

BOOK REVIEWS

Motivational Control Systems Analysis, edited by D. J. McFarland.
Academic Press, 1974, 523 pp. £11.00.

One of the most interesting developments in psychological theory construction to emerge in the last few years, indeed the only major change, has been the increasing use of general systems theory. For a long time ideas such as feedback, stability, control and homeostasis have had lipservice paid to them, but have been useless precisely because they were not expressed in the necessary mathematical form. The requisite mathematics is quite outside the straight-lines-and-analysis-of-variance tradition that inevitably made a dustbowl of much of psychology. Applied mathematicians, engineers and computer systems scientists have now done enough spadework to make the techniques available; this book describes one small area of application in valuable detail.

McFarland has gathered together applications of systems control theory used in the representation and analysis of the behaviour of animals under various conditions of deprivation, gratification and satiation in terms of food, drink and sex. The theory is in some cases well related to data, and the interactive process of modelling, matching theory to experiment, is nicely illustrated; though some of McFarland's own contributions run well in advance of empirical results. This is not necessarily a defect, it can initiate well-directed research. I was surprised to see that the classical ideas of Liapunov, from the 1890's, are still intellectually exciting in their implications for the analysis of behaviour. If Wundt and Liapunov had ever collaborated we might now have been spared a deal of nonsense from learning theorists.

The bibliographies are very valuable to the beginner, who will need to come to terms with a diversity of unfamiliar concepts and techniques before he can usefully add to what has already been done.

R. A. M. Gregson

Intellectual functioning in the Aged by R. D. Savage, P. G. Britton, N. Bolton, and E. H. Hall. Methuen, 1973. 190 pp.

This is essentially a good literature review and a report of a planned and structured survey in intelligence measurement of the elderly, in Newcastle-upon-Tyne in England. It is obvious that research which involves extensive testing on the elderly is a laborious and often unexciting task in which rigour is not always easy to achieve and samples are rapidly lost by the attrition of death. It is also likely to be expensive if sampling is well constructed. The reported research dates

from 1963 to 1971. Intellectual functioning in old people in the community, and in the aged mentally ill, were examined; changes in the pattern of intellectual functioning in old people as a predictor of clinical changes and of death itself are reported. It is pleasant to record that the authors are able to conclude that some disorders of the aged intellect are not solely the consequence of degeneration, and are in part reversible, but the relative death rates in organic and non-organic samples of the elderly raise methodological problems which have not yet been overcome. It is sobering to see how small many published studies in this area are, so that this does, in fact, report one of the largest in recent years.

R. A. M. Gregson

Attributes of Memory by Peter Herriot. Methuen's Manuals of Psychology Series, Methuen, 1974, 205 pp.

Up to date readable nonspecialist accounts of the highly active and rapidly changing field of human memory are rare. Peter Herriot's text which is intended for advanced level English undergraduates is thus welcome and timely.

The preface claims that it should be read in conjunction with "Readings in Human Memory", edited by J. M. Gardener. Publication of Herriot's book predates that of its companion by approximately two years, a long lag for intended companion volumes. Fortunately, Herriot's book can stand alone. Nowhere in the text does he guide the reader to consult the so-called companion volume.

Herriot does not pretend to present an exhaustive survey of memory research and theory; after all, the book is less than 200 pages in length. He is not concerned with mathematical models of information processing, physiological aspects of memory, memory pathology, developmental or motivational problems. Rather, he outlines a considerable body of research, much of it published between 1970-1973, and which is interpreted within a general encoding—retrieval or "coding of attributes" framework. The bias is readily acknowledged. He makes considerable use of the Craik-Lockhart levels of coding approach, and Tulving's distinction between semantic and episodic memory.

Herriot is not a party to the structural "boxes in the head" approach prevalent in the 1960's where information was presumably transferred from one structural store to the next in some temporal sequence although he does deal with this approach in historical context in his final past, present and future chapter. He dislikes computer analogies and their consequent box and arrow flow diagrams—hence the absence of any flow diagrams.

