19 The Psychophysiology of Schizophrenia

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Psychophysiology

Psychophysiology is probably best defined by contrasting it with physiological psychology. This latter sub-discipline is concerned with the alteration of physiological status and examination of the resultant changes in behaviour. Consequently, because of the need for surgical intervention this area of work is normally undertaken with animals as subjects or exceptionally on patients with accidental injury.

In contrast, psychophysiological techniques employ largely non-invasive measures of physiological status and examine them in relation to deliberately manipulated psychological states or states which have become changed as a result of some naturally occurring process or disease condition.

It is not surprising, therefore, that one of the areas in which psychophysiological techniques have had large usage has been in psychiatry or abnormal psychology.

It has been convenient to loosely divide the areas of psychophysiology into those largely using measures of ‘central’ activity—namely, EEG and its derivatives such as event-related potentials—and measures of ‘peripheral’ activity—mainly of autonomic function. These latter include cardiovascular activity in the form of measures of heart rate, vasomotor tone or blood pressure, electrodermal activity measured as skin conductance or skin potential, or activity of the pupil measured photographically or by televisual means. Not all peripheral measures are concerned with autonomic function and other important measures are EMG and eye movement measured by electro-oculographic techniques.

The ‘central—peripheral’ division is not a good reflection of the state of knowledge of brain function. While EEG measures probably reflect cortical processes in general, peripheral measures, used correctly, do more than reflect peripheral activity and may be useful measures of sub-cortical function.

The Use of Psychophysiological Techniques in Psychiatry

It is important before presenting the results of psychophysiological investigations in this area to examine the aims and intentions of the work.

In the past it is probable that investigations have used psychophysiological
techniques to answer such questions as 'Is this group of patients more aroused than normal?' In a sense what has been sought is an additional description to add to the psychiatric description, in the same way as one might ask for a blood sample to be taken and analysed and the results added to the general body of descriptive data on the patient.

The anomaly, however, is that it is at the present time extremely rare for a psychophysiological description of a patient ever to be used in a diagnostic or prognostic sense where functional disorders are concerned. Of course, clinical EEG techniques are used where the main aim is to eliminate the presence of focal or diffuse organic pathology but it would be fairly rare for a routine EEG measurement to be taken from a patient otherwise diagnosed as almost certainly schizophrenic, and even more rare for a measure of his electrodermal activity to be considered to be of diagnostic value.

To some extent, therefore, psychophysiological techniques are more realistically considered as research tools. If this is so, then it is essential that the physiological mechanisms underlying the measurements be understood and the measures be used as more than mere descriptors. Because of this the interaction of psychophysiology and physiological psychology becomes important, and the investigation, using suitable animal models, of the mechanisms controlling peripherally measured variables is a sine qua non for the interpretation of psychophysiological data. This latter type of data is unfortunately fairly rare and appropriate new work may only be stimulated by the process of the psychophysiologist raising in his work points of interest which the physiologist may think worthwhile to investigate.

Another area where some mutually beneficial interaction has taken place but where more is needed is that of psychopharmacology. In the psychophysiological investigation of many psychiatric conditions the fact that the patients are medicated has a major influence on the measurements taken and the need for data in this area is a paramount necessity.

Earlier it was stated that psychophysiological techniques were rarely used for diagnostic purposes. This is true at least in part because of lack of adequate normative data and base rates of incidence of abnormal responses. Psychophysiological techniques have developed markedly over the past ten or twenty years and controversies over systems of measurement have diminished. There is thus a possibility that over the next decade data will be produced which will enable some norms to be established against which abnormalities of function may be recognised.

**Areas of Work on the Psychophysiology of Schizophrenia**

It is obvious that the major area of investigation has been with adult schizophrenics, and this largely with hospitalised patients. Almost all research papers have given lip service to the need for careful sub-diagnosis of the patients to be investigated. The development over the past ten or so years of