FOUR MEASURES OF TEMPORAL EXPERIENCE IN DEPRESSIVES, SCHIZOPHRENICS, AND NORMALS

Thesis for the Degree of M. A.
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Carole Dilling

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ABSTRACT

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by Carole Dilling

The present study was undertaken for the purpose of investigating possible differences in the temporal experience of schizophrenics, depressives, and normals. Attention was focused on three aspects of temporal experience--future time perspective ("extension" and "coherence"), time perception, and time orientation.

The experimental groups included a sample of 20 hospitalized patients with an official diagnosis of depression and a sample of 20 hospitalized patients diagnosed as schizophrenic. The normal control group was composed of 20 hospitalized patients from the medical service of a general hospital. Controls for age, educational level, and verbal IQ level were employed. A series of four tasks were individually administered to all the subjects by the author. The first task involved the subject's estimating his possible age at the occurrence of ten events. This task was employed as a measure of the "extension" of future time perspective. Later in the session each subject was asked to arrange these ten

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events in their appropriate temporal sequence. A rank correlation coefficient between the ordering of events based on the ages associated with them and the forced ordering of the events yielded a measure of the "coherence" of future time perspective. The second task involved four story-completion items. A measure of "extension" of future time perspective was derived from the subject's estimation of the duration time of action in each story. In the third task the subject was asked to estimate two intervals of time with the median duration of 14 minutes and 31 minutes in order to obtain an accuracy measure of time perception. In the final task responses to four TAT cards--2, 4, 6BM, and 7BM were obtained from each subject and rated by two judges according to emphasis on past, present, or future orientation. An interjudge reliability of .77 was obtained.

The data were analyzed by use of two non-parametric techniques (Kruskal-Wallis test and the chi-square test). The results indicated that:

(1) The depressive group, the schizophrenic group, and the normal control group differed significantly in "extension" and "coherence" of future time perspective.

(2) The depressive group and the schizophrenic group made significantly less accurate estimates of the passage of time than the normal group.

(3) The depressive group and the schizophrenic group were significantly less future-oriented than the normal group.

It was concluded that the schizophrenic process and the depressive reaction affect future time perspective, time perception, and time orientation. Concepts of temporality, therefore, appear to be pertinent to formulations of theories of personality functioning. However, further research with other nosological groups is needed before definitive theoretical propositions can be stated.

Approved _____
Committee Chairman

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By

Carole Dilling

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This work

is dedicated

to

my parents

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INTRODUCTION

The phenomena of temporal experience have stimulated an increasing amount of psychological research in recent years. The clinician's present interest in this area has developed because of its relevance to personality development and functioning, both normal and abnormal. Studies concerned with this relationship between the experience of time and psychological functioning have dealt with the following three aspects of temporal experience: (1) the concept of time perception has been utilized in the study of the human capacity to estimate, reproduce, or produce specific units of time; (2) the concept of time perspective finds its basis in the notion proposed by Lewin of "the timing and ordering of personalized events." While the theoretical interest here has concerned the projection of the self in temporal dimension--past, present, and future, the empirical data obtained have mainly considered the temporal dimension of the future; furthermore, the investigators studying this aspect of temporal experience have generally utilized measures of "extension," which refers to the amount of future time an individual can conceptualize, and "coherence," which refers to the logical order imposed on

elements of the time span by the individual; (3) time orientation and time perspective have often been used interchangeably, but for purposes of this study a slight distinction needs to be made. In this discussion time orientation is defined as the direction or orientation of the person's temporal experience, i.e., whether he is present, past, or future oriented.

While many studies have related the above aspects of temporal experience to abnormal psychological functioning, the process of depression has received little attention in these investigations; furthermore, the few accounts that are available are mainly speculative and descriptive in nature. Since the investigation of temporal experience in various nosological groups may provide valuable information for the development of theories of personality and diagnostic techniques, the present research has attempted to systematically study the future time perspective, time perception, and time orientation in patients exhibiting depressive states. Information was also obtained from another experimental group which consisted of schizophrenics and also from a normal control group. It was felt that the process of depression would have an observable effect on temporal experience that is different from the effect observed in schizophrenia and also different from the normal experience of time.

REVIEW OF THE LITERATURE

The concept of time has been considered in the literature from the philosophical (Bergson, 1910), the biological (DuNuoy, 1937), the physiological (Hoagland, 1933), the physical (Eddington, 1928), or the psychological (Fraisse, 1963) viewpoints. It is the psychological or subjective aspect of time that is of prime interest in the present research; therefore, reference to this aspect of temporal experience, especially in regard to the notions of time perception, time orientation, and future time perspective, will be considered in the following subsections. These references include discussions involving the nature of the psychological aspect of time, the relationships of temporal factors and personality development, and the consequent importance of these factors in psychopathology.

General Considerations of Psychological Time

Its Nature

Many authors have considered the general nature of the psychological aspect of time. Schilder (1936), for example, suggested the following description of temporal experience:

> Time is inside as well as outside of ourselves. Time is a perception. It is a part of the outside world, but it also is a sensation of experiences in ourselves. We organize and crystallize the perception of time into the connotation of a continuous flowing time, which we measure by clocks, and we try to apply the same measure to the time experience in ourselves, to what we may call the time sensation (p. 530).

Further suggestion of an inner or psychological aspect of time was made by Van Der Horst (1948). He referred to this aspect of time as "immanent" time (the duration of experience), and contrasted it with "transient" time (the arrangement of events by means of quantities expressable in seconds). While transient time was regarded as measurable, immanent time was hypothesized to be a quality of one's own existence and a product of experience.

Psychoanalytic writers have also recognized facets of psychological time. Their discussions have usually centered around the relationship of the time sense to the fundamental facility of the ego in its interaction with the external world of reality. Schneider (1948) maintained that it was, in fact, the rigorous demands of external timing that enforced the development of the reality principle, and thus as the ego grows the primitive processes become subservient to the perception of chronological time. Dooley (1941) likewise suggested that subjective time is a means of establishing a relation between ourselves and the world of objects. She, furthermore, assumed that since it is one of

the effective ways in which the ego maintained its contact with the outer environment, the perception of time plays an important part in the "synthetic function of the ego." A general acceptance of the above views is found in the discussion by Bonaparte (1940), where the sense of reality and the sense of time are seen as arriving simultaneously in the psychodynamic functioning of the individual.

It has been further suggested by some authors (Freud, 1950 and Schneider, 1948) that this notion of time is communicated to the ego by the Perceptual-Conscious System; for Freud, moreover, the discontinuities in the passage of impulses between the external world and the "unconscious memory systems" through the Perceptual-Conscious was, in fact, the source of the idea of psychological time.

Developmental Aspects

Consideration of the nature of psychological time has led to several accounts concerned primarily with the developmental aspects of temporal experience. These accounts, in general, have emanated either from theoretical orientations or extensive empirical investigations. The theoretical formulations are usually found in psychoanalytical sources which have emphasized phases of psychosexual development. Yates (1938), for example, stressed the importance of the oral period in the development of the concept of time; Dooley (1941) pointed to the anal period

with its toilet training program; Oberndorf (1941) maintained that a later phase of development--the origin of the super-ego and ideals and conscience--is the important one. The empirical studies, on the other hand, have generally concluded that temporal experience is a gradually developing human characteristic which comes into use in a relatively uniform sequence from child to child. The investigations relating directly to the notions of time perception, future time perspective, or time orientation will be considered in some detail below; however, for a more comprehensive review of the empirical accounts, it is suggested that the reader refer to Wallace and Rabin (1960).

