

Book Reviews

Susan Oyama

The ontogeny of information: Developmental systems and evolution.

Cambridge: Cambridge University Press, 1985.

Reviewed by Russell Gray

Dichotomous arguments are very common in psychology. Psychologists have frequently questioned whether human behaviour is the product of personality traits or situations, whether language development is innate or learnt, whether intelligence and schizophrenia are inherited or acquired and whether gender differences are attributable to biological or socio-cultural factors. While the precise question may vary, in all of these arguments there is an underlying opposition between two views of development. In the first, behaviour is regarded as largely determined by internal factors while in the second the environment is seen as the primary determinant.

This is the context from which Susan Oyama's book has emerged and these are the kinds of arguments she seeks to resolve. She begins by noting how common it is for authors to claim that the nature/nurture dispute was resolved many years ago only to reintroduce subtle versions of this argument in new guises. So instead of referring to innate or genetically determined behaviour researchers will use weaker terms such as genetic blueprints, programmes, tendencies and predispositions. Instead of partitioning behaviour into inherited and acquired components they attempt to separate the effects of maturation from experience or phylogenetic from ontogenetic sources of information. Oyama argues that the only way to finally resolve the basic nature/nurture dichotomy is to reject the causal assumptions upon which it is based. Her proposed resolution could briefly, and perhaps rather crudely, be summarized as making three claims.

First, development is thoroughly epigenetic. Morphology, physiology and behaviour must all develop through organism-environment transactions. They do not pre-exist developmental processes as gen-

etic blueprints, programmes, information or in any other implicitly preformationist form. This is the reason for the slightly obscure title to Oyama's book. She argues that developmentally meaningful information does not pre-exist development, either in the genes or in the environment. Instead, information itself has an ontogeny.

Second, she claims that development is a contingent, conditional process. The effects of both genetic or environmental differences are contingent on the context in which they occur. Thus the effects of changes in the environment will depend on the organism's genotype and vice versa. This mutual contingency means that developmental constancy should not be attributed to the constancy of any single factor (e.g., the genes) but rather it is due to the constancy of patterns of interaction.

Third, Oyama argues that development is one process. Developmental causation cannot realistically be cleaved into internal and external components. While it may still be convenient to talk of "internal" and "external" factors, in reality "internal" and "external" factors are co-defining and co-constructing. They are not independent variables and do not exist in a meaningful way in isolation from one another.

Individuals are constantly modifying their environment and the environment is constantly modifying them. In an effort, perhaps, to differentiate her position from previous weaker and unsatisfactory forms of interactionism, Oyama labels her view as "constructivist". There are interesting parallels between Oyama's constructivist view of developmental information and ideas in literary theory and social psychology. Just as Oyama argues that developmental information is constructed from the relationship between "internal" and "external" factors deconstructional literary theorists argue that texts do not contain any fixed, essential reading. Instead meaning is something that is constructed in the fluid, contingent relationship between the reader and the text. Similarly social constructionists like Kenneth Gergen argue that the meanings

we attribute to actions or expressions are totally context dependent.

The issues discussed in this book are not straight forward and neither is the book. Both spread out across many diverse fields relying upon complex webs of interconnecting arguments rather than a simple linear logic. But given the power and persistence of the nature/nurture dispute in shaping our fundamental beliefs about what is natural and inevitable it would be naive to expect simple arguments. Reading the book is well worth the effort. I recommend it to anyone who is interested in the relationship between biology and culture or between development and evolution. Oyama's book is an original and challenging contribution towards resolving the nature/nurture debate.

M. B. Freedman (Ed.)

Social Change and Personality

Berlin: Springer-Verlag, 1987

Reviewed by Janice M. Paterson

Essays in this volume were contributed by former students and colleagues as a tribute to Nevitt Sanford, a co-author of *The Authoritarian Personality*. The contributions reflect Sanford's recognition of the influence of both personality and social processes on human behaviour, and his interest in tertiary education, political psychology, life span development and personality theory.

