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*I hereby recommend that the thesis prepared under my supervision by* Joe J. Carter

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*be accepted as fulfilling this part of the requirements for the degree of* Doctor of Philosophy

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# TYPES OF PERSONAL LIFE MEMORIES FORGOTTEN FOLLOWING ELECTROCONVULSIVE THERAPY

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TABLE OF CONTENTS

LIST OF TABLES

# CHAPTER I

## THE PROBLEM

Janis (20: 359-383), studying psychologic changes following electroconvulsive therapy (ECT), found "definite and consistent evidence of circumscribed amnesias" four weeks after termination of the series of electric convulsive treatments. Most of these persisted as of two and a half to three and a half months after termination of the treatments. In his control group of patients, who did not receive ECT, amnesias were so few as to be considered negligible.

Janis found some support for the hypothesis that those memories which tend to evoke guilt, lowered self-esteem, or other painful affective reactions may be less likely than others to be recalled. In addition, he found some amnesias which did not seem to fit into the above categories, but found some evidence that these also might be understood by further study of the patient's unique personality structure.

Janis answered the question of the existence of amnesias following ECT. The present research inquires into the types of memories forgotten following ECT, in terms of their affective meaning to the patient.

Numerous psychologic experiments have shown that the emotional tone or meaningfulness of memory material is related to forgetting. The present experiment is concerned with this question for the special case of the amnesias which follow the patient's receiving a series of electroconvulsive treatments.

## Definition of Terms

Experimental studies of memory have divided the total function into three phases: (1) fixation, or the original process of acquisition; (2) retention, during the period between fixation and later use; and (3) reinstatement (4:207). The latter includes recall and all other forms of revival. Recognition is considered a special form of revival.

The present research deals with retention and recall only, since fixation of the memories occurred prior to the pre-ECT memory assessment.

Memory may be operative with respect to words and facts (symbols) and with respect to motor reaction patterns such as acquired skills. The present study is confined to memory functioning related to the use of symbols.

The phrase "personal life memories" refers to incidents or events which have occurred in the course of everyday living, as distinguished from rote memory material such as nonsense syllables or specially learned didactic material.

ECT, also called electroshock therapy (EST), designates a widely used type of psychiatric treatment which involves the production of gran mal convulsions, similar to the spontaneous fits of epileptics, by passing a charge of electric current through the head.

There are other forms of electrical treatment which do not involve the production of convulsions, for example, electronarcosis; but the present study is limited to electro-convulsive therapy.

## CHAPTER II

## HISTORICAL ORIENTATION

### Memory Changes Following Electroconvulsive Therapy

In 1938 Cerletti and Bini inaugurated the electroshock treatment of the human patient, despite fears on the part of their colleagues of undesirable or tragic consequences. Experience has allayed many of these fears, but has shown that patients undergoing a series of electrically induced convulsions develop an "organic syndrome"; this includes a decline in intellectual abilities, memory impairment, and a variety of confusional symptoms. This syndrome can be observed in practically every patient, although in widely varying degrees. The most constant symptom is impairment of memory.

It has been observed generally that this "organic syndrome" disappears within ten days or two weeks following termination of the shock series.

As has been seen, Janis demonstrated that circumscribed amnesias remain after the organic syndrome subsides, and suggested that these amnesias may be related to emotional factors. There are other findings that suggest that post-ECT amnesias may be determined selectively: Flescher and Virgili, as quoted by Cerletti (5: 87-94), found that "spontaneous memory is more damaged than that of learned didactic material",

the latter material being, probably, of less affective meaning. Hoch (16: 149-62) reports that "experimental evidence (examination under sodium amytal) supports the emotional rather than the organic factor in these memory defects in artificial as well as real organic brain damage". He refers to research on memory defects following various "traumata", including ECT. Zubin (50: 602-14) found that material learned before ECT was unavailable to recall after treatment, but showed only a slight decline in recognition, as compared to the original recognition test. But loss of feeling of familiarity for the material existed. This loss of familiarity was not observed in patients not receiving treatment. These findings indicated that the memory traces survived ECT, but emerged only in recognition testing, and then with loss of feeling of familiarity.

Other evidence supports indirectly the hypothesis that post-ECT amnesias are related to affective aspects of the memories forgotten. Sherman and coworkers (42: 401-03), Zubin and Barrera (51: 596), Stone (43: 206-15), Rabin (35: 284), Stone (44: 183), Huston and Strother (19: 707-12), and Kessler (24:277-78) found no loss or even improvement in various intellectual abilities, after subsidence of the organic syndrome. There is no

clear evidence that, following the cessation of organic syndrome phenomena, the ability to fixate, retain and recall is impaired; on the contrary, there is rather clear evidence that such abilities are unimpaired or even improved. Yet amnesias occur for some pre-ECT life experiences. Why are some memories from the past forgotten when the majority of them remain recallable? Do the forgotten memories differ in affective value from those not forgotten? To try to illuminate this problem, the present research makes various classifications of these amnesias in terms of their emotional meaning, as elicited from the patient before the amnesias occur.

## Memory in General

Ebbinghaus (7), in his classical studies with nonsense syllables, formulated a curve of forgetting which indicated rapid forgetting during the first few hours after fixation, after which forgetting became progressively slower. These results showed forgetting to be a function of time; this work describes, but does not explain, the process.

Repeated experiment has shown that, other things being equal, the first, the most recent, most frequently repeated, or most intense stimuli of a series will be longer remembered than the others (32: 217). Subsequent findings have shown that the qualification,

"other things being equal" leaves room for other very cogent factors in memory functioning, especially the internal or intraorganismic. "It is now generally recognized that the most important determinants of memory are the intraorganismic needs and interests of the individual."(32: 217)

" . . . recall is not simply a revival of traces imprinted in us somewhere, nor is forgetting simply a fading of that imprint. Reproduction is rather an active production, and forgetting also fundamentally implies an active principle. ( . . .) It is implied that memory is a motivated behavior phenomenon and that emotions are motivating factors." (36: 6-8)

Some research works in support of this viewpoint are:

(1) That engrams or traces become altered with the passing of even short periods of time has been shown by Koffka (26: 423-528), Kohler (27: 219-20), Lauenstein (28: 219-20), Hollingworth (17: 220), and others, whose work shows that memory traces do not wear away with time, but change their nature by entering into functional relationships with other traces. A trace system in existence influences each new trace as it is formed.

(2) Wulf (48:221), Allport (1: 133-48), and Perkins (34: 473-90) asked subjects to reproduce designs from memory just after exposure and at various intervals

thereafter. The figures were found to undergo three sorts of changes: (a.) normalizing, or change toward resemblance of a familiar form, (b.) emphasizing, the successive exaggeration of some feature of the pattern which attracts the attention of the observer, and (c.) autonomous changes, which are determined by the nature of the figure itself, and are such processes as the smoothing out of sharp angles or the evolving of symmetry in the figure.

(3) Bills, Flanagan, and Sharp (4: 257) found a considerable increase in learning time and serious inhibition of recall for salacious and profane nonsense syllables as compared with innocuous syllables.

(4) Bartlett (3: 197-214) had subjects read short passages and then repeat them from memory at varying subsequent intervals up to six and a half years. The form and style of the first, most immediate reproduction usually persisted in succeeding reproductions, but there was a progressive tendency to simplify, to omit details, and to transform them into more familiar and convenient form. Introspective report showed that the subjects were often unaware of the condensation that was going on. He found that details are not merely worn away --- they are altered and reorganized. Bartlett wrote "Memory is primarily reconstructive and not merely reduplicative".

(5) Schilder and Curran (39: 163-87) ordered subjects to continue to repeat a story which had been read to them until they were completely exhausted and refused to go on. Many of their subjects were normal; others had memory disturbances, for example, Korsakoff's disease. They found: in the first repetition the patient not only omitted a great part of the story but for certain phrases substituted other similar ones. Words of a general meaning replaced those of a specific meaning. Instead of a rare word a more common one was used. In the second repetition words which had been omitted reappeared and words of similar meaning were added. Whole sentences reappeared, which were not repeated in the previous repetition. A mistake once made perseverated. Changes in the position of a word or of a whole sentence took place. Finally a primitive version crystallized. This preserved many of the mistakes and perseverations, which were not much changed by further repetition. It is as if the patient reached a comparatively stabilized state after a period of active elaboration and construction. "It was easy to see that we were dealing with a very active process." These findings emerged from the protocol of a normal subject. From study of the case of a woman with severe memory disturbances of an organic type, Schilder noted "the same fundamental characteristics found in the normal ( . . . ) Emotional factors continually interfere".