Smythe and Goldstone (1957) in a study regarding the normative development of time perception found that estimates of one second are extremely variable among younger children but that this variability decreases gradually until the age of 14 when the estimates obtained are similar to those of adults. Moreover, six- and seven-year-olds did not appear to learn from specific time information, whereas the judgment of one second by older children, eight to 14 years of age, did improve following knowledge of such information.

Lovell and Slater's (1960) findings also suggested that the ability to estimate "interior time" (duration of action in which the person is involved) increases with age. Furthermore, in this study both "empty" time intervals (the subject sits unoccupied) and "filled" time intervals (the

subject looks at a picture book) were employed, and it was found that the youngest children tended to think that the empty intervals were longer than the filled intervals.

Other authors have been primarily concerned with the developmental aspect of time orientation and time perspective. An analysis of data from direct observations and questionnaires led Ames (1946) to suggest that the child lives predominantly in the present between the age of 18 to 24 months; then by the age of three the child begins to utilize the concepts of past and future, placing greater emphasis on the future than on the past. Bromberg (1938), on the other hand, maintained that such a developmental sequence occurred late in childhood and stressed that the child needs only the present; however, he also suggested a predominance of future over the past . . . "There is no obvious need for a past when there is a present. The immediate future can be understood as standing in a dim relationship to the present, being a possible repetition of it, but the past is finished and nothing can be expected of it" (p. 143).

A somewhat different set of results was reported in a study by Friedman (1943-1944). Having asked 697 children to decide whether each of twelve events occurred a long time ago, a short time ago, a short time to come, and a long time to come, he concluded:

> There is not so much logic in the child's thinking concerning the future as in his thinking concerning the past. The child lives in the present and his experiences have occurred in the past. Building up a perspective about the future requires more development (p. 340).

In an investigation concerning the time perspectives of eight-year-old children, Eson (1951) also concluded that the child is primarily concerned with the present. This author further maintained that the child's consideration of the past is limited to experiences he has had and whose consequences are still pending and that the child's consideration of the future is found only when anticipation of certain events has been stimulated. In another investigation Eson utilized seven groups of subjects between the age of 10 to 65 in order to test the hypothesis that time perspective increases in the direction of both past and future fairly equally with advance in age. An analysis of the data showed, however, that each of the groups place more emphasis on the future than on the past.

Several investigators have also considered the influences of factors, such as intelligence and socio-economic status on the development of temporal experience. While some authors have found intelligence to have no effect (Bromberg, 1938; Smythe and Goldstone, 1957), its importance has usually been evidenced. Ames (1946) suggested that the individual differences found in the sample in regard to their readiness to acquire time concepts were probably

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partially due to intelligence factors. Lovell and Slater (1960) found that generally children below average intelligence develop time concepts several years later but there is a similar sequence of understanding. Gothberg (1949) in a fairly detailed study of the mentally defective child's understanding of time found that the concept of time is closely related to mental age; accordingly the mentally defective child has little concept of sequence, historical time, and duration.

The relationship between social-economic class and the development of time concepts, particularly time perspective, is suggested by Frank (1938-1939):

> Whole social classes may be described by the time perspectives that dominate their lives as revealed in the range of their planning, their prudential calculations, their forethought, their abstinence and so on (p. 297).

Kinsey (1948) also discussed the different temporal perspectives of social class groups; specifically, he pointed out that the lower classes are less likely to postpone present gratification in favor of future gains. The parental training programs of the social classes were suggested as the important factor in the development of the different temporal experiences, i.e., the children in middle-class families probably receive more training in postponement of need gratification than do children in lower socio-economic groups. Empirical support for the above formulation was found in an investigation by LeShan (1952), where the

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middle-class children presented responses involving longer time spans on story completion tasks than the lower-class children.

Summary

While time has been viewed and discussed from many vantage points, the subjective or "immanent" (as Van Der Horst calls it) aspect is the one of most concern to psychologists. Psychoanalytic writers have usually considered this human experience of time in regard to the function of the ego in relating to reality; moreover, the functioning of the Perceptual-Conscious System has been suggested by some writers as the important medium in the derivation of this psychological notion of time. Such theoretical formulations suggest a possible relationship between the dynamics of the functioning personality of the individual and his temporal experience.

On the basis of the results from the empirical studies regarding the developmental aspects of this phenomenon, it appears that an individual's ability to estimate time becomes more precise with age. There is also evidence that time perspective and orientation are related to age: the present time appears to be of the most concern to the child until the age of eight; the concepts of future time and past time, on the other hand, continue to develop through the age of 13 or 14. Such evidence gives precedence to the

role of the early formative years in the acquisition of temporal notions. Since these years have also been regarded as important in the development of personality, there is further suggestion of a relationship between the acquisition of time concepts and the growth of personality functioning. The results of these studies also imply that factors, such as intelligence and social-economic status, may influence the development of temporal notions.

Temporal Experience and Psychopathology

The suggestion in the previous section that a relation exists between the evolution of the notion of time and personality development gives rise to the hypothesis that there is a consequent relationship between temporal distortion and psychopathology. Such a hypothesis is basic to the present research and will be considered in the following discussion, particularly in regard to the psychopathological conditions of neurosis, schizophrenia and depressive states.

General Distrubances

For many authors, temporal distortions are basic factors in the consideration of mental illness. Minkowski (1958) contended that time is a useful barometer of our mental states. Tamarin (1960) further suggested that disorientation in time is less frequent than disorientation in space and implies severe pathology, for "personal memories

are the bridge to the individual's past, the time continuity guaranteeing the ego." Oberndorf (1941) maintained that when reality appreciation is disturbed, a person's attitude toward time is distorted. For him, disturbance of reality appreciation involved mainly the depersonalization phenomenon found in cases of mental illness where the person's body or any part of it seems unreal and the derealization phenomenon found in cases where the outer world or people in it seem unreal.

Many psychoanalytic writers have attempted to answer queries concerning the forces that bring about the time distortions noted in the pathological conditions. Most of the answers point to an understanding of disturbances that may take place in the psychodynamism of the developing sense of time. Dubois (1954), for example, postulated that the individual achieves a sound sense of duration if the "frustrations and limitations of the basic desires and urges of the infant are sympathetically directed by time in the guise of authority" (p. 49). He further pointed out, however, that if the parents are arbitrary, interfering, and critical or fail to cooperate with the growing child's needs in a sympathetic way an unwholesome and handicapping time sense results which sets the stage for later neurosis to develop; accordingly, rebellion against authority symbolized in time occurs and gives rise to neurotic and psychotic manifestations of unconsciously motivated escapism and regression.

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Yates (1938), on the other hand, suggested that the frustration of infantile needs, especially at the oral period, may lead to acute anxiety. In order to prevent the reoccurrence of this anxiety, the child may place himself outside of the sense of time which consequently causes him to lose both a sense of reality and the passage of time.

Dooley (1941) pointed to the over-concern with time in anal-erotic conflicts. As an explanation, she suggested that "since concession to time is forced upon the child by his habit training in food-taking and the control of excretion, he develops a strangely ambivalent attitude toward it which is expressed later in an exact observance of time as well as in his mishandling of it" p. 21). Schilder (1956) and Arieti (1955) also suggested fixation at the anal stage as leading to temporal disturbances.