In Herriot's view stimuli are translated or coded in terms of attributes at the time of presentation. Various levels of coding are possible—surface levels dealing with physical attributes of the stimulus such as colour, modality, acoustic factors etc. are distinguished from deeper codes related to semantics and linguistics. He has chapters on both types of coding. It is from the coded attributes that the stimulus is reconstructed at the time of recall or testing. The level and manner of coding depends very much upon perceived task requirements and experimental conditions. Thus he has a brief and important chapter on conditions of coding. This coding approach seems stretched a little when dealing with the role of organisation in memory. Nevertheless, the relevant literature is thoroughly and critically examined. Most research on memory, he argues, has concerned itself with retention of experiences or episodes, usually episodes consisting of unrelated sequences of word-events which appear in the context of some list. This is episodic memory. Semantic memory concerns itself with the way a person's organised knowledge of words, verbal symbols and linguistic rules etc. are arranged in some more static long term store.

It is pleasing to see a chapter devoted to this new area of memory research and good to see one that is well organised and critical.

The book contains no tables, no graphs, and no diagrams. Surprisingly these are not missed for the author is a master of concise lucid expression. He wastes no words and draws many far reaching implications from the experimental results he describes. Always he is critical, contemporary, and well organised. I think most undergraduates new to the topic would find the text hard going, but it is one they should enjoy getting their teeth into.

Paul N. Russell

Perception and Understanding in Young Children by Peter Bryant.

Methuen, 1974. 208 pp.

This book is about the development of discriminative processes in young children. It puts forward a new theory of how children code stimuli and provides a conceptual link between several well-known, but usually unrelated experiments.

On the whole, the writing is lucid, and the author's theory is presented with simple clarity. Essentially, it is an attack on the traditional view that young children attend primarily to absolute properties of environmental stimuli and are very limited in their capacity to attend to relations between stimuli or to make deductive inferences about them. According to Bryant the traditional view is based on faulty interpretation of experiments not properly designed to fully explore the child's capabilities. He argues that children in fact make extensive use of configural cues formed by the relation between stimuli, and use

these cues as a basis for making deductive inferences about the nature of the stimuli. It is this reliance on configural cues that leads to errors in judgements about the stimuli, because changes of the context in which a stimulus is presented may often radically change the configural cues to which the subject is attending.

Bryant's theory is bolstered by results from several experiments conducted by Bryant and his colleagues at Oxford. Although most of these studies have already been published in various journals there is every justification for bringing them together in this book where the relations between them can be fully explored. These experiments are intelligently conceived and thoughtfully considered, and they give some fresh insights into the nature of discriminative processes in young children. The well-known paradigms of conservation and transitivity come in for close scrutiny, and the new interpretation offered is in some respects a reversal of established theories.

In other sections of his book, Bryant extends his theory to account for children's performances on transposition and mirror-image discrimination problems. Here the arguments are less convincing than in other parts of the book. The problems seem to arise from reviewing experiments in too narrow a context so that the resulting conclusions are not applicable at the level of generalization where the important issues arise. In the section on transposition experiments Bryant argues that the results are consistent with his theory that young children attend primarily to relations between stimuli rather than to their absolute properties. He recognizes that the main evidence for control by absolute values is the occurrence of transposition reversal during the so-called "far-test". He claims that there is little evidence for clear reversal and that the more typical result would be better characterised as "random choice". Although this claim is the foundation of the rest of his argument, Bryant does not cite any references that support it. If he were right this might not matter, but he is almost certainly wrong. A few experiments that have tested transposition systematically at equal intervals along the stimulus continuum show clearly that the transposition gradient is non-monotonic, passing through an inflexion of equal choice into a descending limb of transposition reversal (cf. Honig, 1962). This is a reliable result with wide generality extending over a variety of training and testing procedures. Moreover, it is now accepted that post-discrimination gradients obtained by testing stimuli singly have an inverted U shape, and may be used to accurately predict choice between pairs of stimuli. Although Bryant allows himself to be misled by too narrow a view of transposition, a broader perspective need not be very damaging to the idea that children attend to relations between stimuli. While the transposition literature does not support the idea that children's *whole* attention is focussed on relations between stimuli they certainly show that *part* of it is; how else might systematic gradients along a stimulus dimension be achieved?