(6) That pride and self-esteem can motivate repression was suggested by experimentation of Rosensweig and Mason (18: 151), who arbitrarily made children individually complete half and fail to complete half of a series of simple jig-saw puzzles. In an attempt to produce anxiety for those failed, each child was told that he had "failed the test". When the series had been finished, the child was asked to recall the names of the puzzles he had tried. Although Zeigarnik (49: 224) had shown a tendency to recall more of the uncompleted tasks, in this situation the children recalled a greater per cent of the completed tasks. The fact that the discrepancy was largest for those children rated high on pride suggested that the anxiety involved in the experience of failure accounted for this discrepancy in recall. In a subsequent study with college students, Rosensweig got further confirmation for this interpretation. He presented some puzzles to one group with the explanation that he was testing their intelligence and the same puzzles to another group with the explanation that he was seeking information about the relative difficulty of the various puzzles. The former group, where pride was involved in completing the puzzles, recalled more of the completed puzzles; whereas the other group recalled more of the uncompleted puzzles.

(7) Miller (32: 253-55) surveyed fifty-one investigations (including Meltzer's review (31) ) of the relationship between P (pleasant) and U (unpleasant) items and memory for them. He emphasizes a semantic source of misapprehension: that ordinary unpleasantness is not equivalent to the psychoanalytic painfulness, the latter designating material capable of "wounding the ego", causing feelings of guilt, shame, or loss of self-esteem.

In these investigations, the thesis that P material is better remembered than U was said to be upheld by thirty-three; thirteen either did not confirm or contradicted it, and the findings of five were indeterminate. "There can be little doubt that in research showing relative lack of bias, the evidence has been strongly in favor of the beneficial effect of P feeling on memory." Miller points out that not all of these studies are applicable to the psychoanalytic concept of repression, then cites two experiments which are "significant tests of Freudian repression theory as it stands today": (a.) Koch (25: 171-90) asked students to mark ten graded quizzes in accord with their feelings about their grades. Several weeks later she asked them to remember all the grades they had received. More of the pleasant than of the unpleasant grades were remembered, and the indifferent grades were most poorly recalled. (b.) Sharp (41: 395-418) used three groups of subjects.

One learned fifteen acceptable phrases; the second, fifteen unacceptable; and the third, fifteen neutral. The acceptable phrases described acts which the case histories of 130 patients in a psychiatric clinic showed to be emotionally acceptable to them. The unacceptable and neutral materials were similarly chosen. Recall was tested two, nine, and sixteen days later. The unacceptable phrases were more poorly recalled and more difficult to relearn than the neutral. The acceptable were forgotten to a degree at the time of the first memory test, but showed enhanced recall (an actual increase in the number of items remembered) thereafter. In the long run, therefore, the acceptable phrases were better retained than the neutral.

Miller concluded: " . . . the main contribution of the psychology of the laboratory to the general question has been to show that all pleasant or unpleasant feeling --- not merely pain and pleasure in the restricted psychoanalytic sense --- has an effect upon memory".

Selected comments of the psychologist-psychiatrist, Paul Schilder (38), will help to integrate this brief sketch of factors important in remembering and forgetting:

> Almost every experience can be remembered when the present situation has an important biologic similarity or partial identity with the past situation.

Remembering is easier when the previous experience has not been too far distant in time, or when the past situation has occurred not once but many times."(p.383). " . . . the memories of situations which have occurred repeatedly are organized into a definite pattern which reappears as a unit. It is comparatively difficult and sometimes impossible to remember the single experiences which went into this pattern and to differentiate them from each other. Learning is not an isolated function. It always occurs in an individual who tries to develop attitudes which are useful ( . . . ) Schematic attitudes are developed. Learning leads to crystallizations which fit regular sequences." ( . . . ) "The psychopathology of memory and learning shows the same basic problems. Amnestic gaps occur if one desires to evade a specific situation. The tendency to run away continues in the attitude toward memory material." " . . . turning away from experience may occur in very different layers." ( . . . ) "The many small events which we forget in the course of our everyday life are very often of no significance and we turn away from them. This is ( . . . ) superficial turning away. In repression, we forget because the event has an importance in our life which we do not want to acknowledge. Deeper problems of the personality are involved here." "( . . . ) After head injuries, retroactive amnesia may occur. Here also, the individual turns away from a part of his experiences. However, personal problems have very little to do with this attitude."

(Schilder opens the topic of memory defect of the Korsakoff patient) "Many investigations have made it probable that this memory material is not actually lost. It is there, but it cannot be used. It is less available than so-called unconscious material. We deal here with another type of organic repression. Psychological motives for this forgetting cannot be found, although it is obvious that the character of the material very often determines whether a specific detail is remembered or not." (p. 385)

"Memory is a dynamic process which is made up of a number of factors: (1) The interest and the tendency to revive the past experience, which arises only in connection with the present situation and with the aims of the individual; (2) the images brought forward do not constitute the remembrance but merely help in the reconstruction of the remembrance; (3) the remembrance is complete when an anticipatory scheme has

been fulfilled and the individual representations are fitted into this anticipatory scheme; (4) the final remembrance is so constituted as to form a basis for a new action." (Italics supplied) (p. 271-72)

In discussing perception, Schilder (p. 242-43) emphasizes motility, for example, eye movements and grasping movements. These occur not only as adjustmental responses to percepts, but also "enrich" perception. Motor and vegetative, for example, glandular and visceral responses are inseparably linked with perception. Perception leaves memory traces, which traces must be inseparably linked with motor and vegetative response tendencies.

Bills (4: 330-31) demonstrated that material learned under conditions of increased muscular tension is recalled with greater facility. Although other workers failed to corroborate his findings (32: 161-62) --- the difficulty is that each person may have an optimum habitual degree of tension, and that deviation from the optimum diminishes his efficiency --- they still indicate likelihood of a relationship between muscular tension and memory.

This linkage of memory traces with impulses to action is probably basic to the relationship between emotions and memory. When memories are recognized to be linked to impulses to action, motivated forgetting becomes explicable in that so-called "painful" memories

are seen to be linked to impulses to action of a type unacceptable to one's code of behavior or value system. These impulses may be menacing to security by jeopardizing self-approval and environmental acceptance.

In conclusion, it may be asked: what types of material, in terms of its affective value to the patient, are most likely to be forgotten? From this survey, the answer seems to be (1) indifferent material --- material not important to his personal value system or anticipated future needs. This is lost chiefly by retroactive inhibition; (2) "painful" material --- material unacceptable to the individual's code of behavior or value system. This is made unavailable to recall by motivated forgetting, designated by terms such as repression.

It is noted that these qualities "indifferent" and "painful" are not absolute concepts; they vary in degree and intensity.

These constructs are not new; in 1935 Bills (4: 341) wrote "Emotional reinforcement and emotional inhibition as applied to recall are commonplace doctrines of orthodox psychology". Subsequent findings have elaborated and emphasized this view.

## CHAPTER III

## DEVELOPMENT OF HYPOTHESES

As has been seen, Janis found definite and consistent evidence of circumscribed amnesias in the case of patients treated with ECT, but found a negligible incidence of amnesias in his control (non-ECT) group. Inspection of his protocols suggested to him that post-ECT amnesias do not appear to differ from other types of amnesias of both functional and organic etiology, as described by Sears: "The emotions most frequently found to have constituted the amnesic reactions (or to have been intimately associated with them) are fear, guilt, shame, disgust, sorrow, and feelings of inferiority". (40: 229)

However, Janis wrote: "But not all of the material which the ECT patients failed to recall was manifestly disturbing, or even unpleasant in character. Sometimes an apparently emotionally disturbing experience was remembered whereas a related, innocuous one was forgotten".

He continues:

> Yet the fact that there is no obvious motive for a given amnesia does not preclude the possibility that the selectivity may be determined by some subtle motivational features of the patient's personality structure. For example, one ECT patient, a twenty-two year old female schizophrenic, was able to remember in the post-treatment interview almost all of the details about a panic episode during which she had been terrified by the thought that she might be sexually

attacked by several young men who were driving her home from a dance hall. She failed to recall only the isolated event of 'phoning her mother for help when the car stopped at a cafe. Her inability to recall this single event, despite her ability to remember the other details about this highly charged episode, becomes much less inexplicable when one reads in the psychiatrist's report that a major defect in this patient's personality make-up is overdependence on the mother.

Janis' study of types of material forgotten following ECT was secondary to his major purpose of finding if amnesias persist after the organic syndrome has subsided. He did not inquire about the affective meaning to the patient of the memories elicited in the pre-ECT interview.

In the present research focus is directed specifically onto feelings related to the memory material elicited. ECT affords a unique and favorable situation for such study, in that (from Janis' findings) it is known in advance that some of the material brought out in the pre-ECT interview will undergo amnesia following ECT. Effort can be made, therefore, to try to elicit, in the pre-ECT interview, thoughts and feelings about each of the memories. In this situation, the advantage is obtaining the <u>patient's</u> expression of the meaning of each memory to him; in most investigations of amnesias the patient was studied only after the amnesia had occurred, and the decision about the specific feeling related to the forgotten

material has been subject to the criticism that it is based on the investigator's opinion rather than the patient's testimony.

The purpose of the present research is to observe possible differences of meaning to the patient of those memories which are forgotten, as compared with those remembered, following ECT.[1] A theoretical hypothesis is that there are such differences, but this is only a starting point from which must be developed working hypotheses which can be tested.