Temporal Disturbances in Neurosis

Theoretical Views. Several theoretical considerations of neurotic conditions in regard to specific temporal distortions are found in the literature. Meerloo (1948, 1949), for example, maintained that neurotics have manifold difficulties in the dynamic experience of time. Such difficulty is expressed in a constant conflict with the here and now, thus forcing the neurotic to live either in the past ("I wish I had not done such a thing!") or the future. On the one hand, the neurotic may choose to live in the past,

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for "the past is happiness, the womb while the future is dangerous, the anxiety of the unknown." This unconscious yearning for the past invests earlier events with tremendous importance, producing a phenomenon referred to by Meerloo as "traumatization of the past." On the other hand, the neurotic may live in the future and imagine and experience the traumatic episode before the traumatic event is provoked. Thus plans for the future are laid in the forms of defensive maneuvers which may lead to increased neurotic suffering. This phenomenon the author called "preparation neurosis."

Arieti (1947), however, suggested that the role of the anticipation of the future is diminished in neurotic conditions and that the patient thinks mainly about the past. His explanation is as follows:

> Probably this is an escape mechanism. It is too painful for the patient to think of the uncertain future and he prefers to withdraw into the past which also may have been unhappy, but whose difficulties are somehow overcome. By resorting to the thought of the past, the patient withdraws in his conscious life to a lower level of integration (p. 477).

Lewis (1931-1932) in an account dealing with temporal experience in mental disorders agreed that the anticipation of the future is diminished for the neurotic, particularly the obsessional patient . . . "In the obsessional patient it is not concern about the future that hinders action; for him, the future is barred" (p. 617).

Empirical findings. While the writers above have been primarily concerned with the disturbance of time perspective and orientation in neurosis, there have been no empirical studies which have investigated this aspect of temporal experience in a neurotic group. Two investigations, however, have included a neurotic group in studies concerned with the perception of time. Dobson (1954), using a neurotic group of subjects in his study of time perception, failed to find any significant differences in their mean estimates of 17, 38, and 72 seconds and the estimates of a normal group and a schizophrenic group. Assuming that the neurotic group has anxiety as a common component, he concluded that the hypothesis that the greater the anxiety the longer a given time will be judged does not hold. Orme (1962), on the other hand, used longer time intervals (20 and 30 minutes) and found that a neurotic group which exhibited symptoms of hysteria gave longer estimates than controls.

Temporal Disturbances in Schizophrenia

Theoretical views. Disorientation for time and a defect in the time sense has long been part of the description of the schizophrenia syndrome. Lewis (1931-1932) suggested that a "feeling of interruption in time" and a "feeling of previous death and rebirth" are typical temporal disorders in the schizophrenic patient. Fischer (1940) maintained that there was no schizophrenic symptom which was not

a space-time disorder. Bonaparte (1940) also suggested that the sense of time is affected in schizophrenia; moreover, she proposed that this defect in the time sense is due to the fact that the collapse of the barriers which maintain the unconscious in a state of repression are of a far reaching nature in psychotics.

Arieti (1947) referred specifically to the time orientation and perspective of the schizophrenic patient. In his discussion of expectation and anticipation he said the following:

> In schizophrenia we have a restriction of the psychotemporal field. The patient withdraws more or less to a narcisstic level and his temporal orientation becomes more related to the present time. . . . He clings desperately and without awareness to the present. . . . In early paranoid forms, anticipation is preserved. Some delusions may involve future but in later stages of paranoiac forms these delusions become related to the present not future (p. 478).

Empirical findings. In a recent experimental investigation by De La Garza and Worchel (1956), schizophrenics were compared with fifty matched normal controls on 72 items which dealt with space and time orientation. Thirty-nine of these items differentiated significantly between the two groups and 21 of the 30 items concerned with temporal orientation were more difficult for the schizophrenics. The authors suggested that the reason for these difficulties was a "loss in conceptualization and lowered attention span involving complex relationships."

In another study, Dahl (1958) investigated the observation that some patients will give the year of their birth and current year correctly but are unable to give their correct age. The author interviewed 500 female patients and concluded that this singular distortion of temporal orientation occurs only in regressed schizophrenics and might be used as a diagnostic and prognostic aid.

Other investigators have studied the schizophrenic's ability to estimate time. Johnston (1939) reported that schizophrenics differed from normals in their estimates of 5-, 10-, 90-, and 100-second intervals. Dobson's (1954) attempt (reported in the previous subsection), however, produced negative results, but there was found a greater variability in the schizophrenic estimates. Rabin (1957) in an investigation of long time intervals (up to one and one-half hours) found that schizophrenics overestimated or underestimated excessively when compared with a group of non-psychotics. He related this inaccuracy in estimation to the general impaired judgmental process of schizophrenia.

Time perspective in schizophrenia has also been the subject of two investigations. Israeli (1936), on the basis of data obtained from questionnaires and interview material, concluded that the outlook on the future of psychotics may be described as "constructive, catastrophic, uncertain, limited, confused, or delusional." He, furthermore, suggested that there is a possibility that such data could be

used to differentiate melancholics and paranoid schizophrenics. Wallace (1956) used a series of projective techniques and other especially designed devices to study future time perspective. He found that the "extension" of future time perspective is foreshortened in schizophrenics when compared with normals. Moveover, he also found that the ordering or "coherence" of future events is more confused in schizophrenia.

Temporal Disturbances in Depressive States

Theoretical views. Several authors have considered disorders of personal or psychological time in depressive states. Eissler (1952) maintained that a severely depressed patient may be correctly informed on all data by which we objectively ascertain the present, such as the hour, day, month, and year; nevertheless, a disturbance of his experience of time has its bearing on the patient's capacity to make a decision or to act on his emotions, his outlook on life and the feeling of closeness to reality.

Supporting the above contention, Strauss (1947) noted particularly the disorders in the subjective representation of the future in the depressed person. While the healthy person directs his thinking and acting toward the future, the depressed patient does not experience the future as a field of potential activity for his road into the future has become blocked. The future thus loses its meaning as a

harbinger of prospective solutions and the past acquires dominance over the patient. Moreover, the depressed person no longer experiences the present as a bridge between the past and future, and he is thus compelled to brood and ruminate and to see the future as if it were a shapless gap.

In regard to time perception, Schneider (1948) contended that in depression in which the ego is overwhelmed by the hostile superego, chronological time passes with "excruciating slowness and is to be interpreted as the time necessary to kill the world and assault the self" (p. 239). For Schneider, it is the pleasure principle rather than the reality principle that is holding sway in such a case. On the other hand, Lewis (1931-1932) suggested that in depressives there is probably an unimpaired time judgment for short intervals but a slight impairment for long intervals since other factors come in here.

Empirical findings. Only a few experimental studies have considered the temporal disturbances in the depressive states. Escalona (1940) in a study where she was mainly concerned with the effect of success and failure upon the level of aspiration and behavior in manic-depressive psychoses, described one of her experimental subjects in regard to one aspect of his temporal experience:

> The painful character of his life situation at large has caused the field guiding his momentary

> actions to shrink, particularly in regard to time perspective. (p. 289).

