PRE-MORBID PERSONALITY AS A PREDICTOR OF RIGHT HEMIPLEGIC, APHASIC, STROKE PATIENT REHABILITATION

by

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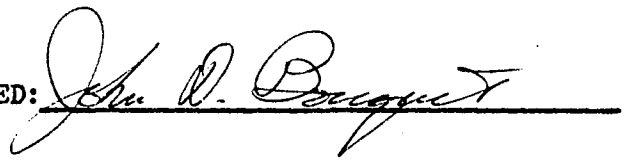
SIGNED: 

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ABSTRACT

Rehabilitation workers often try to predict performance on the basis of pre-morbid behavior and personality. This practice is even more common in cases of head injury when it is very difficult to obtain current psychological readings having validity. Then it is customary to obtain the pre-morbid data through interview of close relatives. The purpose of this research was to develop and evaluate a systematic approach to the use of informants in rehabilitation prediction.

A review of the literature revealed: (1) the possible existence of a stroke-prone personality; (2) certain adaptive and maladaptive behaviors are frequently found in stroke patients; (3) certain personality characteristics are more often associated with rehabilitation success than others.

Specific hypotheses were not warranted, however, for two main reasons: (1) it cannot be assumed that the same personality characteristics in evidence pre-stroke will appear post-stroke, although conceivably some may survive better than others; (2) many characteristics discussed in the literature, e.g., conformism and suppressed rage, have not been operationalized in ways that lend themselves directly to secondhand observational techniques. Therefore, personality instruments were selected which were considered relevant to the

literature, but the experimental hypotheses did not discriminate among the sub-categories.

The predictor instruments were the Taylor-Johnson Temperament Analysis (nine bipolar traits), the Stress Management Scale (a structured interview and semantic differential procedure devised for this study which yielded five bipolar coping abilities: Approach/Avoidance, Independence/Dependence, Rigidity/Flexibility, Emotional Involvement/Detachment, and Internalization/Externalization.) The criterion instruments were the Kenny Self-Care Evaluation (seven categories), and the Minnesota Test for Differential Diagnosis of Aphasia (four categories were used).

The investigator obtained the predictor data from the relative, and the criterion data were obtained by hospital nurses and speech therapists. The patients were evaluated pre- and post-therapy, and improvement scores were determined by subtracting the two sets of scores.

A sample of twenty-six was obtained over a seventeen-month period. The subjects were right hemiplegic, aphasic patients at Rancho Los Amigos Hospital, Downey, California. They were all less than six months post-stroke. They had no residuals of previous strokes, and they were without serious complications. They all had at least one month physical therapy, occupational therapy, and speech therapy. The final evaluations were done before ninety days of therapy were completed.

Pearson product-moment correlations between the fourteen predictor variables and eleven criterion variables produced eight significant correlations out of a possible 154 predictive correlations. Step-wise multiple regression analysis produced significant F ratios in seven out of twenty-two separate analyses. These seven were mainly due to the above eight significant correlations, and the F ratios quickly fell below the required significance levels as additional variables were added.

The significant correlations found could easily have occurred by chance. Hence, the null hypotheses were accepted. There does not appear to be any significant relationship between pre-morbid personality and coping ability and stroke patient rehabilitation insofar as these instruments are concerned. While it remains possible that some of the correlations found in the data may assist in future regression equations, further research will be necessary to rule out the possibility that they represented only chance variation in the data.

The research produced some other findings, for example: (1) time post-stroke made no difference in the relative's appraisals; (2) the T-JTA means were not as a group significantly different from published means, but there were five significant differences (out of nine) which provides support for the existence of the stroke-prone personality described in the literature.

CHAPTER I

STATEMENT OF THE PROBLEM

Introduction

There have been few attempts to formulate a theory of rehabilitation. One reason may be that rehabilitation workers are not concerned simply with individuals; they are also concerned to a great extent with environmental or situational variables. Puth (1970) pictured rehabilitation as probably the most comprehensive science, insofar as the immediate welfare of man is concerned, because it attempts to match "total environmental demands with individual abilities and limitations in an equilibrating balance . . . (p. 15)."

This is not to say that the existing theories of human development (personality theories) do not recognize the importance of environmental factors. Lewin (1935) acknowledged that behavior is determined by contemporary forces, and Murray's (1938) distinction between needs and press gives considerable recognition to environment. On examination, however, these theories appear to focus most attention on the individual. In the words of Yinger (1963):

> It is one thing to take account of environmental forces as limiting conditions, as most psychologically trained field theorists do. It is another thing to incorporate personality variables and environmental variables into the very unit of analysis, with full attention to the fact that neither by itself has "direct effects upon behavior"--that is, has effects that are not mediated through the other system of influences (p. 583).

Thus, instead of wondering only what personality characteristic might contribute to improved performance in such areas as self-care or job seeking, one should ask, "What improvement can be expected given these personality characteristics and these environmental circumstances?" When this is done, theorizing is clearly more difficult. In fact, if all possible combinations of personality traits and environments are to be considered, it might be better to defer theory making and devote one's energies toward collecting and analyzing data.

Bardach (1968) has suggested how such a combination of internal and external factors might be conceptualized. She proposed to relate Maslow's hierarchy of needs to the various demands of a rehabilitation hospital. Thus, physical therapy satisfies physiological needs; training in activities of daily living satisfies safety needs; interactions with staff and relatives satisfies belongingness and love needs, and self-esteem needs; vocational counseling and psychology deal with self-actualizing needs. She did not suggest that the individual masters his environment, but rather the individual and the environment are ready for each other and positive results ensue.

The research reported herein attempts to accommodate this kind of interactional field view. Personality characteristics are correlated with the performances of specifically disabled persons in specific situations. By holding the non-personality factors constant in this way, full allowance is made for their ability to influence the equation. The disability in this case is stroke, in particular stroke with right hemiplegia and aphasia. The situation is an

in-patient rehabilitation hospital which attempts to promote improvement in self-care ability, locomotion, and speaking ability. Only those stroke patients that appear to have the potential for improvement in this situation are included in this research.

