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Fear Reactions in Patients Receiving Electroshock Treatment and the Law of Initial Value

B. J. BOLIN, PH.D.* | Lexington, Ky

INTRODUCTION

Fear of electroshock therapy among persons who have undergone such treatment has long been considered universal or nearly so (1-3). Such fear is often described as intense even by patients who have received EST during drug-induced sleep after having had medication to reduce their fear while awaiting treatment (4, 5). I have heard a great many patients describe EST as one of the most fearsome experiences of their lives.

As a standard fear stimulus, and being applied in circumscribed conditions, the treatment provides a rare opportunity for study of stress and other reactions associated with strong fear. Qualitative examination of the patients' own oppressive feelings while awaiting EST should, in itself, be well worth the trouble.

Normal and Schizophrenic Reaction-Patterns in Fear and Stress

It is an accepted fact that strong fear or anxiety often affects realms of experience and functions far removed from the original stimulus. Dynamic psychologic theories assert that strong anxiety, especially when it is prolonged, is likely to be displaced in various ways to realms of experience that have no apparent connection with the real origin of the emotion. Lightening the burden upon the organism, the freudian "mental economy" is one function of the automatic regulatory mechanism underlying such shift. "Somatization" is one of the commonest manifestations of displacement or "spread" of anxiety. Theoretically, at least, the common psychologic stress-reducing functions operate more effectively in the intact person than in the schizophrenic. One should expect fewer indications of somatization and other shift or displacement in schizophrenics than in non-schizophrenics exposed to strong fear stimuli.

Traditionally, the state of fear has been regarded as one in which pulse

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This work was done while the author was Chief of Psychology Service, Central Hospital, Louisville, Ky.

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rate and blood pressure, at least the systolic pressure, rise in marked degree. Accumulating experimental evidence, while short of providing full confirmation, has in general lent strong support to the traditional assumption. Tong and Murphy (6) conclude from a wide selection of significant studies that applied laboratory work probably should be guided by a schema much as the one given in Table I.

TABLE I

Laboratory measures:	Anger	Fear
Blood pressure	mild increases in systolic and diastolic pressure	marked increases in systolic pressure
Pulse rate	lowered	raised
Autonomic activity	parasympathetic ascendancy	sympathetic ascendancy
Adrenals	release of noradrenaline	release of adrenaline

Moreover, a person's reaction to a threatening situation depends in large measure on his conception of it—that is, whether he feels defeated or not (6, 8).

It is commonly agreed that healthy persons and schizophrenic patients respond in different ways if subjected to stressors (alarming stimuli) under seemingly identical conditions. Furthermore, the reactions of healthy persons to the impact of distressing stimuli differ from those of persons who are already under stress—for example, under the stress of psychosomatic disorders. Fischer and Agnew (9, 10) take such different responses as the starting point for their concept of a "hierarchy of stressors" (which they present as an effort to describe the very same phenomena as those Wilder's Law [LIV] is concerned with [11]).

Levitt, *et al.* (12) measured the plasma hydrocortisone concentration in 27 healthy subjects before and during hypnotically induced anxiety. In accordance with Wilder's Law (13, 14), subjects whose initial hormone levels were low tended to respond to the anxiety suggestion with a rise in hormone level, whereas subjects whose levels were high tended to react with little or negative response. The correlation (r) between the initial hormone level and the change in level was minus .66, with a confidence level in excess of .01. Large increases in the subjects' feelings of anxiety after the anxiety suggestion reflected in a variety of common "scales" and clinical devices.

Schizophrenics fail to react normally to a variety of physiologic stressors—for example, extremes of temperature, thyroxine, insulin, and pituitary hormones (15). Lucy (16) observes that "the tolerance of some of the

Receiving Electroshock I Value

J. BOLIN, P.H.D.* | Lexington, Ky.

persons who have undergone such a procedure or nearly so (1-3). Such fear reactions who have received EST during a procedure to reduce their fear while under a great many patients describe the changes in their lives.