Other investigators have been particularly interested in the effect of depressive illness on time perception. Mezey and Cohen (1961) investigated this phenomenon in 21 patients by utilizing tasks that involved the production, reproduction, and verbal estimation of time intervals ranging from one second to thirty minutes. The control group was composed of the same patients after their recovery. It was found that time production and time reproduction tended to be more accurate after recovery. Moreover, the variability of the results obtained on the tasks tended to decrease after the depression had lifted. A statistical comparison, however, of the results obtained during the depressive illness and after recovery did not reach the .05 level of significance. Introspective statements were also obtained from the patients. A slowing down and even an apparent arrest of time in the depressed state was indicated: "Every hour seems a year to me";"It is terribly slow--interminable"; "Time? It is standing still."

Summary

Views have been presented which suggest that disturbances in the ability to adequately utilize the temporal concepts of time perception, time perspective, and time orientation are found in psychopathological conditions.

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Disturbances in schizophrenia have received the most attention in empirical accounts and, for the most part, the evidence has indicated that the schizophrenic's ability to estimate time is disrupted and his future time perspective is foreshortened. In regard to neurotic conditions and depressive illness, there has also been some evidence that these aspects of temporal experience are disturbed; however, the total number of investigations in this area has been relatively small, and there consequently appears to be a need for a considerable amount of further study before conclusions can be drawn concerning the possible relationship between these psychopathological conditions and distortions in temporal experience.

STATEMENT OF HYPOTHESES

From the preceding review of literature regarding psychopathology and temporal experience, it is suggested that distortion in temporal experience is an important factor in the consideration of mental illness. Therefore, the following question is basic to the present research:

> Do the psychopathological conditions of schizophrenia and depression significantly affect the psychological experience of time?

Arieti (1959) in his discussion of the manifest symptomatology of schizophrenia noted particularly the disturbances in thought and judgment processes. His discussion of depressive reactions, on the other hand, pointed to affective disturbances manifested in a pervading mood of melancholia accompanied by feelings of guilt, the dread of impending disaster and motor retardation. Therefore, while the thought processes in attacks of depression may be retarded and exhibit gloomy and morbid content, the severity of the disturbance does not appear as pronounced as in schizophrenia. These differentiating aspects of the manifest symptomatology of schizophrenia and depressive illness suggest a further question for consideration in the present research:

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Does the psychopathological process of depression have a different effect on temporal experience than does the process of schizophrenia?

As mentioned previously three aspects of temporal experience were investigated in the present research. When these three aspects are measured in terms of the tasks described below, four specific hypotheses are proposed. These hypotheses emerged from the theoretical views and empirical investigations discussed in the previous section along with the clinical observations of these two psychopathological conditions.

Future Time Perspective:

Hypothesis I. The depressive group, the schizophrenic group, and the normal control group differ significantly in regard to "extension" of future time perspective.

Hypothesis II. The depressive group, the schizophrenic group, and the normal control group differ significantly in regard to "coherence" of future time perspective.

Time Perception:

Hypothesis III. The depressive group and the schizophrenic group make less accurate estimates of the passage of time than the normal group.

Time Orientation:

Hypothesis IV. The depressive group and the schizophrenic group are less future-oriented than the normal group.

PROCEDURE

The Samples

Three groups of subjects were used to test the hypotheses outlined previously. The criteria which were used in the selection of these groups are described below.

The Depressive Group

This experimental group consisted of 20 patients at the Detroit Receiving Hospital. The following criteria were utilized in their selection:

Sex. In order to control for possible sex differences an equal proportion of males and females were used in the group.

Age. Between 20 and 50. The mean age for this group was 35.4 with a standard deviation of 5.95.

Educational level. Between 8 and 13 years of formal schooling. The mean educational level for this sample group was 10.6 with a standard deviation of 1.67.

Wechsler Vocabulary level. Between 30 and 60. For the subjects tested, the mean vocabulary level was 36.55 with a standard deviation of 7.12.

Diagnosis. Each subject was required to have an official diagnosis* of depressive state. Of the 20 subjects in this group 14 had received the diagnosis of a psychoneurotic depression while the other six had received a diagnosis of a psychotic depression. None of the subjects exhibited a severe depressive stupor.

The Schizophrenic Group

This second experimental group consisted of 20 patients at the Detroit Receiving Hospital who had received the diagnosis of schizophrenia or schizophrenic reaction. The remaining criteria used in the selection of this group are listed below:

Sex. Same as described for the depressive group.

Age. Same as described for the depressive group. The mean age for this sample group was 33.9 with a standard deviation of 9.07.

Educational level. Same as described for the depressive group. For the subjects tested, the mean educational level was 10.95 with a standard deviation of 1.50.

Wechsler Vocabulary level. Same as described for the depressive group. The mean vocabulary level for this schizophrenic sample was 36.5 with a standard deviation of 6.38.

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*The diagnoses were generally made by residents in the psychiatric service of the Detroit Receiving Hospital.

The Normal Group

This control group consisted of 20 patients from the medical service of the Detroit Receiving Hospital. The subjects presented a wide range of medical problems, but none had received surgical treatment. By interviewing the patient and consulting with the medical staff, it was ascertained that there was no evidence of any psychopathological condition accompanying the subject's illness. Other criteria used in the selection of this sample are described below:

Sex. Same as described for the depressive group.

Age. Same as described for the depressive group. The mean age for this sample group was 32.4 with a standard deviation of 9.52.

Educational level. Same as described for the depressive group. The mean educational level for this control group was 11.0 with a standard deviation of .97.

Wechsler Vocabulary level. Same as described for the depressive group. The mean vocabulary level for this sample group was 34.85 with a standard deviation of 7.29.

A comparison of the two experimental groups and the control group on the three variables upon which the subjects were matched is presented in Table 1. There were no significant differences found among the three groups in regard to these variables.

Table 1. A comparison of 20 schizophrenics, 20 depressives, and 20 normals on three criteria of selection.

	Depressives		Schizophrenics		Normals			
	Mean	S.D.	Mean	S.D.	Mean	S.D.	F	p
Age	35.40	5.95	33.90	9.07	32.4	9.52	.002	--
Wechsler Vocabulary	36.55	7.12	36.50	6.38	34.85	7.29	.01	--
Educational Level	10.6	1.67	10.95	1.50	11.0	.97	.002	--

The Instruments Used

The four experimental tasks that were utilized in the present study will be described in the following section. The method of scoring for each task will also be given.

Task I

The first task was composed of ten statements describing common life events that are likely to occur in the lifetime of an American male or female. This technique represents a modification of one utilized by Wallace (1956). In the present research this technique will serve as a measure of the "extension" and the "coherence" of future time perspective.

Procedure. This task was administered in two parts as described below:

Part 1

The following instructions were given to each subject:

"I am going to read to you a series of events that might happen to a lot of people. I want you to tell me how old you might be when the event might happen to you."

The following items were then read to the subject and his response was recorded:

1. Your first grandchild is born.
2. You die.
3. You can say you have most of the things you want.
4. Your youngest child marries.
5. You retire.
6. Your father dies.
7. Your wife (husband) dies.
8. You are too old to be physically active.
9. You feel you have reached old age.
10. You can no longer have children.

Part 2

After Task IV was completed, the subject was then presented with ten cards upon each of which one of the above items was typed. The following instructions were then given to the subject:

"Here is a group of cards upon which the events I previously asked you about are typed. Arrange these cards in the order that they might happen in your life. Place the event that might happen first, first; the event that might happen second, second; etc."

The order in which the cards were arranged was recorded by the examiner.

Scoring. From the data obtained on Task I, a measure of "extension" and a measure of "coherence" were derived:

(1) The measure of "extension" was obtained by finding the range of years included between the subject's age and the most distant future event given by him.