The choice of which personality traits or constructs to measure was made on the basis of three considerations. First, what existing instruments may be applied with a stroke population? Second, what is the likelihood that ad hoc instruments might be devised for this disability group? Third, what personality constructs seem most relevant to this disability and to rehabilitation success?

In answer to the first question, it was soon discovered that no existing instruments have much applicability to stroke patients. Stroke patients are so often impaired in speech, intellect, and emotional control, as well as visual-motor ability, they could not as a group be expected to take standard personality instruments. Furthermore, the amount of screening that would be necessary to select those few stroke patients that could take standard personality inventories would be prohibitive. The sample size would have to be further reduced because of the prognostic differences between such stroke subgroups as left and right hemiplegics. Even if it were possible to obtain a sufficiently large sample, hospital patients are not the most stable testing subjects: day-to-day changes in physical condition may render test results unreliable, and the shock of disability and one's isolation from normal social contacts must certainly affect one's ability to function reliably in testing.

The second question was answered in the negative for many of the same reasons. If one focused on such a characteristic as emotional lability, the confounding factors of intellectual deficit and visual-motor impairment could not be excluded. It appeared that any instrument might produce results that could be due to either organic or functional factors.

Thus, the likelihood that direct personality measurement of stroke patients was impractical made the evaluation of the third question (what personality constructs seem most relevant to stroke and rehabilitation?) contingent on the availability of some means for indirect personality assessment. Buros' Mental Measurement Yearbook (1965) did not reveal any plausible instruments, and there are no personality data banks where ready-made profiles can be obtained. Thus, it was fortuitous that the Taylor-Johnson Temperament Analysis was discovered (it was developed after the 1965 edition of the Mental Measurement Yearbook). The inventory was constructed for evaluation of "other persons," and it emphasizes important characteristics present in the 'stroke-prone personality,' namely, emotional expression and the presence or absence of socially conforming behavior. Typically, the 'stroke-prone person' is said to repress those emotions that are not socially desirable and to conform with social expectations by being, for example, polite and achievement oriented. The nine scales of the Taylor-Johnson Temperament Analysis appeared remarkably relevant to such patterning. The expression or repression of anxiety, depression, and hostility is coupled with such socially felicitous qualities as

social activity, expressiveness, sympathy, and self-discipline. Related to temperament and its selection as an appropriate object of study is the fact that the human vascular system is quite sensitive to emotional stress; stress, high blood pressure, and stroke are often thought to be related.

A person's general personality as reflected in day-to-day tendencies and response patterns is not necessarily consistent with his reactions to specific traumatic life stresses. The somewhat tense but amiable 'stroke-prone personality' might not be quite so reserved in the face of great stress. Thus, coping ability as it applies to specific life stresses should have central bearing on both the development of the physiological precursors of stroke and the success of the stroke victim in surmounting the stress of his own stroke. While no established instrument could be found for indirect evaluation of this personality characteristic, it seemed ideally suited to the interview technique.

The importance of these personality characteristics in regard to stroke and rehabilitation, and the availability of means for assessing them indirectly, lent support to the use of a pre-morbid approach. Would it not be possible to obtain this information from the patient's intimate relatives? They could describe the patient as they knew him during his lifetime prior to the stroke. Knowledge of a person's pre-morbid personality as it existed over his entire life span should be more meaningful than simply an assessment at one isolated point post trauma. Also, if it were possible to gauge whether or not an individual's personality had developed as a result of many rather

than few life stresses (or only a few but intense life stresses), the predictive power of any measuring instrument might be greatly increased.

There is some evidence in the literature (Small, Small, and Gonzales, 1965; Vestre and Zimmerman, 1969) that relatives can provide reliable and valid information about a patient, but this approach has not been used in any comprehensive manner with physically handicapped groups. Many objections can be raised. Can close family members be expected to be objective in the face of loss, guilt, and anxiety concerning recovery? What about the differences in degree of acquaintance among family members; not all relatives have known the patient in the same way nor would all be attuned to the same things.

These objections notwithstanding, there appeared to be sufficient cause for conducting the research. The incidence of stroke is great and increasing; the disability is severe but it is not beyond remediation; there seems to be no other practical method for obtaining personality information when speech, intellect, and emotionality are impaired. If relationships between personality and rehabilitation success can be demonstrated, screening procedures for rehabilitation candidates can be made more effective. Also, better and more individualized treatment procedures might be developed based on such relationships, and, if causal relationships can be suggested, both prevention and medical management might be improved.

Problem

The main purpose of this study was to seek an answer to the following question: Are pre-morbid personality traits and coping

abilities predictive of the rehabilitation progress of stroke patients? In addition, two ancillary questions were explored: Does the passage of time post-stroke affect the nature of the characterizations of a stroke patient's pre-morbid personality and coping abilities? Are the pre-morbid personalities of stroke patients different from those of people in general?

Hypotheses

Stated in the null form the following hypotheses were tested:

Major hypotheses

1. There is no significant predictive relationship between pre-morbid personality traits and improvement in the performance of self-care activities of stroke patients.

2. There is no significant predictive relationship between pre-morbid personality traits and improvement in the communication abilities of stroke patients.

3. There is no significant predictive relationship between pre-morbid coping abilities and improvement in the performance of self-care activities of stroke patients.

4. There is no significant predictive relationship between pre-morbid coping abilities and improvement in the communication abilities of stroke patients.

Minor hypotheses

5(a). There is no significant difference in pre-morbid personality between those subjects tested shortly after stroke and

those tested after a specified minimum time post-stroke.

5(b). There is no significant difference in pre-morbid coping ability between those subjects tested shortly after stroke and those tested after a specified minimum time post-stroke.