When applied in circumscribed conditions, the opportunity for study of stress and other factors. Qualitative examination of the patient's reaction to EST should, in itself, be well

Patterns in Fear and Stress

or anxiety often affects realms of experience different from the original stimulus. Dynamic changes in the original stimulus, especially when it is prolonged, affect realms of experience that have no direct relationship to the emotion. Lightening the load on the "mental economy" is one function underlying such shift. "Somatization" of displacement or "spread" of the emotion. Common psychologic stress-reducing mechanisms are intact in the schizophrenic patient, as well as in non-schizophrenics exposed to stressors.

is regarded as one in which pulse rate, blood pressure, and other physiological factors are measured. Central Research Center, Frankfurt, Ky.; Consultant in Psychology; address: 627 West Fourth St., Lexington, Ky.

Chief of Psychology Service, Central Research Center, Frankfurt, Ky.

[schizophrenic] patients for a substance as toxic as histamine can only be described as 'staggering.' Wilder (17) describes abnormal reaction of schizophrenics to atropine.

The reactions of schizophrenics to psychologic stressors are perhaps less well documented than are their reactions to physiologic ones, but their tendency to underreact is common knowledge.

The results reported by Williams (18) in his well-known experimental study are consistent with those reported by various other observers. He presented his "early chronic"† schizophrenic patients with three psychologic stress situations: (1) A three-minute motion picture entitled *Killing the Killer* (selected from a large number of films previewed for stress reaction), a film showing a close-up death struggle between a cobra and a mongoose; (2) The Rapaport-Shafer word-association list (which contains many emotionally toned items), presented with the instructions that the purpose was "to look for personal problems in you"; (3) Serial subtraction by 7 (from 100), aloud.

Measuring respiration and pulse rates and galvanic skin responses, Williams found that reaction-tendencies of the schizophrenic patients differed noticeably and often statistically significantly from those of his normal controls. His schizophrenic subjects had a greater than normal background physiologic activity level at rest, with a tendency for the high level to continue during psychologic stress. The patients showed less variability than normals in physiologic background level, under varied and changing conditions. The patients showed less arousal than normal subjects in personal and interpersonal stress situations and less physiologic recovery than the normal subjects.

Wilder's Law of Initial Value (LIV)

The Law claims: The extent and the direction of a response of any function of the organism to any standard stimulus during a standard period of time depends to a very large extent upon the pre-experimental initial (or basal) level of that function. The higher the initial level, the smaller the effect of a function-raising and the larger the effect of a function-lowering stimulus. Beyond a certain medium range of initial values, the effect of stimuli is a reversal, the paradoxical reaction (13, 14).

The reactions of schizophrenic patients to alarming stimuli, indeed to emotional stimuli in general, are diminished, owing in part to the fact that these patients are already under stress, a condition of the schizophrenic process during at least a part of its course. An apathetic attitude or withdrawal

† Criteria: In the hospital one to three years, with little or no response to treatment. Agreement among three qualified psychiatrists and psychologists regarding the diagnosis of schizophrenia.

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drawal from reality might be plausible as an explanation for the failure of
schizophrenic patients to react normally to emotional stress-stimuli. But it
is not quite sufficient to account for their failure to react normally, physio-
logically and psychologically, to various physiologic stressors (15). A plaus-
ible explanation for their under-responsiveness lies in the LIV. Wilder (14)
takes pains to show how the principle holds in the psychologic as well as in
the physiologic realm.

If the response-patterns of active schizophrenics in stressful conditions
generally conform to the LIV, their reactions to stress-reducing measures
should also reflect Wilder's principle.

Lesse's observations (11) in several studies indicate that this is indeed so.
For example, he found, in general, that the patients whose anxiety was
initially highest responded well to chlorpromazine, whereas those with low
initial anxiety ratings attained the least satisfactory improvement ratings
during the treatment. Only four per cent of 66 schizophrenic patients with
low or no anxiety at the outset showed excellent or good improvement. In
striking contrast, 34 per cent of 133 patients rated initially as severely or very
severely anxious reached an improvement rating of excellent or very good.
Intravenous injection of chlorpromazine ameliorated wild panic reactions in
90 per cent of 61 very disturbed patients, but was of no avail in eight patients
who showed few or no anxiety signs at the outset.