(2) The measure of "coherence" was obtained by finding the correlation between the ordinal ranking of the events in regard to the age of occurrence in Part 1 and the order of events arranged in Part 2.

Task II

The second task consisted of a story-completion technique which was originally developed by Barndt (1953); a modified version was later utilized by Wallace (1956). In the present study this technique was used to obtain a measure of the "extension" of the subject's future time perspective.

Procedure.

Story 1

Each subject was given the following instructions:

> "I want to see what kind of a story you can tell. I'll start one for you and then let you finish it any way you wish. Here's the beginning of the first story. 'At 3 o'clock one bright sunny afternoon in May two men (women) were out walking near the edge of town' . . . Now you start there and finish the story for me."

The story given by the subject was recorded. Then the subject was asked: "How long a time is involved in the action described in your story?" The response to this question was recorded.

Story 2

Each subject was given the following instructions:

"That was fine. Now I'll begin another story, which, as before, you may finish any way you want to. Here it is: 'Ten o'clock one morning Al (Sue) met his (her) friend Jerry (Jane) near the center of town' . . . Now you finish it for me."

The duration time of the action in the story was again obtained from the subject.

Story 3

Each subject was given the following instructions:

"Now here is that start of another story which you may again finish in any way you wish. 'Joe (Donna) is having a cup of coffee in a restaurant. He's (she's) thinking of the time to come when' . . . Now you finish it."

The duration time of the action in the story was again obtained from the subject.

Story 4

Each subject was given the following instructions:

"Here is the last story I'll give you. 'After awakening Bill (Betty) began to think about his (her) future. In general, his (her) plans involved' . . . Now you finish it for me."

The duration time of the action in the story was obtained from the subject.

Scoring. A measure of "extension" was obtained from each story presented in Task II. This measure was the length of time given by the subject in describing the duration time of the action in his story.

Task III

The third task attempted to measure the ability of the subject to estimate the passage of time. The procedure employed was based on a technique utilized by Rabin (1957).

Procedure. The administration of this task consisted of two parts.

Part 1

Following the completion of the second task, each subject was asked the following question:

> "How much time has passed since we started talking? Make the best guess you can."

Part 2

At the close of the session the subjects were again asked the above question.

Scoring. Accuracy of the estimation of the periods of time was based on the ratio of the estimated time to the actual time recorded by the experimenter. This ratio was then expressed in percentages, such that a score of 100% represented an exact estimation, a higher percentage represented an overestimation, and an estimate lower than 100% represented an underestimation. The estimates were then placed in three categories: (1) Overestimation--120% and above; (2) Underestimation--80% and below; (3) Close estimation--between 81% and 119%.

Task IV

In order to determine whether the time orientation of the subjects was mainly present, future, or past a task employing four TAT cards was used. This methodology stemmed from the work of Fink (1953).

Procedure. The subjects were presented the following four TAT cards: Card 2, Card 4, Card 6BM, Card 7BM. All of the cards represented interpersonal situations. Instead of using the usual instructions for the administration of the Thematic Apperception Test, the subjects were simply asked:

"Tell a story about this picture."

Scoring. The experimenter rated each story as either past-oriented, present-oriented, or future-oriented, and the following score values were correspondingly assigned to each story: past-oriented (scoring value of one); present-oriented (scoring value of two); future-oriented (scoring value of three). By summing the score values for the four stories for each subject, a measure of time orientation was obtained. Another judge also rated each story, and using the product moment coefficient of correlation an interjudge reliability of .77 was obtained.

Method of Analysis

Consideration of the nature of the distribution of scores obtained from the experimental tasks suggested that the assumption of normality was questionable. Therefore, non-parametric techniques are employed in the statistical tests of significance.

The Kruskal-Wallis test is the most appropriate technique for the statistical analysis of the scores obtained in Task I and Task II. This technique appears to be the most powerful of the non-parametric tests for k independent samples and, therefore, provides a useful alternative for the parametric analysis of variance. The computation of the Kruskal-Wallis test of significance involves the ranking of all observations for the k groups in a single series, assigning ranks from 1 to N. The sum of the ranks for each of the k groups is then determined, and the H-statistic is derived from the following formula.

$$H = \frac{12}{N(N+1)} \sum_{j=1}^{k} \frac{R_j^2}{n_j} - 3\,(N + 1)$$

where k = number of samples

n_j = number of cases in jth sample

$N = n_j$, the number of cases in all samples combined

R_j = sum of ranks in jth sample

The critical values of the H-statistic for one-tailed and two-tailed test can be found in appropriate tables. For a more complete description of this technique, see Siegel (1956).

Since the Kruskal-Wallis test calls for ordinal measurement, it cannot be used for the statistical analysis of the scores obtained in Task III and Task IV. The non-parametric technique that appeared the most appropriate for these tasks was the chi-square test for independent samples. This technique is especially suitable for analysis of these tasks since the data consist of frequencies in discrete categories.

RESULTS

In previous chapters, a presentation was made of the particular hypotheses and experimental procedure that comprise the research design for the present investigation. A brief description of the Kruskal-Wallis test and the chi-square test, which were utilized for the statistical analysis of the data, was also given. In the subsequent pages the results obtained from the statistical analysis of the data are presented.

Results on Future Time Perspective

Measures of the "extension" of future time perspective which refers to the amount of future time an individual can conceptualize, were obtained in the present research from Task I and Task II. On Task I the extension score is derived by subtracting the subject's age from the most distant age given to the ten items presented. On Task II the extension score was the length of time given by the subject as the duration time of action in each of the story completion tasks.

An over-all analysis of the differences between the three groups in regard to the scores derived from Task I

produced a significant H-score of 15.35, p value less than .001. The data, therefore, is consistent with the prediction that the three groups will differ significantly in regard to "extension" of future time perspective. Furthermore, inspection of Table 2 indicates that while the median extension score is substantially less for the schizophrenic subjects than for the normal subjects, the median score for the depressive group is less than those for either of the other two groups. Significant differences between the three groups in regard to extension scores are also found for stories 3 and 4 of Task II. Again inspection of the data presented in Table 2 indicate that the median extension score for the depressive group is less than those for the other two groups; furthermore, the schizophrenic group's median score is less than the one of the normal group. The extension scores derived from stories 1 and 2, however, did not differentiate between the three groups at the five percent level of confidence. Nevertheless the general trend indicated above is still evident in story 2.

Another theoretical hypothesis of interest concerned the concept of "coherence," which refers to the logical order imposed on elements of the time span by the individual. A coherence score was obtained by finding the rank correlation coefficient between the chronological ordering of a series of events based on the ages associated with the events

Table 2. A comparison of medians and sum of ranks of extension scores* on two experimental tasks for the depressive group, the schizophrenic group, and the normal group.

	Depressives		Schizophrenics		Normals			
Task	Mdn	Sum of ranks	Mdn	Sum of ranks	Mdn	Sum of ranks	H	p
I	27 yrs.	390.0	35 yrs.	617.5	49 yrs.	822.5	15.35	$< .001$
II								
Story 1	2 hrs.	530	1-1/2 hr.	541.5	3 hrs.	758.5	5.4	--
Story 2	1 hr.	531.5	2 hr.	534	3 hrs	764.5	5.87	--
Story 3	45 min.	437.5	4 hrs.	618.5	4-1/2 days	774	9.3	$< .01$
Story 4	2 days	411.5	7 mo.	640	2 yrs.	778.5	11.26	$< .01$

*On Task I the extension score is derived by subtracting the subject's age from the most distant age given to the ten items presented. On Task II the extension scores are the length of time given by the subject as the duration time of the action in each of the story completion tasks.

presented in part 1 of Task I and the forced chronological ordering of events in part 2 of Task I.