6. There is no significant difference between the pre-morbid personality traits of stroke patients and the personality traits of a sample from the general population.

Procedure

The subjects for this study were chosen from the stroke ward patients at Rancho Los Amigos Hospital (RLAH) in Downey, California. Twenty-six subjects were included in the sample. Information concerning each patient's pre-morbid personality and coping ability was obtained from a close relative; spouses were preferred although others were accepted if they met certain criteria. The patients were evaluated in terms of their progress relative to their hospital treatment programs.

The personality information was obtained by the administration of the Taylor-Johnson Temperament Analysis (T-JTA), and the coping ability information was obtained through a structured interview combined with a semantic differential procedure called the Stress Management Scale (SMS). The outcome criteria were speech (language) proficiency obtained with the Minnesota Test for Differential Diagnosis of Aphasia (MTDDA) and performance of activities of daily living obtained with the Kenny Self-Care Evaluation (KSCE). The T-JTA and SMS were administered by the investigator. The MTDDA and KSCE were

administered by speech therapists and nurses respectively. The MTDDA and KSCE were administered within the first two weeks after patients had begun their therapy programs and during the last two weeks of their therapies.

A period of seventeen months was required to obtain the data. New subjects were admitted at a rate of approximately two per month. Among hospital admissions of right hemiplegic, aphasic stroke patients, about four out of five failed to meet sampling criteria. Subjects in the study had to have a minimum of one month therapy in physical therapy (PT), occupational therapy (OT), and speech therapy (ST), and a maximum of three months. All twenty-six subjects were selected on the basis that they were in need of, and would be given, PT, OT, and ST.

Statistical Procedures

Improvement scores for each patient were obtained by subtracting the initial and final ratings on the subtests of the KSCE and the MTDDA. Then, after performing computations to verify normality, homoscedasticity, and linearity, stepwise regression analysis was used in order to confirm or reject the first four experimental hypotheses. In addition, the multiple and partial R's (regression correlations) were tested for significance. The fifth hypothesis required the use of analysis of variance in comparing those personality traits and coping abilities obtained shortly after the stroke and those obtained after a greater length of time post-stroke. The sixth hypothesis required the use of means and standard errors of the means in

comparing the T-JTA results with published data on the T-JTA. The .05 significance level was used throughout the study.

Definitions

Problem area: any life situation with a high probability of causing psychological stress.

Stress: a state of psychological tension or concern usually caused by the presence of desires in excess of the available means of gratification.

Coping abilities: the means through which stress is managed or resolved (those means delineated in the SMS).

Pre-morbid personality: the traits, attitudes, and related behaviors exhibited by patients prior to their strokes (measured by the T-JTA).

Rehabilitation progress: the amount of change reflected in the difference between the initial and final testings of the KSCE and the MTDDA.

Stroke: a cerebrovascular disorder, involving hemorrhage, thrombosis, or embolism, due to factors other than trauma or brain tumor, sufficient to warrant placement on the RLAH stroke wards.

Communications disorder: a speech difficulty of sufficient magnitude to warrant at least one month treatment (determined by a RLAH speech therapist). This definition is broader than that implied by the use of the term aphasia in the title of this research.

Hemiplegia or hemiparalysis: one-sided arm or leg immobility of sufficient magnitude to warrant at least one month occupational therapy and physical therapy (determined by RLAH occupational therapists and physical therapists).

Assumptions

1. The personality and coping ability instruments are adequate for pre-morbid assessment.

2. The persons administering the test instruments did so as presented and in a consistent manner across all patients and relatives.

Limitations

1. Each patient may not have equally beneficial interactions with other patients, staff, and relatives.

2. No means is available for checking thoroughly the reliability and validity of the testing instruments and administrative procedures used in this study.

3. No means is available for systematizing and controlling other hospital procedures by which patients are selected and retained on therapy programs.

4. Further statistical analyses and research is necessary in validating the predictor variables isolated herein in order that techniques of relevance to individual cases can be developed.

Summary

This chapter presents an overview of the research and offers justification for the selection of the predictor variables and the adoption of an indirect approach to personality measurement. The basic question raised in this research is: Can pre-stroke personality data obtained from the patient's relatives serve to predict rehabilitation success? The design of the study focuses on validity, not reliability; failure of the personality data to predict rehabilitation success could be due to either inadequate measuring instruments or to the weakness of personality insofar as its power to influence rehabilitation outcome. Empirical research of this nature is meant to uncover possible relationships, not to provide finished measuring instruments.

Stroke ranks third as a cause of death in the United States and fifth as a cause of death during the productive years of life (DeBakey, 1964). Yet, strokes do not always kill; about eight of every ten stroke victims survive the initial phase of the disease (DeBakey, 1964). Thus, many persons who have had strokes are able to return to productive living. A recent Colorado study (Peterson, 1966) found that of those who had been gainfully employed prior to their strokes, one-third were able to return to work. These statistics emphasize the need for experimentally devised procedures that will assist in the restoration of all stroke victims having the capacity for recovery. This research has been conducted in order to improve the procedures now in use for selecting those patients with potential and insuring that they receive adequate treatment.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter contains a review of the literature presented under the following headings: Importance of Pre-Morbid Personality; The 'Stroke-Prone Personality'; Pre-Morbid Personality and Stroke Adaptation; Lateralization of Stroke and Subsequent Adaptation; Personality and Adaptation in Other Disabilities.

