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HABITUATION OF SKIN CONDUCTANCE RESPONSES IN PATIENTS WITH ANXIETY STATES

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SUMMARY

Habituation of the GSR responses obtained from a group of 20 patients sufferings from anxiety states was compared with a group of 20 matched normals, selected for lack of anxiety. Habituation parameter did differentiate the two groups very distinctly, where very fast habituation was noted in the normals. Findings were interpreted in terms of the level of arousal of the patients/subjects tested.

Though a number of reported findings concerning Skin Conductance (SC) response patterns in different psychiatric patients in general, and anxious neurotics in particular, are available at the moment, there is no general agreement as yet regarding any changes from normals which are present. Earlier works were mainly concerned with methodological considerations of the nature of SC and it's psychological significance. There was hardly any physiological interpretation of the data obtained. Considerations of space, and scope of the present paper preclude all but a brief review of SC response patterns in patients with anxiety states. For a detailed review the reader is referred to Martin & Sroufe (1970) and Lader & Marks (1971).

SC response has got very many characteristics (Chattopadhyay *et al.*, 1975), viz., latency, recovery time, level of SC and it's response habituation (GSR) etc., of which the present article is concerned with the latter two. By the term 'habituation' is meant failure to respond to successive redundant stimuli (Thompson & Spencer, 1966).

Malmo & Shagass (1949), Lader & Wing (1966) and Lader (1967) reported that SC was higher in anxious patients than in normal subjects. Howe (1958), on the contrary, reported lower than normal SC in anxious patients. In a previous study using diagnostic sub-classification of depressed patients, viz., 'agitated' and 'retarded', Roy & Chattopadhyay (1980) have found that the trend of GSR habituation was quite different in these two groups. But such a distinct trend was almost completely vanished when the two groups of patients were merged together under a general heading of 'depression'.

The purpose of the present study was (*a*) to examine the level of SC and the nature of it's response habituation in a group of patients suffering from anxiety states, when compared with a group of matched 'normal' subjects, and (*b*) to determine whether the parameter of habituation enables a direct discrimination to be made between the aforesaid two groups of individuals.

METHODS

Subjects :

Twenty patients (12 male) suffering from an anxiety state, mean age 26.75 years, having had their first attack of illness and free from any organic pathology were selected randomly. In all the patients free floating anxiety was a primary symptom, and depression, if present was entirely secondary to the disabilities caused by anxiety. They were drug 'free' at the time of testing and the mean duration of their illness was 9 months.

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Twenty post-graduate students (12 male) mean age, 24.40 years were selected to match the patients for age, sex and socio-economic level. They were free from any psychiatric and neurological complaints since childhood. These volunteers were all selected for lack of anxiety.

MATERIAL

Multichannel Recorder (Polyrite, Inco, Chandigarh, India) with it's accessories, specificaiton of the electrodes used and it's contact medium have already been detailed elsewhere (Chattopadhyay *et al.*, 1975). A visual stimulus of 9.05×10^5 candles/mtr^2 intensity (Chattopadhyay, 1976) was used. A stimulus marker was used to mark the onset of each stimulus on the recording chart.

Experimental conditions and procedure:

Each patient was thoroughly examined by a psychiatrist. Subsequently a check on the psychiatrist's diagnosis was done with the Multi Phasic Questionnaire (MPQ) (Murthy, 1965), administered by a psychologist in a double blind arrangement. When the diagnostic opinion was in conformity with that of the diagnostic impression obtained on the test that patient was selected. For the selection of the controls as well, the same procedure was followed as applied for the patients.

Then the patient was taken for SC recording following the procedure described previously (Chattopadhyay *et al.*, 1975). To sum up, each patient/subject was asked to lay down on a bed in the experimental room. External noise was controlled as far as practicable. Using double-element lead electrodes SC was recorded for 10 minutes in resting condition which was followed by a stimulation period consisting of 20 light flashes each of 10 μ sec duration. The inter stimulus interval varied randomly from 45-80 sec with a mean of 1 minute (Chattopadhyay *et al.*, 1980). The polyrite paper speed was 1 minute/sec. When a subject attained the criterion of habituation (3 successive uncalculable responses) (Lader & Wing, 1966) recording was stopped and in case of non-habituations, the recording continued until the 20th stimulus.

Intra and Inter group comparisons of the data were made applying 't'-test and linear regression equations with regard to SC and GSR habituation respectively. In calculating regression equation, the third zero response was taken as the end of the response sequence (Lader & Wing, 1966).