Lesse observed 43 markedly anxious schizophrenics during what might be
considered extreme stress: craniotomies lasting from one and a half to three
hours, under local anesthesia in all but four cases. Seven of these patients,
who for various reasons had received small intravenous doses of secobarbital
sodium, showed a paradoxical increase in anxiety. Given amphetamines,
they became calmer. Several of the patients who had a history of uncon-
trolled catatonic excitement withstood the psychosurgery in a state of relative
calm. The fact that 79 per cent of the patients required only local anesthesia
is in itself paradoxical.

Experimental Procedure

Hypothesis. The general hypothesis was that psychologic (emotional)
and physiologic measurements of autonomic activity taken on schizophrenics
in a relatively nonstressful and in a stressful situation (for example, while
awaiting EST), would differ from each other in accordance with the LIV.

It is assumed that the level of general autonomic activity is heightened
in most schizophrenics and almost invariably so in the patients chosen for
EST. Chronic patients with clinical signs of limited capacity for affective
response, that is, with the clinical picture of "deterioration flatness," are very
frequently chosen for the treatment.

Changes in blood pressure are taken as a fair index of autonomic activity.
The fact that schizophrenics have a tendency toward below-normal blood

pressure does not destroy the significance of their blood pressure changes or changes in autonomic activity. It is the direction and amount of change that are important.

The more specific hypotheses were these: (1) On a fear-symptom scale the scores of the subject would be comparatively high in both the "neutral" and the "fear-stress" conditions; (2) The blood pressures in the fear-stress condition would not be markedly higher than they had been on admission, and would show a trend toward reversal (downward); (3) Patients showing the lower pulse rates at admission would tend to show the greater difference upward, and vice versa, while awaiting EST.

Subjects. The patients in the subjective fear-symptom study were 30 men and 20 women whose ages ranged from eighteen to sixty years. All were quite actively psychotic. Twenty (40%) had been admitted for the first time; 13 (26%) had been admitted for the second time; 11 (22%) had been admitted for the third time; and six (12%) had been admitted more than three times. All but four patients carried a diagnosis of schizophrenia. Of the four exceptions, three had been classified under the heading of oligophrenia with psychosis (schizophreniform). The remaining one, diagnosed as having a depressive reaction with schizoid features, had been classified in the past as schizophrenic.

The subjects in the blood pressure and pulse rate study, 46 in number, came from the above-described group of 50. It included 27 men and 19 women, whose ages ranged from 18 to 60 years, with an average age of 46.3. Forty-two had been diagnosed as having schizophrenia. The remaining four patients were the same ones described above as being non-schizophrenic at the time of the fear-stress study.

The group as a whole seemed to be in most particulars much like usual EST patients; most had active psychotic symptoms. Careful search of their records revealed that about 80 per cent of them had had EST at some time prior to the present course of treatment.

Since these subjects served in two studies at the same time, it is necessary to digress from the present one in order to outline what happened to them as subjects in the other. It was a double-blind study of the effect of meprobamate in alleviating at patients' fear of EST, reported by Mitchell (4). He found meprobamate medication to be effective in reducing the subjects' anxiety. Although the reduction was not marked, it was statistically significant.

Although the effect of the drug was not great, we could afford to go on with the present report only if evidence could be shown that the medication had not seriously altered the broad patterns of the obtained differences. Medicated and non-medicated patients showed strictly comparable average blood pressures and pulse rates at the outset and insignificant differences in

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dy.

We scheduled fear-symptom scale presentations and examined physio-
ic measurements in this study to circumvent the effects of the usual medi-
ion directly preceding EST. Statistical analysis and close inspection of
: data revealed the same major patterns in both the group receiving
probamate and in the group receiving no medication. Hence the patients
ld be treated as one group in the present investigation.