To do this, two entirely separate classifications were made of the memories elicited: (1) an "affective reactions" classification, based on the expression of feelings by the patient about each memory, and (2) an "interpersonal relationships" classification, based on the direction of movement in interpersonal relationships indicated by the content of each memory.

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[1] The phrase "meaning to a patient of a memory"implies the operational inseparability of memory functioning from the general functioning of a living person within whom memory serves to retain stimuli of the past. The content of memory is residuals of stimuli, which vary greatly in response-evoking value, depending on (1) the original emotional value, which depended on the relationship of the stimulus to the patterned memories of the past; (2) the degree of completion of appropriate response to the stimulus as a given point in time, and (3) other factors, including goals. The essence of the meaning of a memory is its actual or potential response-arousal value.

The two classificatory schemata will be presented in the chapters dealing with results.

Our working hypotheses are: (1) that, of the memories forgotten after ECT, a greater than chance proportion fall into certain of the categories of the affective reactions classification; (2) that, of the memories forgotten after ECT, a greater than chance proportion fall into certain of the categories of the interpersonal relationships classification.

# CHAPTER IV

# METHOD AND PROCEDURE

This research has aspects of the experimental, clinical, and case-study methods.

## Subjects

Thirty-five subjects (eight men, twenty-seven women) were obtained from three institutions: from Longview State Hospital, twenty-seven; from Columbus State Hospital, five; and from Cincinnati General Hospital, three.

In order to complete the research procedure with these thirty-five patients, about one hundred were interviewed. Many of these were insufficiently communicative; others were lost due to other factors: (1) some revealed that they had had prior courses of ECT, none of whom were used in this experiment; (2) some patients who were scheduled to receive ECT, and who completed the pre-ECT interview, did not get this form of therapy due to changes in treatment plans; (3) some went absent without leave after the pre-treatment interview had been completed; (4) some were transferred to distant hospitals (nearer their homes) prior to the scheduled date of the post-ECT interview; (5) some were discharged from the hospital prior to

the scheduled date of the post-ECT interview, and, on being asked, refused to cooperate with the experimenter; and (6) one patient died (not as the result of ECT) before her course of treatment had been completed.

Consequently, the sample obtained is biased; it may be described as a relatively communicative and conformant (obliging) segment of the larger group of patients who are chosen to receive ECT. This bias will not prohibit statistical handling, since direct calculation of probability was the method used --- a technique which involves no assumptions regarding the sampling distribution.

Six of the patients were diagnosed as manic-depressives, depressed phase; eleven, as involutional psychotics; and eighteen as schizophrenics. Of the schizophrenics, nine were designated paranoid; one, hebephrenic; one, catatonic; and one simplex; the other six were not subclassified.

The group average age was thirty-nine years, extending from seventeen to sixty-seven. The average number of years of school attendance ranged from one to fifteen, the average being 7.7.

Eight of the patients had had prior hospitalizations for psychiatric illness. Most (thirty two) of the patients had been in the hospital less than six

months prior to receiving their first ECT; two had been in less than a year but more than six months, and one had been in during most of the preceding nine years. In general, it seems that most of the patients had not been ill for very long at the time treatment was begun.

Twenty three of these patients had been discharged from the hospital as of June 2, 1952. One of these had been readmitted; of the thirteen still in, three were being permitted frequent visits to their homes, and may be expected to be discharged in the near future. All of the other ten have been in the hospital for at least five months since receiving their last ECT. The group was probably average in therapeutic response to this type of treatment. (23: 179-205)

## Procedure

After having been notified by the psychiatrist that the patient was to receive ECT, the experimenter administered, verbally, an interview[1] consisting of sixty questions dealing with: events leading up to hospitalization; childhood; school; familial and extra-familial interpersonal relationships; marriage; sexual relationships; children; vocational history; health, accidents, and operations; habits; avocations; hallucinatory experiences; and dreams. The interview was completed not later

[1] Appendix A.

than eight hours prior to the first treatment.

The interview was preceded by effort to build rapport by brief conversation about the patient's health, the weather, and any topic the patient chose to discuss. The sequence of the interview items was designed to facilitate rapport.

The patient's response to each item was recorded by the experimenter, in writing, as nearly verbatim as possible. Notes of expressive response, for example, flushing or agitation, were recorded also.

The experimenter inquired about the meaning to the patient of each episode[1] in the following words: "What did you think about that?", "How did you feel about that?", or "What did that mean to you?". The response to these inquiries was recorded as above.

Another interview was conducted in the period from twenty-six to thirty-two days[2] following the last treatment of the patient's ECT series. In this interview, questions were asked to assess the patient's ability to recall each episode elicited in the pre-ECT interview.

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1. An episode was considered as an incident or action sufficiently discrete and complete that inquiry about its meaning to the patient would seem reasonable to him.

2. Occasionally it was necessary to alter this interval for patients temporarily unavailable for various reasons. No patient was given the post-ECT interview sooner than twenty-four days following the last treatment of the series. Therefore the organic syndrome following ECT had definitely subsided at the time of all post- ECT interviews.

This implicative questioning gave at least two partial cues of the pre-ECT response, for example: Pre-ECT response: "I was afraid of losing my mind, so I went to see Doctor Jones, the psychiatrist". The post-ECT implicative questions were: "Before your hospitalization, did you have any serious worries about yourself?", and, if necessary: "Did you consult a doctor?".

At the beginning of the post-ECT interview, the experimenter explained that he wanted to ask the patient questions, that the questions imply or suggest certain events, that not all of the implications are true, and that the patient's task was to answer the questions as accurately as possible.

## Experimental Controls

The following factors were controlled in the manner stated:

Suggestion: Patients were kept naive as to the purpose of the experiment.

Motivation: The experimenter introduced himself, in both interviews, as a psychologist who had come in for psychologic consultation, a part of hospital procedure.

Attitudes: These are somewhatly controlled by the patient's expectation of having various medical and psychological tests and consultations in the hospital situation.

They were controlled also by the experimenter's maintaining, to the degree possible, uniformly objective, impersonal, non-evaluative attitudes during both interviews.

Practice: There was no problem of controlling practice effect, since each episode given in the pre-ECT interview received equally as much practice --- one recitation --- as each other episode.

Prejudice: In the pre-ECT interview, both memories and feelings pertaining to the memories were recorded. A possibility existed for the experimenter to bias the post-ECT assessment of memories forgotten if the feelings pertaining to the memories had been visible to him during the post-ECT interview. This possibility for bias was eliminated by having the written record of feelings pertaining to the memories not visible to the experimenter during the post-ECT interview. This was done by preparing a special guide sheet for use in the post-ECT interview; on this sheet was copied the memories only, omitting the written record of feelings pertaining to the memories. In a parallel manner, the categorization of memories was accomplished without knowing whether the memories being classified had been forgotten.

## CHAPTER V

## RESULTS: THE AFFECTIVE REACTIONS CLASSIFICATION

Fifteen hundred and seven memories were obtained from the group of thirty-five patients, an average of forty-three per patient. The range extended from thirteen (patient DS) to eighty-one (patient LC).

Of these memories, 1118 (74%) were remembered and 389 (26%) were forgotten following ECT. The breakdown of these into the various categories of the affective reactions classification is shown in Appendix B for each individual patient.

This classification consists of the following categories:

1. Guilt: strong feeling of moral disapproval or condemnation from within the self.

2. Shame: feeling of being in disgrace or dishonor, or of having committed impropriety or immodesty, especially of believing that others so regard oneself.

3. Inferiority: feeling of low status as compared with another who may be either within the self (in the memory) or in the present external environment.

4. Fear: feeling linked with harm or anticipation of harm from specific, known, environmental agents.

5. Worry: uneasy concern about a specific, known, situation or problem.

6. Anxiety: disrupting concern or fear about a vague or unknown problem or conflict, for example thoughts or impulses of which the subject is unaware or which are very poorly defined. This concern may seem to originate from a known problem, but, in this case, differs from worry

in that (a) there is reasonable doubt that the source of the concern is accurately known to the patient; (b) the concern is clearly disruptive in degree; and/or (c) there is indicated or suggested an impulse to hasty, imprecise, relatively unrefined action, for example, the patient's testimony of feeling "so worried I didn't know what to do". *

7. Disgust: strong distaste, or loathing, of that which excites nausea or deeply offends the sensibilities.

8. Anger: strong feeling tending to incite one to attack, physically or verbally, or to reject or leave, a person or entity.

9. Grief: pain from loss of, or serious threat of loss of, a valued person or entity.

10. Indifferent negative: negative feeling of low intensity, for example "not very bad". Simple disappointment.

11. Indifferent positive: positive feeling of low intensity, for example, "fair", "alright".

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* " . . . I would like to return briefly to one aspect of the theory of anxiety which has been stressed by psychologically-oriented theorists ( . . .) I have in mind the relative lack of structure of the cognitive field in anxiety, the fact that anxiety so often appears as a fear of an unknown, unstructured danger." (13: 63)

* "Fear, as a significant factor in any situation, is often unequivocal. Anxiety, on the other hand (. . .) is seldom clearly represented as such in awareness. ( . . . )

The significant pattern of situations which arouse anxiety is generally obscure; ( . . . ) and shows much less, and very much less obvious, effects of habituation.