Importance of Pre-Morbid Personality

Pre-morbid personality is often suggested for study, but it is seldom researched. Among those who have simply suggested that it be researched are:

> 1. Brent (1958): "I also believe that it will be necessary for the various individuals to direct their skills toward evaluating the premorbid integrated personality of the disabled and to apply their skills to adjusting or manipulating the known post-morbid personality characteristics in order to assist the disabled to attain a reintegrated personality (p. 8)."
>
> 2. Seidenfeld (1958): "The patient's behavior not only is a function of his present catastrophe, but is dependent upon his earlier experiences and his genetically influenced characteristics (p. 79)."
>
> 3. Ayer, Thoreson, and Butler (1966): "It appears from such research [studies showing no connection between disability reaction and disability type] that the personal adjustment of the disabled individual is to a large degree a function of pre-morbid personality integration . . . (p. 632)."
>
> 4. Matlin and Albizu-Miranda (1969): "If people react differently to the same handicap, one has every right to expect that differences in the premorbid personality will account for differential reactions (p. 23)."

The study of pre-morbid personality has also been specifically suggested in connection with stroke (cerebrovascular accident) and hemiplegia, which is a common result of stroke. For example, Tikofsky (1967) stated:

> Results of psychodiagnostic testing during the acute stage may yield unreliable and incorrect estimates of the patient's emotional and adaptive status. Of greater value during the acute stage is careful observation of the patient, supplemented by a reliable and accurate history of his pre-morbid personality and responses to traumatic, stressful, and frustrating situations (p. 109).

In addition, Wepman and Jones (1967) have urged that the relationship between pre-morbid personality and language types and post-morbid personality and aphasic types be researched.

The 'Stroke-Prone Personality'

Research related to the topic of pre-morbid personality and stroke falls into two main categories. One concerns the so-called 'stroke-prone personality,' and the other concerns the relationship between pre-stroke personality characteristics and subsequent adaptation to the stroke. This section will discuss, briefly the first category. Henceforth, the term 'stroke-prone personality' will be used without quotation marks, although it should be understood that the association of certain personality traits with the susceptibility to stroke is far from being established or proven.

The studies of the stroke-prone personality center around the personality traits of persons suffering from hypertension, which is one of the prime factors responsible for stroke. Bauer (1967) found about 75 percent of stroke patients with occlusive vascular disease to be

hypertensive. The hypertensive or stroke-prone person is described as typically overcontrolled and conforming yet particularly prone to anxiety and rage. These emotions must be suppressed or repressed in order for the person to appear normal (Groen, 1964; Moses, Daniels, and Nickerson, 1956; Saul, 1955; Wolf, 1955). Sometimes, the rage becomes so great that it contributes directly in producing the stroke.

Perhaps, because of these bottled up emotions, the stroke-prone person is not always able to maintain complete calm and tranquility. According to Wolf (1955):

> This person [essential hypertensive] is "on guard" but does not necessarily appear under stress. He is feeling angry and resentful but concurrently striving not to show his feelings lest he reveal his hostility toward his environment and precipitate the disaster he fears.
>
> However, such an individual in reaction to less specific topics may perceive himself to be threatened in another way. . . . In such a circumstance the expression of his feelings about the threat becomes obvious, and he is able to be articulate about his anxieties and troubles. He is overtly tremulous, he gives all the outward signs of being frightened and anxious . . . (p. 118).

The same is implied in this statement of Groen's (1964): "Only on careful observation does he appear tense, by which we understand a situation of inhibited (usually neurotic) activity (p. 301)."

Thus, in terms of temperament there seems to be a picture of the stroke-prone personality being generally somewhat bland and well mannered, but, in times of stress or under close scrutiny, underlying anxiety and irascibility may be visible. Certainly this kind of personality is not rare, judging from the work of Lazarus and others on anxiety and reaction to stress. Lazarus and Alfert (1966) have suggested that people may react to stress in either an externalized

fashion or in an internalized fashion: "High deniers refuse to admit disturbance verbally but admit it autonomically, while low deniers are apt to say they are more disturbed while showing less autonomic reactivity (p. 185)."

It is generally agreed that stress can produce elevations in blood pressure. According to Ostfeld and Shekelle (1967), "acute psychological stress may initiate sudden and transient elevations of blood pressure in some persons (p. 321)." Nevertheless, chronic hypertension may not be due to stress, nor to a susceptibility to stress, as in the case of essential hypertension. According to Eisdorfer (1967), "at this time there is no evidence that the well-documented short-term cardiovascular responses to emotional disequilibrium are the basis for permanent structural or functional change in a pathologic direction (p. 622)." On the other hand, Wolman's (1965) review of the subject is somewhat more open to the possibility that emotional factors are contributory. He refers to Ecker's (1954) study and conclusion that the arteries of stroke or stroke-prone subjects contracted excessively, and that it could be a result of emotional disturbance.

Other studies have pointed out that hypertensives react differently from normotensives (for example, Schacter, 1957); consequently, it might be that a third factor is responsible for both the hypertension and susceptibility to anxiety and rage. Kaplan et al. (1961), using verbal samples and hypnotically induced dreams, demonstrated a quantitative relation between blood pressure and hostile emotions, and went on to suggest the possibility that the hostile

verbal content could be due to the elevation of blood pressure rather than vice versa, or that both might be dependent variables of a third factor. If that is the case, then one could speculate that the hypertensive person might use society's conventions and prohibitions as a means of helping him control his tendency to overreact. Then, it could be said that his temperamental style is the direct result of the strength or weakness of his superego.

Returning to the purposes of this study, the literature related to the stroke-prone personality, although equivocal, suggests that the stroke patient is pre-morbidly often a good citizen, hard-working and amiable, but that in part his efforts are designed to protect him from underlying emotions of anxiety and rage, which might be due to dependency conflicts or a constitutional factor. Usually he is able to maintain calmness and good spirits, but at times various stress situations will threaten to penetrate his defenses thereby producing, or revealing, the anatomical signs of anxiety or stress. Whether or not overtly expressed apprehension and hostility are ever manifested is not clear in the literature, yet there are no statements completely to the contrary.