Psychologic Measurements. Initially, an experienced interviewer talked
h each patient privately and informally until rapport had been estab-
ed. The patient was then asked to give his subjective impressions con-
ning 24 feelings or sentiments commonly associated with fear and anxiety.
hould answer "None" for absence of the feeling, "Little" for slight or
d intensity, and "Much" for a troublesome degree of discomfort. The
ns had been selected from suggestions made by three experienced psychol-
ts, a thoroughly experienced nursing service employee, and a psychiatrist.
e counted as 0 points, little counted as 1 point, many counted as 2
ts. The items included: headache; dizziness; abdominal pain; fatigue;
mitus; pulsation in ears; nausea; nervousness; difficult breathing; miser-
or restless feeling; pain in eyes; smothering feeling; tremulous feeling;
or cold spells; choking feeling; need to weep; helplessness; felt danger to
; numbness; weakness; anger; sadness; dryness of mouth; sweating; and
rother complaints the patient might report. It should be mentioned that
igh degree of refinement of the scale was neither sought nor attained. An
essment of immediate feelings and sentiments was the objective.

The subjects answered the fear-symptom questionnaire privately on their
wards two to five days before the first EST application—and presump-
y before they had learned they were to have it. They received the scale
in 15 to 45 minutes before the second EST (40 patients) or the third
T application (six patients), again being interviewed in private. The
s of this timing were to ensure the patients' acquaintance with the electro-
ck experience and to avoid all but minimum EST residual effects.

In order to test roughly the fear-symptom scale itself, the answers of 52
amably well persons—registered nurses, psychiatric aides, and psychiatric
ate nurses—were recorded. The subjects answered anonymously a self-
ministering form of the inventory.

Physiologic Measurements. Readings of blood pressure and rate of
beat taken during the fear-stress period, that is, while awaiting the

I am indebted to W. A. Mitchell, M.D., whose generosity made this investi-
possible. He was responsible for the drug study (4) which included the physio-
ic data he made available to me. Moreover, his informal personal communica-
have been helpful in the preparation of this paper.

second or third EST, were compared to those taken at times presumed to be much less stressful: (1) at the physical examination on admission, done in the late afternoon or early evening, and (2) about two hours before the first EST application and before the patient had left his home ward.

We assumed that the half hour just before the second EST would be for the patient the time of greatest stress. Accordingly, we used blood pressure and pulse readings taken at that interval whenever they were available. The exceptions: in six cases the measurements were taken an hour before the third treatment, and in 12 they were done an hour, rather than half an hour, before the second treatment.

RESULTS

Fear Symptoms, Quantitative. Two-thirds of the patients had higher scores at the second testing (while awaiting EST) than at the first (in the "neutral" condition). The difference is significant to a degree exceeding the .01 level of confidence: Wilcoxon's z -value, 3.8. Although statistically significant, the difference is small in terms of average scores (Table II).

TABLE II

	Condition	Average Score (Points)	Range
Patients	Neutral	8.9	0-11
Patients	Stress (awaiting EST)	10.8	0-11
Normals	Neutral	3.0	0-11

The similarity of the patients' scores in the two conditions is emphasized by the high correlation between them: ρ , .77. Their answers imply that they were considerably less comfortable in the neutral condition than were the normal subjects. Impending EST did not increase their scores markedly. This finding brings to mind Williams's report (18) of heightened background physiologic activity in schizophrenics in a non-stress condition and their less-than-normal response in certain psychologic stress conditions. Explanation by way of the LIV is plausible in his study and in ours.

Fear Symptoms, Qualitative. In the neutral condition, the patient's most frequent complaint was that of fatigue (29 cases). Internal nervousness took second place (28 cases), while numbness, miserable or restless feeling, and weakness tied for third place (26 cases).

