

PHYSIOLOGICAL PSYCHOLOGY

John Blundell

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JOHN BLUNDELL

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Editor's Introduction

Physiological psychology can appear rather intimidating to the newcomer. However, John Blundell's main purpose is to demonstrate how physiological and psychological systems are intimately related. He discusses the old controversy regarding the extent to which psychological functions are localized in the brain, and motivation and learning from a physiological point of view. Of particular value are the case histories of research into particular areas (e.g. hunger) and the practical applications of the knowledge obtained (e.g. the treatment of obesity).

This book belongs to Unit A of *Essential Psychology*. What unifies the titles in this unit is the notion of the human being as a processor of information. Like a computer we can register information, code it, perform operations on the coded version, store the result, and subsequently retrieve it. Moreover, like a computer, we can use our output, or behaviour, as feedback or evidence by which to monitor our subsequent performance. The authors in Unit A are more concerned with making generalizations about people than with exploring their individual differences. Further, they deal with personal mental processes rather than with interpersonal social processes. They also probably place more stress on the traditional scientific experiment as a source of evidence than do most of the authors of the other units. However, the computer analogy may not be suitable for handling other situations, where there is no immediate sensory experience or no easily identifiable

consequent behaviour. And some psychologists also feel that it detracts from the concept of the individual as a person who can consciously act upon and control his environment. The reader will find other general conceptual frameworks in other units. Psychology is struggling to do justice to the complexities of its subject matter; it is hardly likely to find any single analogy to encompass the richness of human behaviour and experience. Coming to terms with a variety of explanatory frameworks may decrease our confidence in psychology as a mature science; but perhaps it is best that we should be honest about what we don't know.

Essential Psychology as a whole is designed to reflect the changing structure and function of psychology. The authors are both academics and professionals, and their aim has been to introduce the most important concepts in their areas to beginning students. They have tried to do so clearly, but have not attempted to conceal the fact that concepts that now appear central to their work may soon be peripheral. In other words, they have presented psychology as a developing set of views of man, not as a body of received truth. Readers are not intended to study the whole series in order to 'master the basics'. Rather, since different people may wish to use different theoretical frameworks for their own purposes, the series has been designed so that each title stands on its own. But it is possible that if the reader has read no psychology before he will enjoy individual books more if he has read the introductions (A1, B1, etc.) to the units to which they belong. Readers of the units concerned with applications of psychology (E, F) may benefit from reading all the introductions.

A word about references in the text to the work of other writers – e.g. 'Smith, 1974'. These occur where the author feels he must acknowledge (by name) an important concept or some crucial evidence. The book or article referred to will be listed in the references (which double as Name index) at the back of the book. The reader is invited to consult these sources if he wishes to explore topics further. A list of general further reading is also to be found at the back of this book.

We hope you enjoy psychology.

Peter Herriot

I

What is Physiological Psychology?

'Perhaps no branch of the science is so exclusive as physiological psychology; for here one must be specialized and no halfway house will do.' This was how Roback described the field in his *History of American Psychology* (1952), and for research workers in physiological psychology the statement remains, for the most part, as true today as it was then. However, some qualification of such a forthright comment seems appropriate for developments which have taken place during the last twenty years have generated a number of telling and diverse consequences. On the one hand, a massive increase in technical skills, in knowledge concerning the design of apparatus, and in the sophistication of instrumentation has produced tools of the trade capable of a high degree of precision and resolution. These improvements, together with advances in knowledge in physiology, neurology, biochemistry and allied sciences, have led to a situation in which physiological psychologists are working within rapidly expanding frontiers of knowledge and accordingly their investigations have become highly specialized to take advantage of these new findings. In this way ongoing research in physiological psychology has remained a scholarly enclave within which workers have more in common with other biological scientists than they do with their fellow psychologists. On the other hand, some of the discoveries which have been brought to light by physiological psychological research have been so dramatic that the vibrations have been felt through the entire psychological world. Investigations showing that electrical stimulation

of certain brain areas is pleasurable, that it is possible to exert a degree of conscious control over one's brain, and that male and female brains may be quite different, have all contributed to a revision of psychological beliefs about the way people operate. In addition, the obvious dynamism which provides the impetus for research in physiological psychology spills over into other spheres and generates both energy and discourse, sometimes in the form of antagonism designed to refute the biological point of view.