Focussing on the educational theme, Axelrod outlines a new theory about the nature of the teaching - learning process, Reisman discusses problems faced by college presidents and their families, and Katz traces changes in the sexual behaviour and gender roles of college students between 1970 and 1977. Sanford's interest in political psychology is represented by an article by Bay, who argues that the U.S.A. needs to develop rational peace and defence policies to protect against the threat of universal destruction through nuclear war. Freedman, who also takes a political psychology perspective, examines the recent decline in American anti-semitism, and suggests that understanding this phenomenon may be useful in reducing a variety of ethnocentric

attitudes and behaviours. The life span development and personality themes are evident in the contributions by Serkin and Schneidman. Serkin, the only female contributor, discusses the personality development of highly educated women, while Schneidman, a clinical thanatologist, describes a case study in which a woman was brought to acknowledge, accept and prepare for her imminent death. In the closing chapter, which reflects Sanford's interest in personality theory, Smith attempts to reclaim humanistic psychology from the 'Pollyanna orientation' of the popular human potential movement, and to force psychology to become more humanistic.

The interdisciplinary approach and diversity of topics covered in the volume suggests that different articles will be of interest to a variety of people. However, there is a certain out-datedness to the volume overall. This arises partly from the psychoanalytic orientation which underlies many contributions, the poor representation of a feminist perspective, and from the age of the data some articles are based on. The problem of obsolescence is apparent and mildly amusing in Bay's speculations about what Reagan may do during the term of his presidency. However, out-datedness is obvious and irritating in Katz's article which discusses increasingly liberal homo- and heterosexual behaviours, and faculty-student sexual relationships with little or no reference to the role of the feminist movement, the problem of sexual harassment, or the potential threat of AIDS. Since nuclear war and AIDS represent two of the most serious threats to humanity today, updating of these articles would have given greater justification for their inclusion in a series dealing with 'recent research in psychology' and provided a more appropriate tribute to Nevitt Sanford.

A. M. Colman

Facts, Fallacies and Frauds in Psychology

London: Hutchinson, 1987

Pp 224, \$34.95

Reviewed by Charles Sullivan

This book concerns six topics commonly of interest to people outside psychology:

heritability of IQ, intelligence and race, obedience and cruelty, hypnosis, eating disorders, and extrasensory perception. Some of these topics deal with popular fallacies; for example, that ESP is scientifically established, or that under hypnosis people have distinctly supernormal abilities such as being able to support the weight of another person when suspended between two chairs (the "human plank" demonstration). Hence many lay readers will be intrigued by the research summarized in this book because it should lead them to modify their present beliefs. Furthermore, several of the topics have provoked wide-ranging controversy, in part because of the fraud associated with the research (e.g., the Cyril Burt affair in IQ research, several cases in ESP research).

The choice of topics is supported well by the style of the book. Firstly, each chapter title bluntly poses a question of popular interest. Examples are "Intelligence and race: are black people genetically inferior?", and "Obedience and cruelty: are most people potential killers?". Secondly, each chapter also starts with a "hook" — an anecdote to further engage the reader's interest. For example, the chapter on intelligence and race starts with some quotations from essays by British police officers concerning "Coloured Emigration" gathered for a study by the author. Here is one of these quotations verbatim:

Over 50% of trouble caused today either by niggers or because of them. Most of them are just Dirty, Smelly backward people who will never change in a month of Sundays. In my opinion most niggers especially Rasters should be wiped out of distinction.