In the fear-stress condition, dryness of mouth was first in terms of frequency (28 cases), with miserable or restless feeling in second place and numbness in third place (26 and 25 cases, respectively). Close behind were nervousness, tremulousness, and weakness, which were reported by 24 patients.

In terms of points on the fear-symptom scale (intensity), patients' most frequent complaint was miserable or restless feeling in first place in both the neutral and stress conditions (45 points each). They described the intensity of internal nervousness

those taken at times presumed to be during examination on admission, done about two hours before the first EST, left his home ward.

before the second EST would be. Accordingly, we used blood pressure measurement whenever they were available. Measurements were taken an hour before EST, done an hour, rather than half

two-thirds of the patients had higher scores (on the EST) than at the first (intensity) significant to a degree exceeding a *t*-value, 3.8. Although statistically significant, the average scores (Table II).

Average Score (Points)	Reaction
8.9	0-2
10.8	0-3
3.0	0-1

in the two conditions is emphasized. The mean score was 10.77. Their answers imply that in the neutral condition than in the stress condition. They did not increase their scores markedly. The report (18) of heightened blood pressure in a non-stress condition during a certain psychologic stress condition is similar to his study and in ours.

In the neutral condition, the patients reported fatigue (29 cases). Internal nervousness, numbness, miserable or restless feeling (18 cases).

Helpless feeling was first in terms of intensity in second place and fatigue (intensity) in third place. Close behind were symptoms which were reported by 24 patients on the symptom scale (intensity), patients in both the neutral and stress conditions. The intensity of internal nervousness

was about the same in the two conditions: 38 in the neutral, 36 in the stress condition. Helpless feeling, in fourth position in the neutral condition, moved up to second place in the stress condition—that is, from 28 points to 38 points.

In terms of increase in intensity during the fear-stress period, tremulousness and awareness of pulsation in the ears tied for first place. Increase in numbness of mouth, in some cases partially attributable to atropine, was in second place. Increase in feeling of danger to life and in helpless feeling tied for third place, by 10 points in each instance.

The three largest decreases in points were in fatigue, sweating, and pain in the eyes—by seven, five, and four points, respectively.

The greater frequency of sadness compared to anger is noteworthy. In the neutral condition, 18 patients reported sadness and four anger. Awaiting EST, 25 said they felt sad, and seven said they felt angry. Thus their answers on the fear-symptom scale correspond to the prevalent impression that many EST patients feel more or less defeated.

As had been predicted, the bulk of the patients' complaints referred to feelings that generally are taken as representative of the more basic, rather than derived, anxiety-fear symptoms: fatigue; internal nervousness; miserable or restless feeling; tremulousness; helpless feeling; weakness; sadness. This emphasis holds in both the non-stress and the fear-stress conditions. The patients complained far less of physical discomfort such as headache, dizziness, tinnitus, nausea, dyspnea, flushing, numbness, and sweating. Dryness of mouth is the one physical complaint they mentioned almost as often as they did such things as internal nervousness or misery. Thus, basic internal fear-anxiety symptoms strongly prevailed over somatic or ideational symptoms, according to the patients' own reports.

RESULTS OF PHYSIOLOGIC MEASUREMENTS

The patterns of changes in blood pressure and rate of heart beat are regarded the greater amount of importance in this paper. Therefore, it is not possible to comment upon the (nonparametric) methods of statistical analysis. Differences between each patient's own reactions (blood pressure and pulse rate) in two different conditions are the starting point and the place where a reaction of change may become readily apparent by inspection. The methods require no particular assumptions about the form of distribution.

Quite contrary to what is expected in normal persons, the subjects had lower blood pressures in the low-stress or neutral condition than in the high-stress condition. Readings were on the whole significantly lower within the hour preceding the second or (in a few cases) the third EST than they were after the admission examination or in the early morning (7 to 8 A.M.) of the day of the first treatment.