The biological approach

It seems therefore that Roback's comment must be updated for in the 1970s physiological psychology, though it harbours a number of esoteric research fields, is far from being an exclusive preserve of the boffin and contributes a definite theme to all areas of psychological thought and theorizing. In the formidable task of understanding why human beings function as they do, physiological psychology contributes a body of knowledge and provides a general theme which attempts to comprehend human behaviour from a biological point of view. In this sense physiological psychology is a club which anyone can join and the biological approach to psychological problems should be used whenever it seems useful and appropriate. This may appear to be a fairly casual attitude to adopt but with the present state of knowledge and with the current rate of change of ideas, this is a time to be open-minded rather than doctrinaire. Moreover, it must be remembered that physiological psychologists are a heterogeneous bunch of thinkers, and while the radicals will invariably espouse a strong argument of biological determinism whenever an explanation for behaviour is sought, the moderates will attempt to interweave the biological approach with other explanatory systems.

The task of physiological psychology

In his textbook (1943), Clifford Morgan defined the task as 'the study of the relation between the organism's physiological processes and its behaviour; or, since behaviour is the outcome of physiological events... physiological psychology is the study of *physiological mechanisms of behaviour*.' This uncompromising view was partly engendered by the resources

accessible at the time, for although a number of techniques were available for looking at the effect of physiology upon behaviour, methods for investigating the effect of behaviour upon physiology were in a primitive state of development. Today the framework of physiological psychology is broader and study within the field is aimed at an elucidation of the *inter-relationships* between physiology and behaviour. It is worth adding that the term physiology implies all 'under the skin' phenomena including events occurring in the brain together with changes in hormone systems and other body chemistry, while behaviour refers to mental events such as thinking and feeling states in addition to physical action. Moreover, since it is not sufficient to study physiology and infer behavioural consequences nor to investigate behaviour while supposing physiological concomitants, the special role of the physiological psychologist must be the study of physiology and behaviour *conjointly*.

Principle of interaction

It is clear that the simultaneous study and appreciation of events in physiology and behaviour need not necessarily be troubled by philosophical arguments underlying this relationship, and it is equally apparent that many people happily accept such a relation between behaviour and physiology without considering that there is a philosophical issue to be resolved. Many would argue that this is a very healthy attitude to adopt. However it is worth remembering that the intimate relationship between events taking place under the skin and events occurring in the psychological realm of behaviour and mind presupposes some sort of translation process. When confronted with the formidable task of describing the mode of this translation some psychologists have abrogated responsibility for the job and, in turning to other explanatory systems, have denied the validity of using physiological psychology to understand what makes people tick (Bannister, 1967). It is neither logically necessary nor practically useful to adopt this nihilistic position. But we must accept that the nature of the interface between what we refer to as physiological happenings and behavioural or mental phenomena may be difficult to identify, and in certain cases may be virtually impossible even to envisage.

Emergence of physiological psychology

Although modern psychology has flourished only for seventy years or so, two distinct movements each known by the label physiological psychology have arisen during this period. Since these disciplines have little in common it is important to distinguish between them. Today it seems quite paradoxical that the late nineteenth century school of Structuralism with its emphasis on the painstaking analysis of perceptions into sensory elements using the method of introspection should be termed physiological psychology. Yet the reason is not hard to find for the *Physiologische Psychologie* which originated with Wundt in Leipzig and was subsequently carried to America by his students grew directly out of German physiology and philosophical psychology and hence the new movement was given the name of its parents.

Modern physiological psychology is an American innovation growing out of an emergent psychology of the early twentieth century. Within this expanding scheme of knowledge and ideas, the single most decisive influence was generated by the impact of Darwin's evolutionary thesis upon the new experimental study of the mind which had originated in Germany and had begun to permeate America. Darwin's radical ideas were based on the principles of natural selection and the struggle for survival, and incorporated the themes of variation among individuals, continuity both within and between species, and above all the functional aspect of structures and abilities. These ideas were taken up by the youthful pioneering spirit of American psychology free from the inertia of a philosophical tradition of its own. Of special importance was the effect of evolutionary ideas in expanding psychology from a narrow front concerned with the analytical study of the adult human mind to a multifaceted discipline incorporating the study of behavioural and mental operations in both animals and humans. Of course this transformation was not an instantaneous happening; in fact the process of assimilation and change took more than thirty years, but it was crucially important for physiological psychology that work on animals became a legitimate aspect of the psychologist's approach since many of the experimental techniques essential for physiological psychological investigations obviously could not be contemplated with human subjects.