This complexity and uncertainty, along with the inadequacies of the various instruments for measuring personality, may account for the large variances that have prevented discernment of a universal stroke-prone personality. The picture of the stroke-prone personality might be somewhat different if our measuring instruments were sensitive enough to detect emotions and attitudes below the level of

superficial adjustment. If the focus is aimed at reaction to stressful situations and attention is directed to covert as well as overt emotional responses, the stroke-prone personality could be seen quite differently. Then simple generalization would not suffice. If a person is generally calm but occasionally quite violent, can a true or false question on calmness be answered fairly?

Pre-Morbid Personality and Stroke Adaptation

What follows is a review of those studies, mainly clinical or observational, that have attempted to explicate the role of the pre-morbid personality in subsequent adaptation to stroke. Most of these studies are merely suggestive: the subject was either not approached systematically or it was only touched on as part of a larger study of psychological factors relating to stroke rehabilitation.

One of the more clinical studies is that of Nemiah (1964). Based on his years of experience in a rehabilitation clinic, Nemiah stated that approximately fifteen percent of the stroke cases to which he had been exposed presented particularly difficult management problems. Nemiah stated that "if one inquires into the pre-morbid personality of a typical patient in this group, one finds a history of certain characteristic behavior patterns (p. 851)." These characteristics may be grouped in three categories:

> 1. The patient has always worked very hard and conscientiously. He is an active doer who likes to keep physically busy.
>
> 2. The patient has gone out of his way to maintain his independence. Although often very altruistically helpful to other people, he rarely or never allows himself to get into a position of needing or taking help from others.

3: The patient has appeared to be a very even keeled person emotionally, almost never getting angry, anxious, depressed or upset, no matter how difficult his situation.

According to Nemiah, however, these characteristics are only superficial: "If one gets to know these people . . . one discovers a curious fact: that beneath these surface personality characteristics, and hidden from the patient's full conscious awareness, are needs, drives, impulses and personality traits quite the opposite in nature (p. 851)." Nemiah then described the supposed underlying dynamics in terms very similar to the classical writings on the stroke-prone personality, namely, repressed dependency needs, rages, and overly strong superego. By maintaining a self-image of the strong, silent, hard working, independent, unemotional, and active person, the underlying tendencies are kept in check. Usually, the person is seen as he would like, although not always.

In the face of stroke Nemiah saw considerable difficulty since the person is forced into just the position of dependency and weakness he has striven so hard to avoid. As a result there is depression, anxiety, anger, and bitterness. The patient then either denies, becomes overwhelmed by depression or anxiety, or suffers a regressive reaction--hypersensitivity and exaggeration of complaints. (If there is a stroke-prone personality, one wonders why difficulties such as these are encountered in only fifteen percent of the cases.)

Ullman (1962), having closely examined 300 stroke patients between 1957 and 1962, came to the conclusion that: "In one sense, the pre-morbid personality is all-important. It forms the nexus out of which all subsequent adaptive responses arise [italics in the original]

(p. 37)." Unfortunately, however, Ullman found insufficient order in his data to allow for the prediction of the kind of adaptive response in individuals. Believing that there are no consistent and reliable ways of evaluating the pre-morbid personalities of individuals who have lived long lives, and that conventional classifications of pre-morbid personality patterns are quite useless for predicting either healthy or pathological modes of adapting to the stroke, he could only conclude that:

> Most commonly what occurs is an accentuation of underlying trends of either a positive or negative quality. Thus, patients may move towards states of more outspoken benevolence, tolerance and appreciation or, conversely, irascibility, suspiciousness, dissatisfaction and intolerance. In some instances attitudes and reactions diametrically opposed to prevailing trends in the premorbid personality come into focus (p. 37).

Another factor must be considered, according to Ullman, and that is the point in a person's life in which the stroke occurs. Common sense would dictate that adaptive reactions for an individual might be different if the stroke occurs when he is forty, and experiencing one kind of life situation, or at fifty when circumstances for him could be quite different. Sometimes a stroke "climaxes a process of resignation and surrender set in motion years before; at other times it initiates such a process (p. 60)." Undoubtedly, this matter of time confounds prediction.

Despite these disclaimers Ullman asserted that "unrealistic strivings for independence and unrealistic dependency are perhaps the two main channels into which irrational modes of adaptation flow (p. 60)." Findings such as these are useful in management and

treatment, but they are insufficient for prediction since "the many variables--social, psychological, and physical--entering into the final adaptive response dilute the possible prognostic importance of a knowledge of the life history of the individual (p. 37)."

Weinstein and Kahn (1955) evaluated 104 brain damaged cases (it is not clear how many were stroke cases) between 1947 and 1955 giving special attention to pre-morbid personality. Personality histories were obtained by interviews with relatives, friends and physicians. These informants were questioned regarding attitudes, character of drive, reaction to stress, interpersonal patterns, and expressive symbols (sayings, superstitions, etc.). Although informants might describe the same patient somewhat differently, "There was a valid common background in terms of the nature of the modes of communication of attitudes within the family group (p. 73)."

Weinstein and Kahn's cases had been selected because each exhibited some form of denial of symptoms. In general, they were impressed with the relationship between pre-morbid personality and subsequent denial: "the work to date indicates that there is a significant relationship between previous behavior and all types of denial expressed after brain damage (p. 84)." In comparing kind of denial with type of pre-morbid personality, they found that "patients with explicit verbal denial seemed to form the most homogeneous group both in clinical behavior and in regard to personality background (p. 84)." This group was so homogeneous that it was considered possible to predict, on the basis of the personality interview, whether

or not a patient would develop explicit verbal denial if the sufficient conditions of brain function developed.