Analysis of tracing :

The clear and typical responses commencing within 6 sec (Lader & Wing, 1966) following the start of stimulus were calculated. The resistance values at the onset and lowest point of each responses were read off the polyrite tracing. Each of these values was converted to conductance, and the response quantified as the difference between these two readings (Chattopadhyay, 1976).

RESULTS

Since sex differences with regard to either of the variables were no where statistically significant, in the final analyses both the sexes were pooled together.

The mean scores obtained and standard deviations on the 'anxiety' and 'depression' scales of MPQ were 12.50 ± 2.94 and 5.50 ± 1.74 respectively for the patients and 3.8 ± 1.24 and 5.00 ± 1.48 for the normal subjects.

The patient group showed significant difference ($t=6.30$, $p<0.01$) between scores obtained on the anxiety and depression scales. This finding suggests that free-floating anxiety was predominent in them. But for the normals anxiety and depression loading was of the same degree, and both these were far below the cutting points (Murthy, 1965) to be considered pathological.

Further analysis revealed significant group mean difference ($t=8.44$, $p<0.01$) in anxiety scale only. This result indicates that the patients possessed significantly high level of anxiety than the normals.

Significantly higher ($t=5.517$, $p<0.01$) level of SC was evident in patients (mean= log 1.230 micromhos, SD=log 0.117 micromhos) than the normals (mean=log 0.921 micromhos, SD=log 0.166 micromhos), which indicates higher arousal in the former than the latter.

In Fig. 1 are plotted the mean GSRs for the patient and normal group as ordinate against the logarithm of stimulus number as abcissa. The equation for the mean regression lines are shown in Fig. 1.

Normals habituated on 8th stimulus whilst for the patients even 20th stimulus was not sufficient to reach the criterion of habituation (Fig. 1.).

The slopes of the habituation lines were −0.034 for the patients and −0.011 for the normals. The difference between these two values was highly significant ($F=50.45$, $p<0.001$).

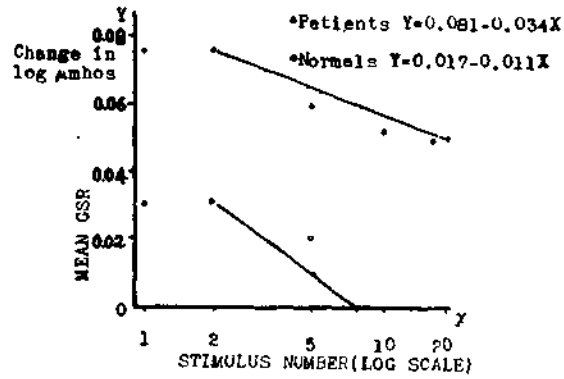

Fig. 1. Regression lines of means GSRs of the two groups on log stimulus number.

DISCUSSION

SC is a function of sweat gland and the secretion of the sweat is mediated autonomically (Noble & Lader, 1971), hence higher SC in the patients of the present study presumably shows that anxious patients are autonomically more aroused than normals. In general, SC is reported to be higher in anxious patients than normals, and thus, our present findings confirm many other previous studies (Lader & Wing, 1966; Chattopadhyay *et al.*, 1980; Edelberg, 1970).

As far as the GSR habituation was concerned, a definite arousal effect was evident. Highly aroused individuals (i.e., patients) showed much slower response decrement over time (less habituation) than the less anxious subjects (normals) (Fig. 1). Similar findings of response decrement in successive stimulation in anxious patients have been reported by others (Lader & Wing, 1966 ; Chattopadhyay, 1976). But the present findings were somewhat contrary to those reported by Hart (1974) who failed to differentiate anxious patients from normal subjects in their response habituation. However, what is evident in the present study is that, impairment of response habituation is related to the level of anxiety an individual has had at a given moment. Similar impaired habituation due to anxiety has been reported for other measures as well, e.g., blood pressure (Malmo *et al.*, 1951), electroencephalogram (Chattopadhyay *et al.*, 1980a).

A plausible interpretation of the present findings would be in terms of Lader-Wing hypothesis that high levels of arousal retard, and can possibly reverse habituation. Also the present findings reveal that the parameter of habituation enables a direct discrimination to be made between patients suffering from anxiety states and normal subjects. In order to verify whether habituation paradigm, likewise, could discriminate between other diagnostic groups of psychiatric patients requires further studies.

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