Habituation is a function of observation and analysis, of information and understanding, of recall and foresight. While fear may impede these processes, anxiety invariably interferes with their effective application to the current situation. ( . . . ) Anxiety from its mildest to its most extreme manifestation interferes with effective alertness to the factors in the current situation that are immediately relevant to its occurrence, and thus with the refinement and precision of action related to its relief or reduction." (46: 3-4)

12. Pleasure: positive feeling, generally from gratification of need or wish.

13. Pride: high self-esteem for some real or imagined accomplishment or merit.

14. Evasion: this category was used in cases in which the patient, when interrogated concerning his feeling, evaded indicating that he had feeling about thememory, by failing to remember, silence, irrelevant response, or intellectualization which gives no evidence of any feeling he may have had.

In making the categorization, the following principles were observed:

1. The patient's expression of feeling was used as the primary source of guiding evidence.

2. Where several feelings were stated by the patient about the same event, one feeling only was scored, using the patient's sequence and emphasis as guides. Example: the patient, when requested to tell her feelings about an event, replied "Very frightened. Then angry --- extremely angry". This was scored anger rather than fear, due to the patient's greater emphasis of anger.

3. In a case in which a relatively strong emotion was verbalized as though it had broken through the personality defenses, then was retracted or modified, the strong emotion was scored, because it was probably closer to the core of meaning to the patient. For example, in the case in which the patient responded "It made me feel angry --- I mean sad", anger was scored.

4. Dreams and hallucinations involving experiences of strongly negative feeling-tone quality were classified as anxiety except where the evidence clearly indicated another scoring, that is, by conforming to the definition of a different category.

5. Undifferentiated responses of strongly negative feeling-tone quality, for example "terrible", suggested the category anxiety, especially when they were accompanied by efforts at evasion.

Forgetting of the Individual Categories

It was sought to test the hypothesis that, of the memories forgotten following ECT, a greater than chance proportion would fall into certain of the categories of this classification. In order to do this, the memories of the entire group of patients were classified into the fourteen affective reactions categories, showing the number and percent forgotten of each category. This data is shown in Table I, which shows also the significance of the difference between the proportion forgotten of each category and the proportion forgotten of all of the other categories. For example, there were 150 memories of the category, anxiety, of which thirty-five were remembered and 115 forgotten. To determine whether this proportion forgotten differs significantly from a proportion that might have been obtained due to chance fluctuation, we compare it with the proportion forgotten of all memories of all categories except anxiety.

The probability that the difference could have occurred due to chance factors alone was computed by the direct or exact calculation of probability method, as shown by Fisher (12: 106-07). The separate probabilities of each combination in the series of progressive permutations up to the end-point of the distribution were summed to give the probabilities shown in Table I (12: 106-07).

## TABLE 1

MEMORIES REMEMBERED AND FORGOTTEN FOLLOWING ECT

| Affective Reaction Category | Number Remembered | Number Forgotten | Total | Percent Forgotten | Probability of no difference from Chance |
|---|---|---|---|---|---|
| Guilt | 3 | 18 | 21 | 86 | .000 |
| Anxiety | 35 | 115 | 150 | 77 | .000 |
| Shame | 17 | 20 | 37 | 54 | .002 |
| Inferiority | 14 | 14 | 28 | 50 | .043 |
| Evasion | 65 | 45 | 110 | 41 | .010 |
| Anger | 85 | 56 | 141 | 40 | .006 |
| Disgust | 11 | 4 | 15 | 27 | .312 |
| Fear | 68 | 19 | 87 | 22 | .351 |
| Worry | 141 | 25 | 166 | 15 | .013 |
| Grief | 118 | 21 | 139 | 15 | .032 |
| Indifferent Positive | 121 | 16 | 137 | 12 | .005 |
| Pleasure | 174 | 18 | 192 | 9 | .000 |
| Indifferent Negative | 238 | 17 | 255 | 7 | .000 |
| Pride | 28 | 1 | 29 | 3 | .035 |
| Totals | 1118 | 389 | 1507 | 26 | --- |

The categories in Table 1 are arranged in descending order of proportions forgotten; thus guilt, with the greatest proportion forgotten, is at the top of the table. It is noted that a greater than average proportion of forgetting was found in disgust and all categories located above, and that less than average forgetting was found in fear and all categories located below.

## Groupings of Categories

Table 1 shows that significantly greater than chance proportions of the categories guilt, anxiety, shame, inferiority, evasion, and anger were forgotten following ECT. Since decades of psychologic research have established the tradition of grouping affective reactions into three principal headings, pleasant (P), unpleasant (U), and indifferent (I) (32: 253-55), an analysis was made of this grouping, which appears in Table 2. The significance figures given there express the probability that so great a difference between the proportions of forgetting shown for the intersecting groupings could have occurred due to chance factors only. For example, it is seen that a significantly greater proportion of unpleasant memories were forgotten, and that the difference between proportions of pleasant and indifferent memories forgotten is quite insignificant. Again, direct calculation of probability was the statistical technique used.

TABLE 2

COMPARISONS OF PROPORTIONS FORGOTTEN OF PLEASANT, UNPLEASANT, AND INDIFFERENT MEMORIES

| Affective Reaction Group | Number Remembered | Number Forgotten | Total | Percent Forgotten | Significance of difference | | |
|---|---|---|---|---|---|---|---|
| | | | | | U | P | I |
| U | 492 | 292 | 784 | 37 | | .000 | .000 |
| P | 202 | 19 | 221 | 9 | | | .323 |
| I | 359 | 33 | 392 | 8 | | | |

The pleasant group consists of categories pleasure and pride.

The unpleasant group consists of categories guilt, shame, inferiority, fear, worry, anxiety, disgust, anger, and grief.

The indifferent group consists of categories indifferent positive and indifferent negative.

Several other questions present themselves. From Table 1, it is seen that grief is forgotten less than the average of all categories, but more than the indifferent and the pleasant categories. The question arises, is grief forgotten to a significantly greater degree than are indifferent and pleasant memories? From Table 3, it is seen that it is, although the significance level is not very far from the .05 borderline. This table shows also that the difference between the proportions forgotten of indifferent and of pleasant memories is not significant.

Range and Pattern of Forgetting of Individual Patients

The percents forgotten by individual patients ranged from 02 to 58, with a mean (and mode) of 26 percent. The distribution was multimodal, with high average variation from the mean.

Comparison of the degree to which the pattern of forgetting of the affective reaction categories by the individual resembles the pattern of forgetting by the group was accomplished by inspection of Appendix A, which gives the individual data, and Table 1, which gives the group data. From this inspection, it appears that fourteen patients show fairly large deviations from the group pattern. All of these fourteen patients were highly deviant in degree of total forgetting, seven having forgotten more than the

TABLE 3

COMPARISONS OF PROPORTIONS FORGOTTEN OF GRIEF, INDIFFERENT, AND PLEASANT MEMORIES

| Affective Reaction Category | Number Remembered | Number Forgotten | Total | Percent Forgotten | Significance of Difference | | |
|---|---|---|---|---|---|---|---|
| | | | | | Grief | Pleas-ure | Indif-ferent |
| Grief | 118 | 21 | 139 | 15 | | .047 | .026 |
| Pleasure | 202 | 19 | 221 | 9 | | | .323 |
| Indifferent | 359 | 33 | 392 | 8 | | | |

The indifferent group consists of categories indifferent positive and indifferent negative.

The pleasant group consists of categories pleasure and pride.

average of the group, and seven less.[1] (For convenience, the former will be called the "high-forgetting" subgroup, and the latter, the "low-forgetting" subgroup.) Each of the remaining twenty-one patients, who comprise the "average-forgetting" subgroup, shows a pattern of differential forgetting essentially similar to that of the total group. Thus, individuals most like the total group in degree of forgetting seem also to be most like the total group in pattern of forgetting.

What comprised the divergences from the group pattern of the fourteen "deviating" patients? To answer this question, use will be made of a special concept, the significantly forgotten categories, which refers to those categories of memories which were forgotten to a significantly greater than chance degree by the group. These were shame, inferiority, anxiety, anger, evasion, and guilt.

The divergences of the "high-forgetting" subgroup most frequently consist of unusually large proportions forgotten of the non-significantly forgotten categories; divergences of the "low-forgetting" subgroup most frequently consist of unusually small proportions forgotten of the significantly forgotten categories. In other words,

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[1] Patients AA, GB, MC, GC, RG, HK, RK, CL, LP, CS, MS, VT, RV, and BW.

the patients who forgot relatively many "overforgot" types of memories usually forgotten little, while the patients who forgot relatively few "underforgot" types of memories which were usually forgotten much.