Systolic Blood Pressure. The average pressures on admission and at two hours before the first EST were 132.3 and 117.7 mm Hg, respectively. While awaiting EST, generally half an hour before the second application, the average pressure was 116.6 mm Hg. With a z -value of 4.9 for the (ranked) differences between the systolic pressures at admission and while awaiting the second EST, the level of confidence exceeds by far the .01 level. The systolic pressures in the early morning on the day of the first EST were also significantly higher than those recorded while patients awaited the second treatment. The z -value is 2.52, with a z of 2.58 being required for the .01 level of confidence.

While awaiting EST, only five patients had systolic pressures exceeding by 10 or more points the level recorded on admission. In contrast, 21 patients had pressures that were lower by 10 or more points than the level first recorded.

Lowered pressure was greatest among patients whose systolic pressure at admission exceeded the median (127.3 mm Hg). Eighteen of the patients with pressures above the median showed downward differences, and sufficiently so to reach statistical significance in excess of the .01 level of confidence (sign test, from Tate and Clelland [19]). Twelve patients in the lower half of the range showed negative (downward) statistically insignificant differences. The patterning of these differences is in accord with the LIV.

Diastolic Blood Pressure. The direction of the differences was the same as that for systolic blood pressure. Eighteen patients had a diastolic pressure 10 or more points below the admission level as they awaited EST to be given half an hour later. In only four of the eight patients showing a higher reading while awaiting EST than at admission was the difference 10 points or more. Diastolic pressures were significantly lower in the stress condition than at the post-admission examination; the confidence level exceeds .01.

Pulse Rate. The average rate of heart beat per minute was 89.0 on admission, 94.4 at a point two hours before the first EST, and 104.3 at the 30-minute or 60-minute interval before the second (or third) EST. There was a steady upward trend in rate from one condition to the next. The absence of dramatic reversal in direction, of paradoxical reaction and failure to accelerate in the face of added stress might at first pass for lack of evidence of the LIV in these particular measurements. Before inconsistency can be assumed, however, one must remember that the Law applies to each single function separately. For example: "While a high blood pressure and slow pulse may go up at the same time in response to one and the same stimulus." There need not be any paradoxical or other dramatic changes at all. The essence of the Law is this: The higher the initial level, the smaller the effect of a function-raising, the bigger the effect of a function-depressing stimulus (14).

The pulse rate, patients' increased rate while awaiting the second EST (rise) in

There was a rise in the first EST and in the difference between the two waiting periods being required.

The physiological convention of the EST blood pressure one hour before the application of the fear-stimulus.

Using 16 mm Hg as the measure of the difference, just before the application of the stimulus, the same

showed a higher level of physical excitement in the patients than the statistical significance of the difference.

There was a rise in the pulse rate, two EST treatments and other factors cannot be studied in the schedule (20).

Some of the patients who did not show a rise in pulse rate observed a general variability in the pulse rate.

who had received no medication had no observations to present in the present study.

The level for the minimum.

ge pressures on admission and at 1 hour before the second application of EST. With a z -value of 4.9 for the difference in systolic pressures at admission and while awaiting the second EST, the confidence exceeds by far the .01 level. The difference in pulse rates on the day of the first EST was also significant, with a z of 2.58 being required for .01 level.

Patients had systolic pressures exceeding 127.3 mm Hg on admission. In contrast, 21 patients had a decrease of 10 or more points than the level before admission.

Among patients whose systolic pressure was 127.3 mm Hg or higher on admission, 18 showed downward differences, a difference in excess of the .01 level (Clelland [19]). Twelve patients showed negative (downward) statistically significant differences in excess of the .01 level.

The direction of the differences was the same. Eighteen patients had a diastolic pressure on admission that was higher than the level as they awaited EST. Of the eight patients showing a high systolic pressure on admission, the difference 10 points or more was significantly lower in the stress condition; the confidence level exceeds .01.