In the section on mirror-image discrimination Bryant argues that the child has difficulty because there are no configural cues for him to use. Bryant describes two sets of experiments which seem to support this view, but these do not capture the essence of the mirror-image problem. The first set of experiments compares children's ability to discriminate mirror obliques with their ability to discriminate horizontal and vertical lines. This choice of stimuli makes it impossible to distinguish between left-right and up-down confusion, because mirror obliques are symmetrical about the horizontal and the vertical. Since prior evidence suggests that left-right distinctions are more difficult for children than are up-down distinctions, experiments on mirror-image discrimination should use stimuli that enable these two types of confusion to be separated. Even as an account of children's coding or mirror-obliques, these experiments are not strong, and the generality of Bryant's conclusions may be very restricted (cf. Fellows and Brooks, 1973).

The other set of experiments deals with the detection of left-right versus up-down differences and here again Bryant emphasises the detectability of relations between stimuli as the important variable. It is unlikely that these experiments could help to explain why children find it difficult to tell left from right, because the detection paradigm is not a genuine test of their ability to do so (Corballis and Beale, 1970). Bryant's experiments have little relevance to the left-right problems described by Mach or Orton, and his criticism of their theories often seems to miss the point.

Despite the difficulties raised above, this book is definitely required reading for any psychologist interested in children's understanding of their environment. It shows how much can be achieved by a well-reasoned experimental approach to old questions, and how this can result in radical changes in the interpretation of well-known phenomena.

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Ivan L. Beale

The Competent Infant: Research and Commentary, edited by L. J. Stone, H. T. Smith and L. B. Murphy. Tavistock Publications, 1974.

The Competent Infant is a handbook of research in the earliest phase of human development—infancy. It contains within its 1300 pages over 200 papers dealing with the development of the infant from conception to around 15 months of age. The vast majority of the selections, some of them heavily abridged, were published during the past 15 years. It is priced at around \$30.00 which, for what sounds like just another book of readings, must seem excessive.

At this price the prospective buyer might justifiably ask a number of questions. First, do we need a handbook of research in infancy? The answer is undoubtedly affirmative. Over the past 15 years there has been an unprecedented spurt in infant research resulting in a vast outpouring of bits of information about our early beginnings. As this somewhat bewildering array is drawn together the infant is forcing many eminent writers of the '40s and '50s to eat their words. His ability to take in and organize information and to adapt to his environment show him to be far from the passive creature "at the mercy of its environment" as he was described some 20 years ago.

The research from which this picture of infant competence is emerging is published in very diverse sources: pediatric, psychological, neurological, psychiatric and sociological journals to mention a few, as well as published symposia and books by authors in these varied fields. It is therefore timely that the monumental task of drawing together this emergent body of knowledge be undertaken.

Given that we need such a handbook, one may ask whether *The Competent Infant* fulfills this need. In my opinion the editors have done an excellent job. In an introductory section they outline their goals, discuss the growth of research in infancy and draw out some of the implications of our newly acquired knowledge of infant competence. A timely consideration of the ethics of infant research procedures is included together with suggested lines for future research.

The book is organized under six major chapters each prefaced by an editor's introduction which surveys and draws out some of the implications of the material to be covered. The papers which are reproduced in each chapter are a representative cross-section of work in the area including many of the seminal studies to which any student of developmental psychology needs to be exposed. Reference is made to important papers not actually included which means that each of these introductions ends with an extensive and extremely useful bibliography. Put together, these chapter introductions amount to a small and concise textbook on infancy.