The divergences of pattern of even the "deviating" subgroup are not great. Only two patients showed divergences in more than two categories.

In short, individuals vary much in amount of forgetting following ECT, but vary little in their patterns of differential forgetting of the various categories.

It is emphasized that the analysis of patterns of individual patients is based on the inspectional method, that many of the preceding statements in this subsection are partially based on small numbers, and that other eductions were omitted because they were based on even smaller numbers. Consequently, the statements of this subsection must be considered to be suggestive rather than conclusive.

## CHAPTER VI

## RESULTS: MISCELLANEOUS FACTORS

In this chapter three factors will be reported on: (1) number and type of treatments; (2) sex of patient; and (3) the diagnostic category of the patient. Since these are by-products of the current research, and since, in the nature of the research, these factors were not subject to experimental manipulation, our findings in this section must be considered suggestive rather than conclusive, except where otherwise indicated.

### Number and Type of Treatments[1] Received by the Patients

Three clearly defined subgroups of patients were found: (1) those who had relatively few (average 7.6) ECT; (2) those who had relatively many (average 16.8) ECT; and (3) those who had BST[2] (average 16.8). These three subgroups were of nearly equal size, consisting of eleven, eleven, and thirteen patients, respectively. The numbers and percents forgotten are shown in Table 4, which shows also the apparent level of significance of the difference between proportions forgotten by these three subgroups. This level is

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[1] Although patients were gotten from three different hospitals, essentially the same type of electrical treatments was given to all patients who received ECT. BST was given only at Longview State Hospital. A description of the treatments is given in Appendix C.

[2] Brief stimulus therapy, a variant form of ECT, which, like ECT, produces a gran mal convulsion. See Appendix C for details.

TABLE 4

COMPARISONS OF PROPORTIONS OF MEMORIES FORGOTTEN BY THE "MANY-ECT", "FEW-ECT", AND BST SUBGROUPS

| Treatment Subgroup | Number Remembered | Number Forgotten | Total | Percent Forgotten | Apparent Significance of Difference | | |
|---|---|---|---|---|---|---|---|
| | | | | | Many-ECT | BST | Few-ECT |
| Many-ECT | 308 | 174 | 482 | 36 | | .000 | .000 |
| BST | 480 | 129 | 609 | 21 | | | .209 |
| Few-ECT | 330 | 86 | 416 | 21 | | | |

designated apparent to avoid the possible misinterpretation that the difference is absolutely or finally proven. Direct calculation of probability was the statistical technique used.

The data suggest that the "many-ECT" subgroup forgot a greater proportion of memories than the "few-ECT" subgroup and the BST subgroup. As will be seen, however, there may be a sex difference in forgetting following ECT, men forgetting less than women. When men are omitted from the analysis, the relationships suggested above (that the "many-ECT" subgroup forgets more than the other two subgroups and that there is no difference in proportions forgotten by the "few-ECT" and BST subgroups) hold true; these relationships do not, however, hold true for the exclusively male subgroup. Since women gave seventy-eight percent of the total number of memories, it seems likely that the preceding relationship between number of treatments and amount of forgetting holds true, since the data from the male subgroup may be unimportant because based on small numbers, and therefore is subject to unreliability. The data for the male subgroup is not so discrepant as to suggest that a different relationship may be characteristic of men.

## Sex Differences

The twenty-seven women patients gave 1175 memories, an average of forty-three and a half per woman. The eight

men gave 332 memories, averaging forty-one and a half per man. Women forgot thirty percent of the memories given by them, as compared with thirteen percent for the men. This difference was found to be highly significant, but it is possible that the difference might have been related to the number and type of treatments received by the different sexes. Further analysis showed that the men of each of the three treatment subgroups ("many-ECT, few-ECT", and BST) forgot significantly smaller proportions than the women of each of the respective treatment subgroups. Again, direct probability was the method used; the significance levels were .000, .002, and .029 for the many-ECT, few-ECT, and BST subgroups, respectively. This consistency makes it probable that men forget less following ECT than women, but, since the number of men patients was small, this finding should be considered to be tentative, pending further research.

Inspection shows that the distributions of memories among the affective reactions categories was very similar for men and for women. The women yielded slightly greater proportions of anxiety and slightly smaller proportions of indifferent negative.

The patterns of forgetting were generally similar for men and for women, the latter forgetting somewhat larger proportions of inferiority and of anxiety and somewhat

smaller proportions of indifferent positive.

Diagnostic Categories of Patients

The diagnoses accepted by the hospital staff were used. The patients fell into three categories: (1) schizophrenics, eighteen cases; (2) involutional psychotics, eleven cases; and (3) manic-depressive psychotics, including non-involutional depressed patients, six cases. A comparison of their degree of forgetting is shown in Table 5. Apparently, a significantly smaller proportion is forgotten by the involutional psychotics than by the schizophrenics, or the manic-depressives. However, the level of significance is unimpressive except in the case of the difference between the manic-depressives and the involutionals. In this case, the number of patients in the manic-depressive group is small, increasing the chance that the difference could be due to chance fluctuation. Furthermore, a disproportionately great (three obtained where two were expected) proportion of the manic-depressive group belong to the "many-ECT" subgroup, by which a large proportion were forgotten. It seems doubtful that there is a significant difference in proportions forgotten by the three diagnostic category groups of patients.

TABLE 5

COMPARISONS OF PROPORTIONS OF MEMORIES FORGOTTEN
BY DIAGNOSTIC CATEGORY SUBGROUPS OF PATIENTS

| Diagnostic Category | Number Remembered | Number Forgotten | Total | Percent Forgotten | Apparent Significance of Difference | | |
|---|---|---|---|---|---|---|---|
| | | | | | M-D* | Schiz** | Involut.*** |
| M-D* | 182 | 77 | 259 | 30 | | .269 | .008 |
| Schiz.** | 621 | 229 | 850 | 27 | | | .042 |
| Involut.*** | 315 | 83 | 398 | 21 | | | |

* Manic-depressives (see text).
** Schizophrenics.
*** Involutional psychotics.

## CHAPTER VII

## RESULTS: THE INTERPERSONAL RELATIONSHIPS CLASSIFICATION

This is entirely separate from the affective reactions classification. The two schemata are based, usually, but not always, on the same units of the material, for example, an episode which involves several affective reactions may comprise but one interpersonal movement.

The interpersonal relationships classification consists of the following:

1. Memories of relationships with others involving or implying movement of the patient in the direction of:

    a. Dependence.
    b. Independence (including loss of dependence).
    c. Aggression (including hostility).

2. Memories of relationships with the self[1] involving movement of the patient in the direction of:

    a. Dependence: acts and feelings of self-reliance which are self-serving and/or self-harmonious.

    b. Independence: acts not willed, but performed under inner compulsion felt to be alien to self-directive functioning; involuntary neglect of self, for example, loss of appetite; feeling of loss of self-control, for example "losing my mind"; feeling of loss of ability to direct one's own behavior.

    c. Aggression (including hostility).

3. Memories of relationships with entities[2] and phenomena not included in (1) and (2) above involving movement of the patient in the direction of:

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[1] Self: the portion of the personality subjectively experienced to have volition, conscious control and direction of one's own organism.

[2] For example, with institutions, such as a hospital or an employing corporation when there is no specifically personal involvement.

a. Dependence.
b. Independence (including loss of dependence).
c. Aggression (including hostility).

In making the categorization, the following principles were observed:

1. This classification includes memories involving actions by the patient which brought about the particular movement in interpersonal relationships*. It does not include interpersonal movement totally unrelated to the patient's action or provocation.

2. The classification is based primarily on the relative interpersonal movement protrayed in the memory, and only secondarily on the feeling expressed. The latter becomes important only when the former is unclear.

3. The classification is made, to as great a degree as possible, from the subjective point of view of the patient. For example, a patient (CG) hallucinated a deceased sister on whom the patient was dependent, materially and emotionally; this was scored 1 a, not 2 a, although from an objective point of view the gratification came from within the self. Example number two: this patient hallucinated lights shining, with expressed feeling "very frightened, I can't express it"; this was scored 3 c --- hostility, the evidence being the feeling of inexpressible fright.

4. While delusions of being persecuted are not usually scored (unless there is evidence that the patient provoked the alleged persecution), hallucinatory material, including dreams, is nearly always scored because whatever action is involved therein is "brought about by the patient".

Twelve hundred seventy three memories of this classification were elicited. Of these, 933 (73%) were remembered and 340 (27%) were forgotten following ECT.

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* The interpersonal movement may be brought about in two ways:
1. Directly, by the patient's action, or
2. Indirectly, by the patient's provoking or inciting the action of the other person or entity.

In order to test the hypothesis of differential forgetting of the several categories, a procedure similar to that for the affective reactions classification was followed, yielding the following results: Memories of relationships with others involving or implying movement of the patient in the direction of independence or in the direction of aggression are forgotten to a significantly greater than chance degree; which is also true of memories of relationship with the self involving movement of the patient in the direction of independence. Remembered to a significantly greater than chance degree are memories of relationships with others, with the self, and with external, impersonal entities and phenomena, involving movement of the patient in the direction of dependence. Memories involving expression of hostility toward the self, and memories involving movement of the patient in the direction of independence, and in the direction of aggression toward external, impersonal entities --- none of these three categories is remembered or forgotten to a significantly greater than chance degree.