The coherence scores for the depressive group, the schizophrenic group, and the normal control group were analyzed by the Kruskal-Wallis test. The H-score of 15.49 was significant, p value less than .001. It can thus be concluded that there are significant differences between the "coherence" of future time perspective for the three groups. Inspection of the data presented in Table 3 provides information concerning the direction of these differences. A median rank correlation coefficient of .49 indicated that the schizophrenic group presented the least "coherent" future time perspective. The depressive group, on the other hand, was somewhat more "coherent" with a median rank correlation of .63, while the normal control group gave the highest rank correlation coefficient of .83.

Two additional findings, for which no hypotheses were offered, may also be noted. A comparison of the "extension" measures obtained from the psychoneurotic depressives and the psychotic depressives revealed no statistically significant intra-group differences. It, therefore, may be suggested that the total group of depressive subjects represent a homogeneous sample with regard to this variable. A comparison of the "coherence" scores obtained from these sub-samples, however, revealed statistically significant intra-group differences, p value less than .05. This finding

Table 3. A comparison of medians and sum of ranks of coherence scores* on an experimental task for the depressive group, the schizophrenic group and the normal group.

Depressives		Schizophrenics		Normals			
Mdn	Sum of ranks	Mdn	Sum of ranks	Mdn	Sum of ranks	H	p
.63	558.5	.49	423	.83	848.5	15.49	$< .001$

*The coherence score is the rank correlation coefficient between the chronological ordering of a series of events based on the ages associated with the events presented on part 1 of Task I and the forced chronological ordering of the events in part 2 of Task I.

suggests that the total group of depressive subjects does not represent a homogeneous sample with regard to the "coherence" of future time perspective. Furthermore, the data (see Appendix I) indicate that the psychotic depressive group is less "coherent" than the psychoneurotic depressive group.

Results on Time Perception

A measure of the subject's ability to estimate the passage of time was based on the ratio of the subject's estimation of two time intervals to the actual clock time for each of these intervals. The ratio-scores were further categorized as an overestimation (over 120%), an underestimation (under 80%), and close estimation (81% to 119%), and chi-square was employed for the statistical analysis.

No significant differences were found between the three groups of subjects in ability to estimate time intervals when the median duration was 14 minutes. The data presented in Table 4, nevertheless, indicate that the normal control group was somewhat more accurate in their estimation than the two experimental groups. A chi-square of 11.11 was obtained from the subject's estimation of the second time interval. The median duration in this case was 31 minutes. This chi-square was significant, p less than .025. Therefore, it would appear as though depressive subjects, schizophrenic subjects, and normal subjects differ in ability to

Table 4. Categories of estimation of two time intervals by the depressive group, the schizophrenic group, and the normal control group.

	First Interval (Mdn = 14 min.)			Second Interval (Mdn = 31 min.)		
Category	Depressives	Schizophrenics	Normals	Depressives	Schizophrenics	Normals
Underestimation	6	5	3	5	8	4
Overestimation	10	10	8	11	8	4
Close estimation	4	5	9	4	4	12
Chi-square (4 d.f.)		3.62			11.11	
p		--			$< .025$	

estimate the passage of time, but only when longer time intervals are considered. Furthermore, the data presented in Table 4 suggest that the normal group was the most accurate in their estimates. The majority of the schizophrenic subjects and depressive subjects, on the other hand, made poor judgments with respect to the amount of time passed.

A supplementary, non-hypothesized finding was obtained in a comparison of psychoneurotic depressive subjects and psychotic depressive subjects in regard to estimation of the two time intervals. No significant intra-group differences were found. Therefore, the total depressive group appears to represent a homogeneous sample in regard to this aspect of temporal experience.

Results on Time Orientation

The direction or orientation of the subject's temporal experience was derived by categorizing the summation of score values assigned to the subject's four TAT stories as follows: past orientation (score value of four to six), present orientation (score value of seven to nine), future orientation (score value of ten to twelve).

An over-all chi-square comparison between the three groups of subjects with regard to these categories is not appropriate since the expected values in six of the cells were less than five. While the logic of the theoretical interest would permit the combining of the past and present

categories, the expectations in some of the cells are still small. Therefore, instead of an over-all analysis between the three groups, two individual comparisons* appear to be the most appropriate tests of the hypothesis. In a comparison between the depressive group and the normal group of chi-square of 9.18 was obtained, p value less than .005. A second comparison indicated that the schizophrenic group and the normal group differed in time orientation. In this case the level of significance was beyond the .02 level. The Yates correction was used in both comparisons. Inspection of Tables 5 and 6 indicates that the normal group was more future-oriented than the two experimental groups. Therefore, the data are generally consistent with the hypothesis stated previously. An individual analysis of each TAT card, however, suggests that only three cards (Card 2, Card 4, and Card 7BM) account for the differences found between the experimental and normal control groups. (For data, see Appendix II.)

An additional finding, for which no hypothesis was offered, is again noted. A comparison of the time orientation measure obtained from the psychoneurotic depressives and the psychotic depressives revealed no statistically

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*The careful reader will note that these comparisons are not orthogonal. An appropriate adjustment, therefore, should be made in the alpha level, but no such adjustment is available at the nominal level of statistical inference.

Table 5. Categories of time orientation given by the depressive group and the normal group on stories to TAT cards.

Category	Depressives	Normals
Past*	3	0
Present*	17	11
Future	0	9
Chi-square (1 d.f.)	9.18	
p	$< .005$	

Table 6. Categories of time orientation given by the schizophrenic group and the normal group in stories to TAT cards.

Category	Schizophrenics	Normals
Past*	2	0
Present*	17	11
Future	1	9
Chi-square (1 d.f.)	6.53	
p	$<.02$	

*The past and present categories were combined for the analysis.

significant intra-group differences. Again the total group of depressive subjects appears to represent a homogeneous sample.

DISCUSSION

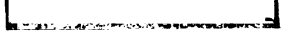
The findings presented above generally support the hypothesis that temporal experience is significantly affected by psychopathological disturbance. Furthermore, the results seem to indicate that the psychopathological process of depression has in many cases a different effect on temporal experience than schizophrenia. In the following paragraphs the specific findings in regard to each of the three aspects of temporal experience studied in this research will be discussed.

Future Time Perspective

The data concerning the "extension" of future time perspective indicated that the schizophrenic group, the depressive group, and the normal group can be differentiated from each other in regard to the length of the time interval utilized in conceptualizing future events. The curtailing of this time span in schizophrenic subjects is in agreement with the findings presented by Wallace (1956). In regard to the depressive group there was evidenced an even more severely limited future time span, which supports the contention that the "road into the future has become blocked in depressive states" (Strauss, 1947).

Stories 1 and 2 of Task II, however, did not differentiate between the three groups. Again the data obtained in this study are in agreement with the results presented by Wallace (1956). It is noted that the context of these two stories limits the possible future courses of action; therefore, the task becomes somewhat structured and concrete. Clinical observations have suggested that when a schizophrenic patient is exposed to a concrete, structured environment, his experience of anxiety is decreased and he is able to function at a higher level of integration. In stories 3 and 4, where the future courses of action are almost unlimited, the schizophrenic subject probably becomes confused and disorganized to such a degree that his conceptualization of the future is curtailed.