Many papers are abridged, some of them heavily, and at times information is missing which the critical reader will find essential, for

example, on methodology. This is undoubtedly irritating and one feels that the editors may be giving us just those sections which help to make their point. Nevertheless, the naive reader of *The Competent Infant* is certainly in a better position to weigh up the evidence for himself than he would be if faced with the typical categorical statement in a textbook followed by a number of brackets. Abridgement was inevitable considering the volume of work to be included and the source references are given so that the interested reader can follow up the original versions. The references quoted in each paper are also given.

A third question concerns the audience. Who is going to find this book useful? I would venture to say any psychologist who can afford it, since all of us at some time or other have to do with infants, either as parents or as "experts" asked for professional advice by interested laymen. The plain fact of the matter is that knowledge acquired over the past 15 years simply contradicts earlier notions of infant incompetence and necessarily leads to quite different recommendations about optimal infant rearing practices.

Finally, from the teacher's point of view, this handbook should prove invaluable, not only as a personal reference source, but as a single volume to which students of developmental psychology can be referred for course reading in the original.

J. Dubignon

Psychometrics of Similarity by Robert A. M. Gregson. New York: Academic Press, 1975.

The notion of similarity is fundamental to many areas of psychology, cutting across the normal boundaries. Professor Gregson's book is an attempt to draw together some general principles in the theory and measurement of similarity. Such a book, one might have thought, should have broad appeal to psychologists of all sorts. Most of us are concerned in one way or another with the manner in which people or animals organize the perceptual world, whether in the context of a well-defined field like psychophysics or of a more complex and nebulous realm such as social perception. Yet, although this book performs a valuable service in drawing our attention to the generality and complexity of the problem, few psychologists will find it to their taste. For it is undeniably a difficult book.

Gregson makes it clear from the beginning that, in his view, the proper approach is a formal, quantitative one. To illustrate his point, he draws attention to the so-called "Skaggs-Robinson hypothesis" which has to do with the effect of interpolating irrelevant material between presentation and recall of some original material. The hypothesis states that as the similarity of the interpolated to the original material decreases, recall at first drops to a minimum and then rises again, although it never reaches the level achieved with maximum similarity. Gregson points out that the hypothesis is untestable without some measure of similarity that is independent of recall. He suggests further that the hypothesis is irrefutable even if we can rank order the similarity of the interpolated to the original material, but this is an argument I cannot follow: surely the hypothesis would be refuted if recall were to at first *increase* and then *decrease* with decreasing similarity. The general point is valid, however; the hypothesis presupposes a similarity metric that does not yet exist.

In any event, few would deny that a mathematical approach is necessary to model similarity judgments. In fact, the remarkable thing is that people can so readily provide *quantitative* judgments, on a more or less continuous scale, even when the stimuli are multidimensional and often ill-defined. The ease with which they do so is deceptive, and in many cases no amount of complex mathematical modelling seems to have been able to capture exactly what they are doing. The alternative models are many, however. Given some multidimensional representation of a pair of stimuli, for example, how might we represent the similarity between them? We might consider the representations as vectors, and construct the projection of one on the other. We might regard them as points in space and consider the distance from one to the other. But distance can itself be defined in infinitely many ways. There is distance in the Euclidean sense, or distance according to the "city-block" metric, but these are only two of the possibilities defined by the so-called "Minkowski metric". In Chapters 3 and 4, Gregson leads us through the intricacies of these various alternatives and introduces us to yet more general notions about spatial representations—nonmetric, metric, ultrametric! One may sometimes wonder if this has much to do with similarity, or whether we are simply playing sophisticated mathematical games, but the ideas are challenging and entertaining (for those who like that sort of thing). I thought Chapter 4 the best and most rewarding one in the book.

However the book makes very few concessions to the reader who is unfamiliar with mathematical conventions, particularly those of set theory. Sometimes the formal approach seems a little excessive; many of the ideas are not complicated and could just as well be expressed in words. For all that, Gregson sets up some of his own symbols and

conventions to refer to different judgmental paradigms and operations, and this adds coherence and unity to the presentation. For the benefit of the reader who is "a psychologist first and a mathematician second", formal proofs are omitted. Yet, as one who perhaps fits that description, I found this unsettling; one is often presented baldly with an equation or graph with little hint as to why it should look the way it does. I needed a scribbling block to provide myself with the necessary continuity. The bones are there, but the flesh is often missing.