## CHAPTER VIII

## RESULTS: THE "RECENT-REMOTE" CLASSIFICATION

This is a classification of the memories into categories based on the age of the memory as of the time of the pre-ECT interview. The 1507 memory units of the affective reactions classification were used.

Memories were classified as remote if they were older than one year; recent, if one or less old. One year was chosen because it probably includes the majority of memories of events during the "incubation time" of the mental illness. Furthermore it subdivided the total number of memories into nearly equal parts; forty-three percent of the memories were recent, fifty-seven, remote.

Of the recent memories, thirty-seven percent were forgotten; of the remote, only twenty percent. The difference between proportions forgotten is very significant.

# CHAPTER IX

# DISCUSSION

## The Affective Reactions Classification

The proportion of all memories forgotten, twenty-six percent, is similar to the analagous figure cited by Janis and Astrachan (21: 501-11), thirty percent. It is emphasized that in the present research, the patient was given very ample opportunity to recall the events being tested for in the post-ECT interview. As a check on the genuineness of the amnesias, the experimenter sometimes, exploring, confronted the patient with the entire memory and asked if he remembered it. The amnesias were found to remain even under such procedure. The forgetting is genuine, and exists as of thirty days subsequent to the last ECT given the patient.

"Most clinical observers claim that within two to three weeks after the last convulsion, the patients show no deficit in their ability to recall past experiences" (20: 360). The apparent contradiction between this statement and the preceding evidence probably has its roots in several sources: (1) that busy hospital staff members may not be sufficiently well acquainted with the patients to discern their forgetting of personal life experiences; (2) that the comments of patients about having forgotten past happenings

may be discounted as "neurotic" complaints; (3) that relatives, out of social discretion, fail to mention their observations; and (4) that patients themselves, out of anxiety, may minimize the amounts they have forgotten.

The experimenter observed frequently, disinterest (although sometimes interest was real, frequently it was superficial) in the patient's attitude toward recalling the past. For example, one patient (a paranoid schizophrenic) said, in a conversation with the author a few days after her post-ECT interview "The eye part was especially difficult to recall because it was directly associated with the dreams and the mental telepathy conversations and the odd things that had happened to me, and those were the things I'd tried hardest to push out of my mind". Experimenter asked why. The patient replied "If such things can upset me so that I have to come to such a concentration camp as Longview, a hell, then I don't want to remember --- not till I get again so I can laugh at 'em". This clear statement is the exception rather than the rule. It shows more than disinterest; it shows almost voluntary intent not to remember. The latter sentence of her quotation is important in pointing up the temporary nature of these amnesias, suggesting that, when and if time decreases the painfulness of the forgotten memories sufficiently, they may again emerge into awareness. Long-term follow-up studies will

be needed to answer completely the question of permanency of these amnesias. Janis found that most of them persisted as of two and a half to three and a half months after termination of the treatments.

Differential forgetting of the various categories.--Sears' conclusion that material most often forgotten involves guilt, shame, and feelings of inferiority is in agreement with the present research findings, but not his listing of fear and disgust, which were here forgotten only to an average extent. It is probable that he included in his fear category material which would have been included in category anxiety in this study.

Fromm-Reichmann (9: 83) emphasizes cultural standards as determiners of type of material repressed, giving special weight in modern Western culture to feelings of hostility. This agrees with our finding that anger and guilt (which frequently implies underlying anger) are significantly forgotten.

From the historical introduction, it was concluded that indifferent material is highly subject to amnesia, yet the indifferent categories were significantly remembered. Could it be that the memories of the latter categories are not so indifferent, and that the fact that they were given in the pre-ECT interview implies at least a hidden significance, such as being associatively related to pleasant memories?

In general, the present research shows unpleasant memories to be forgotten frequently, while indifferent and pleasant memories are forgotten seldom. But grief, by definition unpleasant, is remembered to a greater than chance degree. Most of the grief memories comprised the deaths of relatives, which were probably remembered because of their intensity, continuation over a long time period, and freedom from reflection of unique, individual characteristics; that is, grief is, to a greater degree than the other painful emotions, associated with uniformly realistic causation. Grief is, however, forgotten significantly more than indifferent, and pleasant,memories.

Range and pattern of forgetting of individual patients. --The high range in amounts forgotten by different patients casts doubt on the speculation that the organic brain damage wrought by ECT is responsible for forgetting. The most tenable hypothesis is stated by Mosse (33: 296-302) "The effects of electric shock therapy both immediately after ( . . .) as well as later,( . . . ) depend as much on the personality of the patient as on physical factors".

It should be mentioned, too, that patients vary in the degree to which they yield material of the significantly forgotten categories. Several of the patients who forgot least, gave few of the types of memories most forgotten. These results do not prove that relatively extensive forgetting

did not occur in the case of those patients whose forgetting percentages were low, or, more generally, in all patients who get ECT. However, it is true that a few individuals remember much of the significantly forgotten types. This may be due, in part, to the fact that the meaning of feelings are "subject to specific modifications ( . . . ) depending upon the history ( . . . ) of each personality and the respective frame of reference of interpersonal experiences" (9: 135). In general, the patients had similar patterns of types of memories forgotten.

Miscellaneous factors.--The suggestion that patients of the many-ECT group forgot more than those of the BST and few-ECT groups parallels a suggestion by Levy, Serota, and Grinker (29: 1009) that "the degree of cerebral dysfunction varies directly with the number of convulsive treatments". From the present study, the latter phrase might be changed to "with the number of treatments and the amount of electrical energy used", since BST induces a convulsion with less electrical energy than EST (See Appendix C).

The suggestion that men forget less following electric therapy than women suggests further research, particularly since there seems to be no notice of this possibility in the literature.

## The Interpersonal Relationships Classification

This classification probably has never been used before as a research schemata; consequently little is known about it.

Memories involving movement towards expressing aggression are similar to anger memories, and, like anger, were significantly forgotten. Also significantly forgotten were memories involving movement in the direction of independence of others; these usually entailed self-committed or self-provoked loss of a pre-existing interpersonal relationship, and were frequently important as precipitating factors in the illness. The last of these categories that was significantly forgotten was movement in the direction of independence of the self, which, as used here, implies loss of voluntary control of one's functioning. The latter two categories are, very roughly, equivalents of anxiety, or anger, or grief.

Gratification of dependency-strivings, whether realized in relationships with other people, other objects, or one's own functioning, were remembered significantly more than chance --- as were pleasant memories.

This classification was attempted, despite its partial similarity to the affective reactions classification because of the value ascribed to study of interpersonal relationships by the Washington-New York "school" of

psychiatry. It is derived from theory evolved by Sullivan (45) and elaborated by Sapirstein (37).

Should future research be attempted using a similar classification, it is recommended that further refinement be made, since the categories seem to be too broad to permit precise definition and application.

### The "Recent-Remote" Classification

The finding that significantly more of recent than of remote memories are forgotten is paralleled by the findings in animal research (30: 92-100), that, following electrically induced convulsions of animals, more recent habits or modes of adjustment disintegrate, permitting the animal to return to older, simpler, less "neurotic" behavior (6: 11-16).

This finding also tends to parallel Jost's law (47: 58): If two associations are now of equal strength but of different ages, the older one will lose strength more slowly with the further passage of time.

### Some Practical Implications

Since the illnesses of most of the subjects of the present research were of apparently recent onset, the fact that more recent than remote memories were forgotten must be at least an auxiliary factor in maintaining the remission or "cure" of the illness. This statement is based on the currently held assumption that mental illness is precipitated

by life events (14: 69).

Another at least auxiliary factor in maintaining the therapeutic effect of ECT is, as hypothesized by Janis, the removal from the patient's active awareness of disturbing memories which interfere with his ability to function well in current situations. The present research has shown that disproportionately great proportions of memories involving guilt, anxiety, shame, feelings of inferiority, evasion, and anger are forgotten following ECT.

An objection sometimes used against advancing amnesias as a therapeutic factor is that ECT is not very effective in schizophrenias of more than a year of duration. This objection may be met tentatively by the conception of many schizophrenias as being of early and insidious onset, so that the patient, even when partially relieved of memories of painful, recent events by ECT, would lack a healthy base of somewhat earlier behavior patterns to depend on.

## A Note of Caution

It is emphasized that these research findings do not constitute a contraindication to the generally accepted treatment, ECT. Only availability to past memories has been significantly impaired, not current ability to learn, retain,and recall. Nor do these findings disagree with the ascription of the induction of the therapeutic effect of

ECT to processes at a lower (physiologic) level of organismic functioning.