The heart beat per minute was 89.0 on admission before the first EST, and 104.3 at 1 hour before the second (or third) EST. The difference from one condition to the next was significant, of paradoxical reaction and increased stress might at first pass for lack of similar measurements. Before inconsistent results, remember that the Law applies to all functions. Example: "While a high blood pressure is the same time in response to one and the same stimulus, there may be any paradoxical or other dramatic reaction." The Law is this: The higher the initial level of a function, the bigger the effect of a function.

The pulse rate patterns in this study conform to the LIV in that, in general, patients who had rates below the median (87.5) on admission showed increased rates, and to a very highly significant degree collectively, while awaiting the second EST. Consistent with the same principle, the difference (rise) in those above the median was of no statistical significance.

There was a significant difference between pulse rates two hours before the first EST and those taken while awaiting the second EST. It was smaller than the difference between the reading on admission and that while patients were awaiting EST, but is statistically highly significant: z -value, 11.2, with 2.58 being required for .01 level.

The physiologic measurements examined in this study were taken before the conventional drug injection given the patients directly before administration of the EST. Such timing circumvented immediate effects of these drugs. Blood pressure was measured just before the atropine injection, given half an hour before the EST, in order to avoid contamination of the patterns by atropine-induced changes (4, 21). Some of the patients, however, did complete the fear-symptom scale after having received atropine.

Using 16 more EST patients, taken consecutively, we replicated the procedures used in the larger study to record blood pressure changes. In each case measurements of pressure were made half an hour prior to the treatment, just before the injection of atropine. The pattern of differences is exactly the same as that observed in the 46 original subjects. Only three showed a higher systolic pressure 30 minutes before the second EST than at the physical examination on admission. The average difference was 16.7 points in the patients who changed in the opposite direction (downward). Statistical significance of the difference between the two readings is a little better than the .05 level.

There was no way of avoiding possible residual effects of one or, in a few cases, two EST applications, given two or more days earlier, upon the physiologic and other measurements analyzed in this study. A patient's fear of EST cannot be studied until he has experienced the treatment. Perrin and Schule (20) and Mitchell (4, 21), who studied aggregate reaction patterns of patients before treatments, report that the blood pressures of their subjects did not tend to fall before an EST application. Perrin and Schule observed a general trend toward increase, while Mitchell noticed general variability and inconsistency in blood pressure changes among patients who had received meprobamate and a small increase among those who had received no medication. It is to be noted that these studies use a series of observations to capture trends extending over a number of treatments. In the present study, only a few subjects had had more than the first EST of a series. The aim was to get a basal or near-basal level and a maximum level for each subject while keeping EST residual effects at the minimum.

SUMMARY

Fifty actively psychotic patients received a fear-symptom scale, and in this same group, blood pressure and pulse readings in a "non-stress" neutral condition and again while awaiting EST. In each part of the study schizophrenics accounted for all but four patients, who showed clear schizophrenic-like features.

The patients' fear-discomfort scores, while statistically significantly different in the two conditions, were remarkably alike: $\rho = .77$. Their average discomfort score in the non-stress condition was three times the average score of a group of 52 nursing service employees and students who took the scale anonymously. The failure of the schizophrenic patients to show markedly different scores in the two conditions is consistent with the claims of the LIV. Generally heightened basic levels of autonomic activity as a corollary to active schizophrenic symptoms have been reported by various observers. The reaction-patterns (changes) in the present patients support the likelihood of very similar heightening in their levels of autonomic activity—predictable abnormalities in their responses to stress. Primary anxiety-like complaints predominated over somatic and ideational symptoms, as has been predicted.

Systolic blood pressures and diastolic pressures were lower while patients awaited EST than they were at the physical examination on admission (done well after actual reception). In 65.2 per cent of the patients the systolic pressure, and in 79.2 the diastolic pressure, was lower half an hour before EST than at the physical examination. Significance of the differences exceeds the .01 level. A careful replication study of the systolic pressure on 16 more EST patients yielded differences significant beyond the .05 level. Pulse rates below the median in the neutral condition rose significantly in the stress condition whereas above-median rates did not.

Explanation of the findings by way of the LIV is offered as provisional.

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