Despite these stylistic characteristics, the book is not a superficial account of such controversies to be scorned by those with a good knowledge of psychology. Colman thoroughly documents his arguments and gives plenty of the standard references on the topics. I can think of few better introductions to some of these topics for undergraduate psychology students. Colman is particularly good at concisely summarizing the often tortuous histories of these contro-

versies and the major researchers concerned. It is a feature of the book that both sides of the controversies are well presented and documented, that is, the author does not simply seek findings to argue for one point of view. This would not normally be cause for comment. But with some of these topics (e.g., ESP, or even heritability of intelligence) such balance in presentation is surprisingly rare. In addition, concise explanations of technical traps and potential sources of misunderstanding are well written (e.g., the concept of *heritability* crucial in the intelligence debate). The reliability of Colman's writing is particularly clear in the chapter on ESP. Both his choice of research to discuss, and his handling of the general argument over evidence for ESP are excellent. This is an area where many consider themselves instant experts even when knowing little about the relevant research. Such instant experts are prone to repeating fallacious lines of argument dealt with decades ago in the parapsychological literature, and prone to being insensitive to the quality of the research from the serious parapsychologists (how many of those happy to firmly denounce parapsychology as obvious nonsense have actually read a single article in, say the *Journal of Parapsychology*?). In summary, having got attention and interest by good selection of Fallacies and Frauds, Colman follows through well with good presentation of Facts.

Obviously with such controversial topics, there are many who would dispute Colman's arguments and conclusions. Overall however the book achieves its goal of being stimulating reading for non-specialists in psychology (although probably demanding in parts for such readers). In addition, it is sufficiently reliable for academic psychologists to find it handy to brush up on some of these topics. After all, whatever your specialities in psychology may be, is it not embarrassing how often others expect you to have an informed opinion on topics such as these?

D. Laming

Sensory Analysis

London: Academic Press, 1986

Pp. 306.

Reviewed by R. J. Irwin

This is an exceptionally important book. Laming offers a fresh reading of experimental findings that have been gathered over the last 120 years and presents an elegant theory of early perceptual processing that synthesizes, unifies, and explains a wide range of hitherto disparate results. There has been no shortage of theories in sensory psychology and psychophysics, but Laming's theory embraces a larger domain than earlier theoretical accounts. He shows how a variety of seemingly unrelated phenomena — for example, Weber's Law, the shape of the psychometric function, negative masking — converge on a set of principles that reveal how the senses work.

Much of the book is about Weber's Law. This law states that when two stimuli are just-noticeably different in magnitude, the magnitudes always bear a constant ratio to each other. Previous attempts to explain this near-universal finding have done little more than re-cast the result in new terminology. And an attempt to derive the law from the Poisson character of the train of neural impulses has foundered on the ineluctable conclusion that Weber's Law ought to be a square-root function, which it is not. But in Laming's account — an account which is closely related to the theory of the ideal observer detecting a signal that is a sample of noise — Weber's Law falls out naturally from the chi-square distributions that the theory generates. Laming presents this most important result in two separate ways, but I think it deserves a still more lucid statement than he provides. Certainly many graduate students falter, in my experience, when trying to follow the argument. Actually Egan (1975) had earlier recognized that a chi-square observer strictly obeys Weber's Law (surprisingly, Egan is not cited by Laming) and still earlier Green and Swets (1966) had set a problem (number 7.3) in which the student is asked to deduce the relation between a chi-square observer and Weber's Law. But

neither of these earlier works provided a general foundation for Weber's Law because they did not show, as Laming does, why chi-square serves as the proper statistic for every sensory dimension.

In the theory that Laming presents, the chi-square distributions arise from the operation of several mechanisms. Perhaps the most counter-intuitive proposal is that the senses respond only to changes in a signal — a process that Laming calls differential coupling. As a result of this operation, the mean is stripped from the signal waveform and only transient changes remain. The evidence for this operation (which has occasionally been recognized, though never with the consistency shown here) comes from a variety of sources. One of the lines of evidence that Laming cites will have to suffice to show his originality: if one extrapolates the visual contrast sensitivity function to zero spatial frequency, then it turns out that there is zero sensitivity at that frequency. In other words, if there is no change in luminance there is no response. In vision, differential coupling is probably realized by the receptive field with its balanced excitatory and inhibitory components. As a result, a steady light source emitting a high density Poisson stream of photons is converted, by differential coupling, to a Gaussian process with zero mean and variance proportional to the luminance. As is well known, the energy in such a process is distributed as chi-square with degrees of freedom determined by the waveform's bandwidth and duration. The degrees of freedom can be computed with the aid of Shannon's sampling theorem, and here Laming is, for once, perhaps too facile: the reader will have to turn to other sources (for example, Green and Swets, 1966, chapter 6) for the many complexities and subtleties that the application of that theorem, or similar sampling plans, entails.