# CHAPTER X

## SUMMARY AND CONCLUSIONS

An experimental study of forgetting of personal life memories was carried out in order to test hypotheses of a differential degree of forgetting of various categories of memories. The experimental design consisted of face to face interviewing of patients, using uniformly a questionnaire dealing with the major areas of living. Approximately four weeks after each patient's last treatment, he was questioned to test his ability to remember the material given in the first interview. The amnesias found were classified and analyzed, yielding the following definite findings:

(1) Janis' finding of definite and consistent evidence of circumscribed amnesias persisting as of four weeks following the last ECT is confirmed.

(2) The hypothesis that, of the memories forgotten following ECT, a greater than chance proportion will fall into certain of the categories of the affective reactions classification, is confirmed. As assessed, a significantly greater than chance proportion of the following categories was forgotten: guilt, anxiety, shame, feelings of inferiority, evasion, and anger.

(3) The hypothesis that, of the memories forgotten following ECT, a greater than chance proportion will fall

into certain of the categories of the interpersonal relationships classification, is confirmed.

(4) Analysis of groups of categories showed that, following ECT, a significantly greater proportion was forgotten of unpleasant than of indifferent or of pleasant memories. No difference was found between proportions forgotten of indifferent and pleasant memories.

(5) Individuals differ greatly in proportions forgotten following ECT.

(6) Following ECT, a significantly greater proportion was forgotten of recent than of remote memories.

Suggestions for future research.--A number of findings in the chapters on results were designated as suggestive rather than definite. Although practical difficulties may present challenging obstacles, many of the suggestions are susceptible to experimental testing.

It is further suggested that the following hypotheses may be tested:

(1) that there is positive correlation between relative amounts of forgetting following following ECT and ratings of clinical improvement in the patient's life-adjustment.

(2) that patients who yield relatively few memories of the significantly forgotten categories in response to the

personal life memories questionnaire will show less clinical improvement than patients who yield relatively many.

(3) that patients who forget relatively few memories of the significantly forgotten categories (above) will show less clinical improvement than those who forget relatively many.

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# APPENDIX A

## INTERVIEW

1. Tell me a bit about your life during the past six months or so.
2. Tell me about the events leading up to your being here in the hospital.
3. Tell me about a few incidents or happenings of your childhood.
4. Do you remember your first day at school? Tell me about it.
5. How did you like school? Tell me a bit about it.
6. Tell me about an incident or happening that took place in school --- any you can recall.
7. Tell me a bit about what you did for recreation during your childhood.
8. Tell me about any specific happening this brings to your mind.
9. Tell me a bit about your mother. (If necessary) Was she strict? Did she have any faults?
10. Tell me about a particular happening pertaining to your mother.
11. (If mother is living) Is she well?
    (If mother is deceased) How old were you when she died? What was the cause of her death?
12. Tell me a bit about your father. (If necessary) Was he strict? Did he have any faults?
13. Tell me about a particular happening pertaining to your father.
14. (If father is living) Is he well?
    (If father is deceased) How old were you when he died? What was the cause of his death?
    If patient has foster parents or stepparents, ask same questions as for the parents, plus: How old were you when adopted (or when parent remarried)?
15. Tell me about your brothers and sisters. How did you get along with them?
16. Tell me about a particular happening pertaining to your bro--thers and sisters. Any that comes to your mind.
17. Do you remember when any of your brothers or sisters were born?
18. Are any of them dead? (If so) How old were you then? What was the cause of death?
19. Did you work at home, or outside of home, when you were a child?
20. Now that you're thinking back in the past, tell me about the earliest incident you can recall.
21. Tell me about one of the happenings of your life that made you feel the best.
22. Tell me about one of the happenings of your life that made you feel the worst.
23. How old were you when you first learned about sex? Tell me about it.

Interview, continued

24. How old were you when you first started masturbating? How did you learn about it?
25. How old were you when you had your first sex experience with another person? How did it come about?
26. Have you ever had any particularly important experiences associated with sex? For example, any ways in which you think it had an important influence on your life? For example, any frightening or surprising experiences pertaining to sex?
27. (If patient is married) How have you gotten along in general? Tell me a bit about it, please.
28. (If patient is married) Are there any persistent points of disagreement or argument?
29. Have there been problems concerning sex?
30. Have either of you had problems about thoughts and feelings in connection with other (women or men --- the opposite of the sex of the patient)?
31. (If patient is divorced) What was the cause of divorce?
32. (If patient has children) Tell me a bit about your children, please.
33. (If patient has children) What difficulties, if any, have you had with them.
34. (If patient is married) Have any children died? From what cause? How old was the child?
35. (If patient is married) Have there been miscarriages? When? What ideas, if any, did you have about what caused it?
36. (Women patients only) Would you rather have a job than take care of the home? Tell me a bit about it, please.
37. Tell me a bit about your work.
38. How do you like it?
39. What worries have you had about your work?
40. Tell me a bit about the jobs you've had in the past.
41. Tell me some specific events or happenings in connection with your work.
42. Tell me about how you usually get along with the boss.
43. Tell me a bit about how you usually get along with your friends.
44. Tell me about any instances of disloyalty on the part of friends or relatives.
45. Tell me about any split-ups or hard feelings you have experienced. What did you do?
46. Do you usually let off steam, or hold your temper? Give an example, please.
47. How is your health usually?
48. About how much do you drink, usually?
49. Have you ever had a problem with drugs you couldn't do without?
50. Tell me about any major illnesses or operations you've had.

Interview, continued

51. Tell me about any major accidents you've been in.
52. Tell me about any experiences you've had with the law or police.
53. What is your favorite recreation?
54. Tell me about any hobbies you've had.
55. Are you much interested in religion?
56. Have you ever seen a vision?
57. Have you ever heard a voice from no apparent source?
58. Tell me about any childhood dreams you can recall.
59. Tell me about any more recent dreams you can recall, especially those you dream again and again.
60. Are there any other happenings of your life you'd care to talk about?

## APPENDIX B

### RAW DATA; AFFECTIVE REACTIONS CLASSIFICATION

| Identifying Data | | | | | | Affective Reactions | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Patient | Age | Sex | Diagnosis | Treatments | | Guilt | | Shame | | Inferiority | | Fear | | Worry | | Anxiety | | Disgust | |
| | | | | | | R | F | R | F | R | F | R | F | R | F | R | F | R | F |
| CA | 50 | F | Depr. | 15 | E | 1 | 1 | 0 | 2 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 4 | 2 | 0 |
| AA | 38 | F | Invol. | 19 | B | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 8 | 5 | 1 | 1 | 8 | 0 | 0 |
| GB | 35 | M | Schiz. | 10 | E | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 5 | 0 | 6 | 0 | 0 | 0 |
| JB | 27 | M | Schiz. | 21 | B | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 3 | 0 | 0 |
| MC | 36 | M | Depr. | 7 | E | 0 | 2 | 0 | 0 | 4 | 0 | 0 | 0 | 4 | 1 | 6 | 1 | 0 | 0 |
| GC | 32 | M | Schiz. | 10 | B | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |
| EC | 27 | F | Schiz. | 17 | B | 0 | 0 | 1 | 0 | 1 | 0 | 5 | 1 | 6 | 1 | 2 | 5 | 1 | 0 |
| LC | 38 | F | Schiz. | 19 | B | 0 | 1 | 0 | 1 | 0 | 0 | 3 | 0 | 5 | 0 | 1 | 4 | 3 | 2 |
| MD | 42 | F | Depr. | 15 | E | 0 | 0 | 2 | 0 | 1 | 0 | 2 | 0 | 6 | 0 | 0 | 5 | 0 | 0 |
| ID | 45 | F | Invol. | 22 | B | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 0 | 0 | 1 | 0 | 0 |
| RG | 35 | F | Schiz. | 15 | B | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 3 | 0 | 2 | 6 | 1 | 0 |
| CG | 22 | F | Depr. | 8 | E | 1 | 2 | 1 | 1 | 1 | 0 | 3 | 0 | 9 | 1 | 0 | 2 | 0 | 0 |
| MH | 54 | F | Invol. | 15 | E | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 4 | 0 | 0 |
| CH | 42 | F | Schiz. | 14 | E | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 3 | 4 | 0 | 0 | 0 | 1 |
| AH | 41 | F | Schiz. | 15 | E | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 3 | 0 | 0 |
| MI | 43 | F | Invol. | 20 | B | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 5 | 0 | 1 | 3 | 0 | 0 |
| AJ | 29 | M | Schiz. | 15 | B | 1 | 1 | 2 | 2 | 1 | 0 | 2 | 1 | 5 | 0 | 2 | 1 | 2 | 0 |
| HK | 54 | F | Invol. | 4 | E | 0 | 0 | 2 | 0 | 0 | 0 | 3 | 0 | 11 | 0 | 3 | 1 | 0 | 0 |
| CK | 67 | F | Depr. | 13 | E | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 9 | 1 | 5 | 6 | 0 | 0 |
| RK | 17 | F | Schiz. | 14 | B | 0 | 0 | 2 | 2 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 0 |
| VK | 49 | F | Invol. | 22 | B | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 6 | 0 | 0 |
| CL | 44 | M | Depr. | 10 | E | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 5 | 1 | 0 | 2 | 0 | 0 |
| SM | 45 | F | Schiz. | 5 | E | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 4 | 0 | 0 | 2 | 0 | 0 |
| LP | 49 | M | Invol. | 9 | B | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 5 | 1 | 1 | 1 | 1 | 0 |
| MR | 41 | M | Schiz. | 21 | E | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |
| MRk | 45 | F | Depr. | 2 | E | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 1 | 0 | 0 |
| CS | 50 | F | Invol. | 15 | E | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 5 | 1 | 1 | 18 | 0 | 0 |
| DS | 43 | F | Invol. | 10 | E | 0 | 3 | 3 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| MS | 23 | F | Schiz. | 20 | E | 0 | 1 | 1 | 1 | 1 | 2 | 5 | 3 | 3 | 3 | 0 | 3 | 0 | 0 |
| RS | 38 | F | Schiz. | 15 | E | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| VT | 30 | F | Depr. | 16 | E | 0 | 1 | 0 | 2 | 0 | 3 | 4 | 2 | 3 | 5 | 0 | 6 | 1 | 1 |
| RV | 26 | F | Schiz. | 24 | E | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 1 | 0 | 0 | 5 | 0 | 0 |
| BW | 39 | F | Schiz. | 9 | E | 0 | 0 | 0 | 2 | 0 | 3 | 2 | 0 | 4 | 1 | 0 | 5 | 0 | 0 |
| SW | 20 | F | Schiz. | 9 | B | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 0 | 1 | 4 | 0 | 0 |
| NW | 57 | F | Invol. | 16 | B | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 6 | 0 | 0 | 0 | 0 | 0 |
| Totals | 39 | | | | | 3 | 18 | 17 | 20 | 14 | 14 | 68 | 19 | 141 | 25 | 35 | 115 | 11 | 4 |