In clinical observations the depressed subject, on the other hand, appears to be specifically threatened by any conceptualization of the future, since as Strauss (1947) contended "the future is seen as a shapeless gap giving no possibility for potential activity." It is probably the specific nature of this threat for the depressed subject that curtails and blocks his outlook on the future even more severely than is evidenced in the schizophrenic subject. In stories 1 and 2, where the possible courses of action are limited, the threat concerning the conceptualization of the future is apparently reduced. Therefore, in these two



stories the depressed subjects' "extension" of future time perspective is not significantly affected.

A measure of "coherence," the second aspect of future time perspective studied in this research, also differentiated significantly between the three groups of subjects. The difficulty exhibited by schizophrenic subjects in organizing future events in a meaningful and logical manner is compatible with the clinical observation that disturbances in secondary process thinking are an important aspect of the symptomatology of schizophrenia. While sluggishness and retardation in the thought processes have often been noted in the depressive states, secondary process thinking is seldom disturbed to the extent noted in schizophrenia. This noted difference between the manifest symptomatology of these two psychopathological conditions in regard to the thought processes accounts for the depressive group's more "coherent" future time perspective. However, an intragroup comparison revealed that the psychotic depressives are significantly less "coherent" than the psychoneurotic depressives. This finding may likewise be interpreted in regard to the degree of the thought disturbance generally found in these two depressive states; for while delusional ideation is sometimes found in psychotic depressions, it is seldom noted in psychoneurotic depressions.

Time Perception

The results obtained in Task III indicate that the psychopathological conditions of schizophrenia and depression affect the individual's ability to accurately assess the passage of long intervals of time. The schizophrenic subject's inaccurate estimations tended to fall in both directions, overestimation and underestimation. The inaccuracy of their estimates appear to be most appropriately related to the impaired judgmental process in schizophrenia. In general, these results are in agreement with those obtained by Rabin (1958).

The depressed subjects frequently overestimated the passage of time. Such an observation is compatible with the introspective statements given by the depressed patients in Mezey and Cohen's study (1961): "Every hour seems a year to me"; "It (time) is terribly slow--interminable." This overestimation of the passage of time seems to be most appropriately related to the pervading feeling of melancholia evident in depressive states.

No significant results were found, however, when a shorter time interval was employed. Previous studies have noted that relatively short estimates of time intervals--17, 38, and 72 seconds--failed to differentiate between a schizophrenic group and a normal group (Dobson, 1954) while estimates of longer time intervals--one hour to one and

one-half hours--differentiated between these two groups (Rabin, 1957). These findings along with the data obtained in this research suggest that psychopathological disturbances have a greater effect on the estimation of longer time intervals than on short intervals. The perception of short intervals may involve mainly a direct, immediate mental process while in the perception of longer time intervals the judgmental process may become increasingly important. Thus as Woodrow (1951) has contended "time is a concept . . . that attaches to perceptions only through a judgmental process." On the basis of this theoretical description of time perception, it can be further suggested that it is the mediating judgmental process that becomes disturbed in psychopathological conditions with a consequent effect on the estimation of long time intervals. The question arises: How long does a time interval need to be before psychopathological disturbances affect the estimated duration?

Time Orientation

The results obtained from Task IV support the hypothesis that the depressive group and the schizophrenic group will be less frequently future oriented than the normal control group. Arieti (1947) suggested that this restriction of the psychotemporal field occurs in schizophrenia . . . "The patient withdraws more or less to a narcisstic level and his temporal orientation becomes more

related to the present time" (p. 478). In the case of the depressed patient, Strauss (1947) has suggested that the future loses its meaning as a harbinger of prospective solutions and the past acquires dominance over the patient. Our results, however, indicated that the depressed subject is dominated by the present rather than the past. It is, therefore, suggested that the subject has found it too painful to look at the past, which tortures him and reminds him of his impardonable guilt, his unworthiness, and his inability to accomplish; since the future has been blocked for him, the only remaining choice is to abide in the present with its pronouncement of irreparable ruin.

Implications for Future Research

The results of this study suggest the potential usefulness of quantitative measures of temporality in making differential diagnosis between various nosological categories. Such a possibility points to the need for future research concerned with the compilation of data for nosological groups other than schizophrenia and depressive illness. Empirical investigations using experimental groups of subjects who give evidence of psychoneurotic conditions or organic conditions appear to be especially pertinent. The data also suggest that aspects of temporal experience may be useful in delineating the types and/or severity of emotional disturbance involved in a single diagnostic classification.

Questions for the psychophysicist also emerge from the results obtained in this study. The results from the time perception task suggest that judgment of long intervals involves factors which are affected by psychopathological disturbance, while judgment of shorter intervals are not as dependent on these factors. Even though a theoretical view was offered in the preceding discussion of these results, further empirical studies are needed before this view can be considered a satisfactory explanation. Furthermore, an interesting endeavor might involve attempts to determine the critical duration point at which these additional factors become important in time perception.

SUMMARY AND CONCLUSIONS

This study was concerned with an investigation of three aspects of temporal experience--future time perspective ("extension" and "coherence"), time perception, and time orientation in the psychopathological conditions of schizophrenia and depression.

The experimental groups included a sample of 20 hospitalized patients with an official diagnosis of depression and a sample of 20 hospitalized patients diagnosed as schizophrenic. The normal control group was composed of 20 hospitalized patients from the medical service of a general hospital. Controls for sex, age, educational level and verbal IQ were employed. The subjects were given four tasks which involved: (1) estimates of the age of occurrence of 10 future events, presented by the examiner, and the subsequent forced ordering of these events (Task I); (2) completion of four stories and the estimation of the duration time of action in each story (Task II); (3) estimates of duration of two long intervals (Task III); and (4) stories given in response to four TAT cards (Task IV). The first two tasks were employed to provide measures of the "extension" and "coherence" of future time perspective; the third task

provided a measure of time perception; the fourth task was used to obtain a measure of time orientation.

The specific hypotheses that were examined in this research are the following:

Hypothesis I: The depressive group, the schizophrenic group, and the normal control group differ significantly in regard to "extension" of future time perspective.

Hypothesis II: The depressive group, the schizophrenic group, and the normal control group differ significantly in "coherence" of future time perspective.

Hypothesis III: The depressive group and the schizophrenic group make less accurate estimates of the passage of time than the normal group.

Hypothesis IV: The depressive group and the schizophrenic group are less future-oriented than the normal group.

The results obtained on the basis of a comparison of the three groups by use of non-parametric techniques generally confirmed these predictions. In two instances, however, the statistical analysis did not yield significant findings: (1) stories 1 and 2 of Task II; (2) the estimation of the first time interval in Task III. The lack of significant findings in connection with stories 1 and 2 of Task II was interpreted on the basis of the fact that these two stories were more highly structured than stories 3 and 4. The failure to differentiate between the experimental groups and the control group in the estimation of the shorter time

interval suggests that psychopathological conditions do not significantly affect the estimation of relatively short intervals.

In general, it may be concluded that the schizophrenic process and the depressive reaction significantly affect the three aspects of temporal experience studied in this research. Concepts of temporality, therefore, appear to be pertinent to formulations of theories of personality functioning. However, further research with other nosological groups is needed before definitive theoretical propositions can be stated.