With a reasonable number of degrees of freedom (greater than 30) chi-square distributions closely approximate the normal distribution, and so for many tasks, the familiar signal detection model with normal distributions of equal variance affords a satisfactory account of perceptual performance: for example, of the form of the receiver operating characteristic and the

shape of the psychometric function for discriminating a difference between two stimuli. By this means the normal-normal equal variance model is given new respectability.

With a few basic mechanisms (differential coupling, half-wave rectification, an observation window, and some others) Laming's theory provides a quantitative explanation of many phenomena hitherto seen as distinct and often puzzling as well: the shape of the psychometric function, low-signal suppression, temporal and spatial summation at threshold, negative masking, the discrimination of visual contrast. And in achieving this, the theory is not replete with free parameters. Thus the long and complicated equation 8.16 (although expressed in extremely compact form) for the shape of the psychometric function for the detection of sinusoidally modulated luminance, contains only one free parameter, a scaling constant. The quantitative nature of the theory makes it especially vulnerable to experimental refutation — which is why quantitative theories, as Karl Popper has told us, are to be preferred.

Sensory Analysis is mostly about seeing and hearing, with occasional references to the cutaneous senses. In a subsequent article in 1987, however, Laming applied the theory with equal facility to smell and taste as well. An earlier paper in 1985 was concerned with the application of the theory to visual phenomena, but it provides a succinct exposition of the theory elaborated in the book.

The book is attractively presented with copious illustrations. There are surprisingly few misprints for such a complex work, although an unfortunate one occurs in equation 5.5 where a square-root sign is missing, and there is something seriously amiss with the chi-square density functions illustrated in Figure A.1. Readers of this book will be both challenged and rewarded: challenged by being asked to cast aside some cherished assumptions, and rewarded by new insights into how their minds and bodies work.

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Michael King, Gordon Stanley, & Graham Burrow

Stress: Theory and practice.

Marrickville, NSW, Australia: Grune & Stratton, Inc, 1987.

Pp 139.

Reviewed by Rossana Mariezcurrena

This book summarizes stress theory and discusses results from numerous experiments and case studies involving stress management and the treatment of stress related problems.

The authors define human stress as "a negative emotional experience resulting from negative thoughts about the environment". This definition diverges from those derived from traditional animal-based studies of stress (e.g. Tache & Selye, 1978). Because of the complexity of human cognitive processes, the authors conclude (and rightly so) that extrapolating the results of animal-based studies to inferences about human behaviour is risky, and may be misleading. The definition adopted in this book provides a more individual perspective of stress, which, incidentally, corresponds closely with the principles of cognitive therapy (Ellis & Dryden, 1987).

Chapter two incorporates a review of the stress and performance literature and a discussion of related experiments carried out by the authors. The experiments support Sanders' (1983) findings that increased levels of stress reduce performance, while increased arousal has a small but beneficial effect.

A wide spectrum of diagnostic tests and therapies for stress management are provided in the following chapters. These include psychoanalysis, rational therapy, physical exercise, chemotherapy and diet. The utility of one of the most popular stress management techniques, relaxation therapy, is discounted by the authors. They

state that relaxation alone serves only to distract a person's thoughts from the stress inducing condition and will often fail to alleviate stress related problems in the long term. However, only one study (Sherman, 1982) is quoted to support this claim — further documentation would be desirable. Also, the complete omission of any discussion of biofeedback in stress management (used alone or in conjunction with relaxation therapy) is surprising given the many applications of this technique to stress related problems (e.g., Libo & Arnold, 1983; Peavey, Lawlis & Goven, 1985).