Specifically, those who used denial explicitly after a brain injury had used it before. As in the case of the hypertensive personality, they were historically concerned with presenting a good image of themselves, and any illness was seen as a sign of weakness or disgrace. Other characteristics of the explicit deniers were strength and independence, conscientiousness and responsibility, energy and compulsiveness, conventionality and the likelihood of attaining success. Those patients who used denial in more subtle ways (implicit deniers) were also likely to have been "fearful or ashamed of previous ailments and were apt to become anxious, depressed and withdrawn when ill, but they did not tend to deny or rationalize it (p. 81)." Additionally, the implicit deniers were described as being more open in the expression of their needs and feelings. Some were characterized as being "dependent" or childish, and there were some who were more creative and imaginative than the explicit deniers.

Weinstein and Kahn administered IQ tests and Rorschachs to the various kinds of deniers to determine what effect denial may have on the patient's adaptive success: "There was a bland serenity in the patients with verbal denial, and paranoid, euphoric or withdrawn attitudes in the patients with other forms of adaptation (p. 101)." These reactions seemed to result in unnecessarily low IQ scores. In general, the Rorschach responses seemed to support the importance of the pre-morbid personality as a factor in determining the kind of denial used. Whether or not "poverty of response," excessive focus on sex, food, and anal

content, euphoric responses, etc., are reflective of ward behavior is a matter of conjecture.

Others who have studied the question of pre-morbid personality and its relation to stroke disabilities and brain damage are: Cobb (1944); Lee et al. (1958); Teuber (1960); Diller (1962); Litman (1962); Eisenson (1964); Schulman, Kaspar, and Throne (1965); Tikofsky (1967); and Horenstein (1970). With some exceptions, their findings and opinions have supported the notion that pre-morbid personality affects the reaction to the disability and moreover that the reaction to the disability influences the way the patient responds to treatment. Unfortunately, these studies have been reported in very general terms--there is little quantification and little discussion of what specific pre-morbid characteristics are followed by what specific adaptive reactions. In addition many writers have been compelled to conclude that causation must be viewed multifactorially as an interaction between pre-morbid personality, the brain, etc. This has been repeated so often that it may have become an apology for unproductive research.

Diller (1962) has offered a good summary of the above:

> Observers have noted that people with consistent histories of successful vocational attainment may fail to adapt to hemiplegia and do poorly in rehabilitation. This is thought to occur in people who attain success at the price of denying their needs in other areas, e.g., those who have limited cultural interests, lack close inter-personal relationships, or are unable to admit illness or personal weakness . . . . In such cases, adaptation occurs not by accepting the disability but through denial. Denial, in fact, may be a characteristic defense in this type of personality structure. While premorbid personality, therefore, is an important consideration in evaluating response to a disability, its relationship to current functioning in hemiplegia must be very carefully evaluated. In general, it can be said that premorbid personality and intelligence are important--but

> they may be vitiated by a diffusion of large lesions in the brain, by lesions strategically placed, or by the nature of the lesions (p. 139).

Lateralization of Stroke and Subsequent Adaptation

Weinstein and Kahn believed that denial is associated with diffuse brain damage; they rejected any notion of localization and apparently felt that denial may occur regardless of whether the left or right hemisphere is involved. Ullman (1962) has also been of this opinion. On the other hand, Friedlander (1967) reported that denial is more often associated with left hemiplegia. Drawing in part from Weinstein and Kahn's work, he theorized that this is the case because generally language functioning is localized in the left hemisphere (left hemisphere damage produces right-sided paralysis and vice versa). When language is impaired, as in stroke patients with aphasia, the patient is unable to use the "metaphorical speech" which is necessary for denial; he cannot talk to himself about his disability and in so doing develop defenses against it. Without defenses the left hemisphere damaged patient is more likely to have a "catastrophic reaction." Research was cited to substantiate the panic of left hemisphere patients. Friedlander summarized the development of denial:

> I believe a theory can reasonably be constructed for the anosognosic denial syndrome in which all these various explanations are utilized. The patients have a particular type of personality, one which has utilized denial of illness in their premorbid state. There is then damage to the brain which results in: 1) parietal lobe damage or at least damage to that part or parts of the brain which have to do with the correct synthesis of multiple perceptions; and 2) confusion with loss of some ability for reality testing. Hence, these individuals, having learned how to perceive based at least in part on their personality, will have a defect in perception

> that leads to a particular caricature of perceptual morphosynthesis. This disorder is more frequently recognized when there is a left hemiplegia because: 1) the body-concept is skewed based on the major hand's alteration of body-percepts and thus giving greater relative protection to the major side of the body; and 2) the aphasia which results from a major hemisphere damage leads to, a) a non-specific difficulty in communication, and b) loss of ability to utilize metaphorical language (p. 1406).

Although there are many cases of right hemiplegic denial, there seems to be a fairly strong case in favor of left hemiplegia denial being the most prevalent. Luria (1966) stated: "Nor must it be forgotten that the right hemisphere is [italics in the original] dominant with respect to certain mental processes. There is evidence that such processes include those concerned with music and the awareness of a personal disability (p. 90)." Diller (1969) was most persuasive: "Left hemiplegics tend to belittle, omit, or minimize problems. Right hemiplegics tend to admit the existence of a problem, but respond with anxiety as a preferred style (p. 578)." Also, literal denial of a disability, anosognosia, occurs more often in left hemiplegics than in right hemiplegics.

On the other hand, Weinblatt (1960) brought up a point that adds some complexity to the issue. He felt that the more severely impaired left hemiplegics were anxious and denying; perhaps the above distinction is less relevant when there is severe injury.

In an attempt to integrate the notions of the stroke-prone personality, laterality, and the denial/anxiety reaction, some authors have in effect proposed that, depending on the site of the lesion, the person is able to elaborate on pre-morbid defense mechanisms, e.g.,

denial, or he is "stripped naked" and all his fears about dependency, failure, etc., are triggered.

