also a different kind of book, since it is now probably the best and most cheerful introductory text one could recommend to a layman who wishes to understand how work on artificial intelligence and information processing is currently applied to psychological problems.

Among a large, mostly very recent, literature this book has distinctive virtues. First it is by a single author, who writes well. Second, it is short. Most importantly it is a good natured book, which seeks to be eclectic in appreciating the values of a wide range of different approaches. It retains enthusiasm without losing balance. It is a book to teach *with*, although possibly not a book to teach *from*.

Norman hopes that "the study of human information processing is becoming the study of the human" but aptly warns that "one must always be wary of comparisons of human psychology with any man-made device, most especially with computers. The human mind is not a computer, and the differences between the two far outweigh the similarities". Norman is also rare among workers in Artificial Intelligence in having a scholarly interest in the history of psychological problems. To quote one of his favourite authors, William James, he also has an appetite for the "more nutritious objects of attention" in psychology.

He is willing to accept the kinds of questions which students bring to psychology from their discursive reading, and while pointing out that some of them are unprofitable, is willing to discuss them seriously and in an illuminating way. Thus we find comment (and very useful references) on the topics of mystical experiences (Carlos Castenada *et al.*), hemisphere differences (Ornstein *et al.*), mnemonic systems (an entire very useful chapter and excellent bibliography), pathologies of attention and of cognitive processes, and even the art of juggling. To some extent these are embroidery on a serious text, and they do not occupy much space. But they are not mere decoration. They provoke useful commentary, and show a recognition that the enthusiasms which bring students to psychology need not be stifled, but can mature into more usefully directed intellectual curiosity.

It is easy to dismiss such topics as irrelevant to current empirical work, and to depress students by insisting that psychology has nothing to do with the study of human experience and is concerned instead with the description of "performance" or "behaviour". Norman's caveat for psychologists should be taken seriously by all students, and properly understood is an antidote to the depression felt by research workers who may feel that they are wasting time on the precise definition of trivial problems. He points out that human beings have been the object of their own attention for a very long time, and that perhaps "We cannot discover anything surprising . . . It would be peculiar if our careful study of thought processes led to results which are at odds with our intuition". But he further points out that the bridging of a gap between a nebulous appreciation of generalities and the precision of predictive mathematical theory is an exciting, and ultimately a satisfying, occupation for a scientist.

The work follows the format of the first edition in presenting related readings with commentary and further development. The chapter on attention is now extended by a discussion of recent work by Kahneman and Moray, with useful remarks on the problems in terms of Bobrow and Norman's own distinction between "data-limited" and "resource-limited" processing. The previous section on short-term memory has been extended to cover the Craik–Lockhead idea of levels of processing. There are excellent chapters on pattern recognition programs sensibly restricted to detailed analysis of the problems encountered with a *single* new system (Reddy and Newell's Speech Understanding system). A section on semantic networks forms part of an excellent chapter on representational systems. There is a good introduction to imagery, in the same vein.

The book is research oriented rather than didactic, and ends as it should with a set of problems outstanding (Unfinished Business). Not the least of its values to students and to lecturers is the care with which really comprehensive bibliographies are assembled and annotated.

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