The authors state that the aim of this text is to challenge some well known views of stress, as well as to provide an easily readable reference suitable for both laypersons and practitioners. The structure of the book, with its numerous supporting experiments and case studies, allows it to meet the first aim. The writing style, vocabulary, short length and substantial bibliography ensure that the book will be a useful introduction to the topic for all interested readers.

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Vicki Bruce
Recognising Faces

Hove & London: Lawrence Erlbaum Associates, 1988.

Pp. 154.

Reviewed by Gill Rhodes

Recognising Faces is a terrific book. It is

the first title in Erlbaum's new series, *Essays in Cognitive Psychology*, which aims to evaluate what is going on in various areas of Cognitive Psychology, to assess trends, and to advance new theory and novel approaches. This book does all of these things in a highly readable and lively style — no dry literature review for Bruce (although a lot of review material is packed in); instead a lucid analysis of the important questions about face recognition and how they might be answered.

The primary aim of the book is to chart the progress of theoretical development in understanding face recognition. The opening chapter introduces the problems of face recognition in an everyday context (how do you recognise your friends and remember the faces of strangers, problems with identification parades and techniques for face reconstruction used by the police) and reviews basic facts about face recognition memory.

In Chapter 2, "Affective and Communicative Aspects of Face Perception", Bruce argues that recognition of identity is independent of judgments about expression, attractiveness and other semantic properties of faces. Such modularity means that different aspects of face processing can be factored apart, an important result for the theoretical development advanced later in the book (see Chapter 4). The crux of the argument is that an identity judgment requires us to classify together all instances of a person, irrespective of the angle of view, expression, lighting, etc., whereas judgments about expression require that we group together all "facial action patterns" of a certain sort irrespective of the faces that are making them. The logic of the argument is attractive, although the only compelling evidence for it comes from neuropsychological data showing that the two processes can be disrupted independently, as can identity and facial speech judgments (the experimental work reviewed does not show the required double dissociation).

In the course of making the independence argument, Bruce reviews empirical work on various social and communicative aspects of face perception including the perception of expressions, facial speech,

and social attributions such as attractiveness. This review is enlivened by interesting tidbits, for example perception of perfectly clear, but "difficult", speech is aided by seeing as well as hearing the speaker, misbehaving children are likely to be perceived as "basically wicked" if they are unattractive, but as having an "off day" if attractive, and parents may fail to recognize their own child if she is in an unexpected location and acts like a stranger.

In Chapter 3, "Faces as Patterns", Bruce examines the properties of faces thought to be important for identity analysis. She considers the relative merits of individual components (features) versus the overall configuration, the salience of different aspects of faces, spatial frequency analysis, and the implications of distinctiveness effects in face recognition for theories of face recognition. In particular, she reviews recent work showing that caricatures of familiar faces, which exaggerate distinctive aspects of those faces, may be recognized better than "veridical" representations, a result that suggests that faces may be stored in terms of deviations from a typical or norm face. Bruce notes, however, that no formal scheme is currently available for deciding what the important dimensions of facial variation are — clearly an important area for future research, and a topic considered further in chapters 4 and 6.

In Chapter 4 "Semantic Coding of Faces", Bruce outlines a theoretical framework for face recognition developed by herself in collaboration with Andy Young. In the model, identification occurs when a structural coding module creates a representation, which triggers a face recognition unit (FRU), that is, a stored description of a known face. Activation of the FRU then triggers semantic information about the person, which in turn triggers name generation (ever noticed how you can often remember lots about a person but not their name, but never the name without any sense of who the person is?). Separate modules code information about expression and facial speech. The model (and others like it) describes the dynamics of face recognition. However, it begs the \$64,000 question, which is, what information does the structural coding module code and the

FRU store? Bruce is aware of this limitation and also faces fairly and squarely other problems that the model has in accounting for context effects in face recognition.