Gregson's general approach is probably weakest when it comes to the specification of stimulus structure. At one point, he quotes Ekman and his colleagues as saying that a particular principle would not be expected to apply to "percepts or other psychological phenomena involving an obvious subjective structure". Curiously, Gregson focuses on the word "obvious" and wonders how obviousness might be scaled. But the priority here is surely to characterize structure. In Chapter 6, which is something of a pot-pourri, Gregson does briefly discuss some aspects of the specification of structure, but only in a superficial way. His instincts seem naturally to lead him to an analytic, axiomatic approach which may not always capture the more holistic structural properties of stimuli.

In summary, this is not a "how to" book, and it will not have wide appeal to psychologists. Even those considering a text or supplementary reading for an advanced course might find that W. R. Garner's new book, *The Processing of Information and Structure*, covers at least some of the same material in a more straightforward manner. Yet Gregson's book has its rewards. In its own way it is an intellectual tour de force, a personal, even idiosyncratic statement that challenges and sometimes illuminates. Among those who persevere with it, I suspect that some will find themselves at odds with Gregson's recipe for science. His final advice on how to proceed in an analysis of similarities may seem ridiculously over-formal. The value of the book lies in its careful and systematic evaluation of the formal properties of theories. It is an enterprise of consolidation, retrospective rather than prospective. It is not an innovative book, for innovations in science and mathematics usually occur when ideas are still loosely formulated and may not even be fully understood. Formalization comes later. Gregson's book may give some readers a deeper, more sophisticated understanding of what mathematical modelling is about, but I do not think it tells us where to go next.

Michael C. Corballis

Polynesian and Pakeha in New Zealand Education (Vol. I: The Sharing of Cultures; Vol. II: Ethnic Difference and the School), edited by Douglas Bray and Clement Hill. Auckland: Heinemann Educational Books, 1973, 1974.

This two-volume work contains 36 chapters written by 34 authors and distributed through 350 pages of text. This multi-origin brevity would be a problem for anything other than an encyclopaedia, since so little appears to be said by so many for such a long time. Ten pieces are less than six pages long, and one is a bare two and a quarter.

The first volume contains the bulk of the background discussion and the second concentrates on the school and classroom context. In terms of interest the second volume scores well, including as it does material of a Polynesian rather than a purely Maori nature. It is also printed on better paper. The first volume looks as if it contains more meat for the scholar, but falls short of a good academic target through lapses in documentation in several chapters.

Considering that themes of intergroup relations, racial distinctiveness, Maori identity, and self respect crop up so often, it is disappointing that little attempt is made to relate local problems to overseas research—or even to already existing psychological or developmental theory. One could similarly criticize the second volume were it not so clearly practical and teacher-orientated.

The work as a whole is nonetheless welcome in that it could reach a wide audience. It will undoubtedly be useful for student groups, particularly in teachers' colleges. Since this reviewer was also responsible for editing a small volume of essays in 1972, the abiding impression is that the time is right for a work of scholarly substance, in depth, and by fewer authors.

G. Vaughan

Mental Handicap: A Brief Guide by Brian Kirman. London: Crosby Lockwood Staples, 1975. 192 pp.

This book provides an elementary coverage of mental retardation from a medical point of view. It is written primarily to meet the needs of nurses and it emphasises the treatment and training requirements of the retarded to help them to participate in and contribute to society. Psychologists are presented in the traditional role of intelligence assessors

and there is nothing in the book to indicate the contribution of operant psychology. The term behaviour modification, however, does appear but it is not clear what the author understands it to mean. The aims of the book are laudable but it is regrettable that the recent major contributions of psychology are unknown to the author who is described as being a leading authority in the field of mental handicap in Britain and chairman of the Research Committee of the Institute for Research into Mental Retardation.

W. A. M. Black