One study that tends in this direction is that of Hirschenfang, Schulman, and Benton (1968). Although their results may be clouded somewhat by the fact that language difficulties in themselves may greatly influence psychosocial adaptation following stroke, they stated that:

> Right hemiplegics generally are more physically involved and therefore, more dependent upon the family and hospital staff. This dependence often manifests itself . . . as incontinence, "laziness and negativism" . . . . While further investigation is necessary . . . relationship therapy with these patients has often brought out retrospective feelings of frustration, hostility, depression and confusion about being unable to communicate such vital needs as . . . . whereas reactive depression is found in many hemiplegic patients, it is almost universally evident in the right hemiplegic, who is seen as labile, immobile, withdrawn and apathetic. Among many of the left hemiplegics we have found a different phenomenon. Many of these patients perhaps because of fear, feelings of inadequacy and diminished self-image, wish to assume a more passive-dependent role which is usually denied . . . . Thus, we find a large number who unconsciously resist the rehabilitation process by being late for therapy, not attending their program, and even denying the extent of their disability (p. 6).

The denial of the left hemiplegic and the anxiety and depression of the right hemiplegic are likely to be equally maladaptive. There seems to be considerable opinion supporting the equally maladaptive effect of these reactions (discussed in the next section), and some evidence has been cited that left hemiplegics and right hemiplegics perform equally well in rehabilitation. For example, Bourestom (1967) found that the diagnosis of left vs. right hemiplegia was not correlated with change in self-care status. On the other hand, contrary evidence is also available (see Chapter III); the question

becomes very tangled when matters of criteria are raised. At this point in the literature review it seems appropriate to simply state that anxiety and depression may be a frequent reaction of the right hemiplegic and that possibly this reaction is related to underlying insecurities and a "susceptibility" to stress.

Personality and Adaptation in Other Disabilities

In predicting rehabilitation success in disabilities other than stroke, some consideration has been given to pre-morbid personality. For example, with regard to mental illness, Phillips (1953) found that a mature pre-morbid social and sexual life are related to short duration of illness and early hospital discharge. Rosenbaum, Friedlander, and Kaplan (1956) found that improvement among outpatient mentally ill was greatest in those with good pre-morbid histories whose environment afforded many supports. (Improvement was mainly in marital and work adjustment.) Moran, Fairweather, and Morton (1956) evaluated tuberculosis patients and found that premature discharge was best predicted on the basis of pre-hospital life adjustment--those who left too soon had a long history of being unable to adjust to their life situations. Bolton, Butler, and Wright (1968) reported from a literature review that mental patients who made poor recoveries were in childhood more nervous, less conforming, and more aggressive. They also reported that general vocational rehabilitation was impaired in those handicapped persons who had little prior participation in social activities.

Thus far, this review has been concerned with pre-morbid studies. Is it possible that post-morbid studies of other disability

groups have found some relationships between personality characteristics and rehabilitation success that by implication support or discount the suggestions made above? As Wolman (1965) pointed out, post-morbid personality measurement has many problems in itself, perhaps as many as pre-morbid measurement. The effects of timing, recency of trauma, and cognitive impairment are probably prohibitive except in selected instances. Nevertheless, research has been done in this area, and those findings are of interest if those personality characteristics that affect rehabilitation after trauma existed, at least in part, before the trauma.

These studies have usually combined several disabilities in the same sample. General reactions to disability have been sought rather than how particular disability groups react. Those reported herein are primarily concerned with the physically disabled, and some have included stroke patients in their samples; however, the results cannot be said to apply to stroke patients any more than to other disability groups. The results have not always been in agreement, and even when agreement may exist the reporters frequently emphasize different aspects. Rather than dwell on individual studies, several personality clusters have been identified as associated with rehabilitation success of one kind or another. The references include: Davis (1955); Goldsmith (1956); Gilbert (1964); Cohen (1964); Tamerin (1964); Sinnett, Stimpert, and Straight (1965); Wolman (1965); Ayer, Thoreson, and Butler (1966); Gray et al. (1966); Lyerly and Abbott (1966); Pool and Brown (1966); Eber (1967); Bardach (1968); Barry, Dunteman, and Webb (1968);

Diamond, Weiss, and Grynbaum (1968); Bolton, Butler, and Wright (1968); McDaniel (1969); and Anderson, Bourestom, and Greenberg (1970).

The following personality factors have been associated with rehabilitation success:

A. Ego strength, positive attitude, energy

1) self-confidence and assertiveness
2) surgency, ascendance and dominance
3) enthusiasm
4) drive and determination, aggressive feelings
5) positive, hopeful, future oriented attitude
6) optimism
7) need for achievement
8) favorable attitude toward self and disability
9) active rather than passive (but not hyperactive)
10) feelings of independence and the desire for independence
11) not too much hope (which indicates denial)
12) absence of feelings of inadequacy
13) "active upset" which means dissatisfaction along with efforts to improve the situation

B. Balanced sociability

1) interest in people
2) social restraint
3) capacity for warm interpersonal relations, geniality
4) greater social competency
5) absence of paranoid tendencies and over-sensitivity
6) heterosexuality, sexual adjustment, not too high in masculinity or femininity
7) some inner directedness but considerable extroversion
8) not too dependent
9) not demanding
10) not self-centered, generosity
11) not withdrawn
12) frankness
13) easygoing manner

C. Balanced awareness

1) awareness of and acceptance of self rather than denial of disability, although some denial may be alright
2) absence of denial of depression
3) willingness to admit psychological problems

4) not too defensive
5) fewer physical complaints or somatic preoccupations
6) realistic aspirations

D. Balanced emotionality

1) not too much emotionality although some emotional maladjustment is not necessarily counter-productive; some emotional discomfort is probably adaptive; it is motivating
2) moderate anxiety and tension is alright and person with high anxiety does better than person with low anxiety; key factor is the ability to tolerate anxiety
3) not too much depression
4) neuroticism is counterproductive but it is better than character disorders
5) frustration tolerance

E. Miscellaneous

1) guilt proneness without self-punishment or internalized aggression is adaptive because it promotes acceptance of responsibility
2) conscientious, responsible, painstaking
3) reporting natural causes rather than supernatural punishment
4) small discrepancy between self and ideal self
5) flexibility (not well substantiated)
6) personality integration and maturity

Thus, in some ways the stroke-prone personality might actually facilitate rehabilitation progress. The stroke-prone personality is active and achievement oriented, fairly outgoing socially, and generally disregards unpleasant emotions. On the negative side, however, the stroke-prone personality might be too rigid, too ambitious, too conforming, and too prone to use denial, in which case the sudden imposition of extreme disability might either be completely deflating, producing depression and anxiety, or excessive detachment and denial. Perhaps the degree of stroke-prone personality that existed prior to the stroke will prove to be the most important variable; a little could

be positive, too much could be negative insofar as rehabilitation success is concerned.