In the more speculative chapters 5 and 6 potential research directions are examined in light of problems with the existing theoretical framework. Bruce and Young's framework is "abstractive" in the sense that a recognition unit, the FRU, contains the "essence" of a face, which allows an instance of that face to be recognized. In Chapter 5 ("Remembering Instances") Bruce considers non-abstractive or "instance-based" models (e.g., Morten's headed records, distributed memory models) and concludes that the question of whether an abstract recognition unit or instances are stored in memory is unlikely to receive an answer until we know what visual parameters are coded, that is, until progress is made on the \$64,000 question.

In Chapter 6 ("Towards a Computational Theory of Face Perception") Bruce concentrates on the \$64,000 question. Bruce begins by considering Marr's theoretical framework for understanding vision. Not all aspects of Marr's theory are suitable for coding faces (e.g., the proposed 3D model, a modular representation in terms of parts and their relations, is not well-suited for faces, which are inherently non-modular and which all share the same basic parts in the same basic arrangement). Nevertheless Bruce shows that some aspects of Marr's theory may provide clues about how faces are visually coded. For instance, failure to address the question of how 2D image patterns relate to 3D surface properties, an important goal of perception noted by Marr, may have limited much of the work on recognition of faces as patterns (see Chapter 3). Marr also notes that physical constraints can be used by the viewer to make sense of images of that world. Bruce suggests that the fact that faces grow on heads (which results in the interdependence of parts due to constraints imposed by global growth transformations) may be one such physical constraint that perceivers might exploit when recognising faces. Furthermore, she argues that faces are unlikely to be coded as lists of independent parts and that future research

should be directed to discovering relevant global properties, patterns of redundancy and interdependence of face "parts", and the algorithms by which such information is extracted.

This book provides a rich, stimulating and well-written introduction to research on face recognition. Both theoretical (how are faces mentally coded in memory? how is information about a person accessed?) and practical issues (e.g., eyewitness identification, face recall systems and computer recognition of faces) receive careful attention, thereby giving the book broad appeal. Not only does Bruce provide an excellent account of progress to date, but also previews what looks like being an exciting future.

James E. Maddux, Cal D. Stoltenberg, and Robert Rosenwein (Eds.)
Social Processes in Clinical and Counseling Psychology.

New York: Springer-Verlag, 1987.

Pp. 205.

Reviewed by Wendy Drewery

This is a timely and useful book. In fourteen chapters, written by a variety of authors, the editors explicitly address the gap between clinical and counseling psychology, and social psychological theory, and begin to explore ways in which practitioners might make immediate and effective use of research findings from social psychology. The introductory chapter sets out quite clearly the book's "orienting assumptions", so that those who wish to dissent from the book's general intentions can save themselves further time and effort. For example, the editors' first orienting assumption is that "clinical and counseling psychology can be viewed as areas of applied social psychology". Nothing problematic or new about that, you may say, and in-

deed, it is true that many of us who regard ourselves as practitioners, would assert the importance of maintaining our awareness of current research and its application to our field. But do we? I think the editors are right when they say "Despite these good intentions, the true scientist-practitioner is a rare breed".

I particularly like the second chapter by Richard McGlynn on "Research Issues at the Social, Clinical, and Counseling Psychology Interface". This addresses some of the epistemological and methodological issues which (often unconsciously) beset students of counseling and psychology. It is a clearly written chapter, bringing a number of points together in a way which students will find helpful.

The chapter by Sharon S. Brehm on "Social Support and Clinical Practice" maintains the clarity of the previous chapter, and provides a very useful review of aspects of the literature on social support, with some clear indications of its applicability for practitioners. Other chapters deal with such topics as interpersonal change processes, counselor supervision, counseling and persuasion, self-efficacy theory, depression, self-handicapping, self-perception theory, rehabilitation, and couple attributions. A number of chapters make use of cognitive-behavioural concepts. Of these, the chapter on the Elaboration Likelihood Model seemed least attractive. This may simply reflect my own preferences, which are for ideas which contribute to a greater understanding of relationships between various strands of the discipline which we know as psychology. This seems to me to be an urgent task, if psychology is not to spin off in a vast number of ever-decreasing circles, mostly of dubious relevance. I think this book contributes to that understanding, whilst at the same time providing practical help for practitioners.