(Continued)

## Raw Data; Affective Reactions Classification, continued

| Patient | Affective Reactions | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Anger | | Grief | | Ind. Neg. | | Ind. Pos. | | Pleasure | | Pride | | Evasion | | Total | |
| | R | F | R | F | R | F | R | F | R | F | R | F | R | F | R | F |
| CA | 2 | 2 | 6 | 3 | 7 | 0 | 1 | 0 | 6 | 0 | 0 | 0 | 6 | 4 | 32 | 18 |
| AA | 0 | 1 | 4 | 0 | 8 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 2 | 29 | 21 |
| GB | 7 | 0 | 1 | 0 | 8 | 0 | 4 | 1 | 7 | 0 | 1 | 0 | 0 | 1 | 46 | 2 |
| JB | 5 | 0 | 5 | 1 | 13 | 0 | 5 | 1 | 7 | 0 | 0 | 0 | 3 | 2 | 42 | 9 |
| MC | 4 | 1 | 4 | 0 | 0 | 0 | 2 | 0 | 6 | 0 | 1 | 0 | 1 | 0 | 32 | 5 |
| GC | 1 | 0 | 6 | 0 | 12 | 0 | 5 | 1 | 5 | 0 | 1 | 0 | 3 | 0 | 38 | 1 |
| EC | 1 | 0 | 9 | 2 | 6 | 0 | 6 | 0 | 4 | 1 | 0 | 0 | 3 | 0 | 45 | 10 |
| LC | 16 | 10 | 0 | 1 | 9 | 2 | 6 | 0 | 10 | 1 | 1 | 0 | 3 | 2 | 57 | 24 |
| MD | 4 | 6 | 6 | 0 | 7 | 0 | 1 | 1 | 7 | 1 | 1 | 0 | 4 | 1 | 41 | 14 |
| ID | 1 | 1 | 1 | 1 | 3 | 0 | 2 | 0 | 10 | 1 | 2 | 0 | 1 | 2 | 25 | 6 |
| RG | 12 | 0 | 1 | 0 | 14 | 0 | 6 | 0 | 6 | 0 | 4 | 0 | 7 | 0 | 58 | 8 |
| CG | 2 | 2 | 2 | 0 | 3 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 25 | 9 |
| MH | 0 | 1 | 2 | 0 | 6 | 0 | 4 | 1 | 7 | 1 | 1 | 0 | 0 | 2 | 25 | 9 |
| CH | 3 | 2 | 1 | 0 | 11 | 1 | 7 | 0 | 4 | 0 | 1 | 0 | 3 | 1 | 35 | 11 |
| AH | 0 | 2 | 1 | 1 | 8 | 0 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 17 | 7 |
| MI | 3 | 0 | 6 | 0 | 14 | 0 | 6 | 0 | 2 | 0 | 1 | 0 | 1 | 2 | 41 | 6 |
| AJ | 6 | 7 | 2 | 1 | 11 | 2 | 2 | 0 | 3 | 0 | 2 | 0 | 0 | 0 | 41 | 15 |
| HK | 1 | 0 | 2 | 0 | 6 | 0 | 7 | 0 | 8 | 0 | 0 | 0 | 2 | 0 | 45 | 1 |
| CK | 1 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 21 | 12 |
| RK | 2 | 1 | 2 | 0 | 2 | 0 | 1 | 1 | 3 | 2 | 1 | 0 | 0 | 3 | 15 | 14 |
| VK | 1 | 0 | 2 | 0 | 5 | 1 | 4 | 1 | 5 | 1 | 0 | 0 | 0 | 1 | 20 | 10 |
| CL | 2 | 0 | 6 | 0 | 3 | 0 | 1 | 0 | 3 | 0 | 1 | 0 | 4 | 0 | 26 | 3 |
| SM | 1 | 1 | 5 | 0 | 7 | 0 | 4 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 28 | 4 |
| LP | 0 | 2 | 2 | 0 | 13 | 0 | 3 | 0 | 4 | 0 | 2 | 0 | 3 | 0 | 36 | 4 |
| MR | 0 | 0 | 1 | 0 | 10 | 1 | 5 | 1 | 5 | 0 | 2 | 0 | 2 | 1 | 29 | 3 |
| MRk | 0 | 0 | 4 | 0 | 10 | 0 | 4 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 31 | 4 |
| CS | 4 | 0 | 4 | 1 | 5 | 0 | 4 | 0 | 4 | 0 | 0 | 0 | 1 | 4 | 31 | 24 |
| DS | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 6 |
| MS | 0 | 3 | 2 | 0 | 4 | 0 | 4 | 2 | 2 | 1 | 1 | 1 | 7 | 2 | 30 | 22 |
| RS | 0 | 2 | 3 | 1 | 5 | 1 | 2 | 0 | 4 | 1 | 1 | 0 | 1 | 0 | 20 | 7 |
| VT | 1 | 0 | 4 | 4 | 7 | 0 | 3 | 3 | 3 | 1 | 0 | 0 | 0 | 0 | 26 | 28 |
| RV | 0 | 2 | 3 | 3 | 1 | 4 | 4 | 3 | 8 | 5 | 1 | 0 | 2 | 6 | 22 | 31 |
| BW | 0 | 3 | 6 | 2 | 4 | 0 | 4 | 0 | 7 | 1 | 1 | 0 | 1 | 2 | 29 | 19 |
| SW | 5 | 7 | 1 | 0 | 14 | 4 | 4 | 0 | 5 | 1 | 0 | 0 | 4 | 5 | 40 | 21 |
| NW | 0 | 0 | 10 | 0 | 2 | 1 | 3 | 0 | 9 | 0 | 1 | 0 | 0 | 0 | 33 | 1 |
| Totals | 85 | 56 | 118 | 21 | 238 | 17 | 121 | 16 | 174 | 18 | 28 | 1 | 65 | 45 | 1118 | 389 |

# APPENDIX C

## DESCRIPTION OF ELECTROCONVULSIVE TREATMENTS

Offner Electronics Machines, types 731, 732, and 733 were used at Longview State Hospital, Cincinnati General Hospital and at Columbus State Hospital respectively. These machines use alternating current propogated in sine waves at the rate of fifty to sixty cycles per second using 105-125 volts.

The type of ECT given at each of the three hospitals was very similar (8, 15): "each individual treatment is given with a slow rise of current, taking two to four seconds to reach the maximum level, which is retained from five to ten seconds, then diminished slowly. The current is usually turned off from twenty to twenty-five seconds after starting. This method gives control of muscular movements, mild seizures, and minimal effects on the sensorium. Often, two or three such seizures are given at one sitting, with about one minute between administrations. This technique gives rise to the organic syndrome much less often than older, high-current, short time period techniques" (11).

The amperage used is varied to meet the individually determined needs of each patient. Most therapy is done at about 350 milliamperes.

An Offner machine is used for BST also. This apparatus produces square waves, 300 per second, sixty to 120 volts. "The average electrical energy necessary for production of the seizure is very much less than that necessary with classic sine wave currents" (10: 36-45). An advantage of this type of treatment is marked diminution, and at times, complete absence,of the confusion associated with ECT.