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APPENDIX A

Intra-group Comparisons between the 14 Psychoneurotic Depressives and the 6 Psychotic Depressives on the Four Measures of Temporal Experience

Table 7. A comparison of medians and sum of ranks of extension scores on two experimental tasks for the 14 psychoneurotic depressives and the 6 psychotic depressives.

	Psychoneurotic depressives		Psychotic depressives			
Task	Mdn	Sum of ranks	Mdn	Sum of ranks	H	p
I	27 yrs.	154.5	24 yrs.	55.5	.38	--
II						
Story 1	2 hrs.	158.0	32.5 min.	52.0	.82	--
Story 2	1.5 hrs.	156.5	30 min.	53.5	.61	--
Story 3	25 min.	131.5	11 hrs.	78.5	1.63	--
Story 4	5 days	158.5	1 day	51.5	.90	--

Table 8. A comparison of medians and sum of ranks of coherence scores on an experimental task for the 14 psychoneurotic depressives and the 6 psychotic depressives.

Psychoneurotic depressives		Psychotic depressives			
Mdn	Sum of Ranks	Mdn	Sum of Ranks	H	p
.720	175	.273	35	5.33	$< .05$

Table 9. Categories of estimation of two time intervals by the 14 psychoneurotic depressives and the 6 psychotic depressives.

	First interval (Mdn = 14 min.)		Second interval (Mdn = 31 min.)	
Category	Psycho-neurotic depressives	Psychotic depressives	Psycho-neurotic depressives	Psychotic depressives
Under-estimation	4	2	4	1
Over-estimation	7	3	8	3
Close estimation	3	1	2	2
Chi square (2 d.f.)	.07		1.04	
p	--		--	

Table 10. Categories of time orientation given by the 14 psychoneurotic depressives and the 6 psychotic depressives to the four TAT cards.

Category	Psychoneurotic depressives	Psychotic depressives
Past	0	1
Present	14	5
Future*	0	0
Chi square (1 d.f.)	.01	
p	--	

*The future category was dropped from the analysis and the Yates correction was used.

APPENDIX B

Comparison of Categories of Time Orientation given by the Depressive Group, the Schizophrenic Group, and the Normal Control Group in Stories to each TAT Card

Table 11. Categories of time orientation given by the depressive group, the schizophrenic group, and the normal group in stories to card 2.

Category	Depressives	Schizophrenics	Normals
Past*	3	1	0
Present*	16	15	8
Future	1	4	12
Chi Square (4 d.f.)	15.91		
p	< .001		

*The past and present categories were combined in the analysis.

Table 12. Categories of time orientation given by the depressive group, the schizophrenic group, and the normal group in stories to card 4.

Category	Depressives	Schizophrenics	Normals
Past*	2	2	0
Present*	17	16	12
Future	1	2	8
Chi Square (4 d.f.)	9.57		
p	< .01		

*The past and present categories were combined in the analysis.

Table 13. Categories of time orientation given by the depressive group, the schizophrenic group, and the normal group in stories to card 6 BM.

Category	Depressives	Schizophrenics	Normals
Past*	4	5	4
Present*	10	12	8
Future	6	3	8
Chi Square (4 d.f.)	3.13		
p	--		

*The past and present categories were combined for the analysis.

Table 14. Categories of time orientation given by the depressive group, the schizophrenic group, and the normal group in stories to card 7 BM.

Category	Depressives	Schizophrenics	Normals
Past*	4	3	1
Present*	14	14	8
Future	2	3	11
Chi Square (4 d.f.)	14.69		
p	$< .001$		

*The past and present categories were combined for the analysis.

APPENDIX C

Data Collection Forms

INFORMATION SHEET

Group: Depressive_____

Schizophrenic_____

Control_____

Name_____

Subject number_____

Hospital_____

Age_____ Race_____

Last year of school finished:

1 2 3 4 5 6 7 8 9 10 11 12
Grammer School High School

13 14 15 16
College

Verbal IQ_____

Starting Time:_____ page 2

TASK I...FUTURE TIME EXTENSION AND COHERENCE TEST (a)

Instructions:
I am going to read to you a series of events that might happen to a lot of people. I want you to tell me how old you might be when the event might happen to you.

1. Your first grandchild is born. _____

2. You die. _____

3. You can say you have most of the things you want. _____

4. Your youngest child marries. _____

5. You retire. _____

6. Your father dies. _____

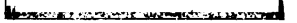
7. Your (husband) wife dies. _____

8. You are too old to be physically active. _____

9. You feel you have reached old age. _____

10. You can no longer have children. _____

Extension score _____



STORY 1
I want to see what kind of a story you can tell. I'll start one for you and then let you finish it any way you wish. I'll start it now. "At 3 o'clock one bright sunny afternoon in May two men were out walking near the edge of town"... Now you start there and finish the story for me.

Duration time of action in the story: _____

STORY 2
That was fine. Now I'll begin another story which, as before, you may finish any way you want to. Here it is: "Ten o'clock one morning Al met his friend Jerry near the center of town"... Now you finish it for me.

Duration time of action in the story: _____

STORY 3
Now here is the start of another story which you may again finish in any way you wish. "Joe is having a cup of coffee in a restaurant. He's thinking of the time to come when..." Now you finish it.

Duration time of action in the story: _____

STORY 4
Here is the last story I'll give you. "After awakening, Bill began to think about his future. In general, his plans involved..." Now you finish it for me.

Duration time of action in the story: _____

TASK III...TIME ESTIMATION (a) page 7

Instructions:
How much time has passed since you entered the room and started talking to me? Make the best guess you can.

Clock time_____

Estimated time_____

Accuracy of estimate:

Ratio of estimated time to actual time_____

Category of estimation:

_____Underestimation
_____Close estimation
_____Overestimation

TASK IV...TAT PICTURES

Instructions:
I am going to show you some pictures. I want you to tell a story about each of these pictures.

Present the pictures in the following order:

Card 2.

Response:

TASK IV (continued)

Card 4.

Response:

Card 6 BM.

Response:

TASK IV (continued) page 11

Card 7 BM

Response:

TASK I....FUTURE TIME EXTENSION AND
COHERENCE TEST (b) page 12

Instructions:
Here is a group of cards upon which the events I previously asked you about are typed. Arrange these cards in the order that they might happen in your life. Place the event that might happen first, first; the event that might happen second, second; etc.

The order given in Task I	The order given in Task V
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Rho-Correlation_____

VOCABULARY SUBTEST--WAIS page 13

1. Bed
2. Ship
3. Penny
4. Winter
5. Repair
6. Breakfast
7. Fabric
8. Slice
9. Assemble
10. Conceal
11. Enormous
12. Hasten
13. Sentence
14. Regulate
15. Commence
16. Ponder
17. Cavern
18. Designate
19. Domestic
20. Consume
21. Terminate
22. Obstruct
23. Remorse
24. Sanctuary
25. Matchless
26. Reluctant
27. Calamity
28. Fortitude
29. Tranquil
30. Edifice
31. Compassion
32. Tangible
33. Perimeter
34. Audacious
35. Ominous
36. Tirade
37. Encumber
38. Plagiarize
39. Impale
40. Travesty

Score

TASK III...TIME ESTIMATION (b) page 14

Instructions:
How much time has passed since you entered the room and started talking to me? Make the best guess you can.

Clock time_____

Estimated time_____

Accuracy of estimate:

Ratio of estimated time to actual time_____

Category of estimation:

_____Underestimation
_____Close estimation
_____Overestimation