Summary

This chapter has reviewed the literature of relevance to the assessment of pre-morbid personality characteristics that may have predictive significance in stroke patient rehabilitation. Since there have been no reported studies investigating the relationship between pre-morbid personality and stroke patient rehabilitation, it was necessary to support a case for doing so. Then, the related areas of psychosomatics, pre-morbid personality and behavior following stroke, the distinctions between right and left hemiplegics, and the general subject of personality and rehabilitation were explored. Although these related areas are in themselves large and not amenable to easy distillation, they do provide a number of clues as to the direction this research should take and the nature of the results that can be expected.

CHAPTER III

PROCEDURES

Chapter III is devoted to a discussion of the methods and procedures used in this study. The chapter is divided into the following sections: Sampling Criteria and Procedures; Instrumentation and Testing Prccedures; The Sample; and Statistical Procedures.

Sampling Criteria and Procedures

Stroke is a very general term. While the term conveys meaning concerning the development of the patient's condition, the category of cerebrovascular disease is more useful (Milikan, 1967). The National Institute of Neurological Diseases and Blindness includes more than fifty cerebral vascular diseases which can cause stroke in their system of classification (Toole, 1968).

In many cases the stroke (thrombosis, hemorrhage, or embolism) is simply the small part of the iceberg above water, so to speak. The diseases hypertension and arteriosclerosis (atherosclerosis), for example, often produce widespread underlying cerebral disease. These diseases can greatly affect the stroke patient's prognosis, but as is the case with many neural phenomena, it is difficult to determine with precision their gravity and extent. Consequently, research in stroke prognostication has included attention to a large number of specific

symptoms, details, and test data related to location and severity of the pathology in addition to concern for the type of stroke.

In order to develop sampling criteria for this study, those recovery parameters were selected which could lead to the greatest number of homogeneous rehabilitation cases available at Rancho Los Amigos Hospital over the shortest practicable time period. Although the usual screening procedures at the hospital are designed to admit for therapy only those patients that have at least some potential for recovery, there exist wide differences among the various kinds of stroke patients in their prognosis and rate of recovery.

Related to the above was the matter of criteria for recovery; the choice of outcome criteria had a great deal to do with the selection criteria to be followed. This was most crucial in the question of whether or not to combine left and right hemiplegics in the sample. While left and right hemiplegics perhaps could be combined for one criterion, improvement in self-care, they could not be combined insofar as improvement in speech, since left hemiplegics do not have speech problems as a rule and right hemiplegics do. Thus, the questions of whether or not left hemiplegics should be included to make it possible to collect the sample in a shorter amount of time, and whether or not speech improvement should be retained as a criterion in order to add more validity to the study, became very crucial.

The literature on this subject was not definitive. Although several researchers were of the opinion that there was no significant difference in recovery rates and amount of progress in PT and OT for

left and right hemiplegics (Adler and Tal, 1965; Bourestrum, 1967; Hirschenfang, Schulman, and Benton, 1968), others have disagreed. Both Wylie and Baltimore (1961) and Diller (1969) have suggested that the language and mental functioning disparities could differentially affect their abilities to profit from PT and OT. According to Diller, competence in mental tests is highly related to competence in motor skill functioning, and he found that improvement in mental functioning can be demonstrated in right hemiplegics but not in left hemiplegics. Thus, the difference in opinion might be related to the amount of relearning necessary in the various PT and OT tasks. In view of this uncertainty, and the possibility of different emotional reactions in left and right hemiplegics discussed in Chapter II, little would be gained by grouping left and right hemiplegics, and more would be gained by keeping them separate and insisting on a sufficiently large sample of exclusively right hemiplegics.

The next most important variable, judging by the emphasis given it in the literature as well as common sense, appeared to be the amount of elapsed time between the onset of the stroke and the beginning of rehabilitation. Certainly the longer the time interval the greater the probability that the natural processes of recovery will already have taken place and the remaining deficits will be largely permanent. The literature clearly suggests that diminishing returns accrue when therapy is started late, but the real question insofar as this research was concerned was at what point the elapsed time becomes crucial; what should be the maximum acceptable time?

The following review of the literature was of some help. Johns (1967) found that any paralysis remaining after six months will persist and be permanent, whereas cerebellar ataxia, dysphasia, and dysarthia will continue to diminish up to twelve months. Miller (1968) reported a study which found that 34% of the patients reached maximal ability to perform self-care activities during the first months, 19% did so later, and 47% showed no improvement. He concluded that maximum functional improvement generally occurred during the first month, but a few continued to improve up to two years. Bourestom (1967) stated that after three months the patients remained static or later lost functioning ability. Lee et al. (1958) found that while best results were obtained during the first three months of stroke, good results were obtained as long as one to two years post-stroke. Anderson, Bourestom, and Greenberg (1970) found that those admitted within three weeks of their strokes made greater self-care improvement than those who came in eight or more weeks after onset. Thus, three months might be the best cutoff, but it could possibly be somewhat longer.

Another important variable is whether or not the patient has had a previous stroke. Presumably, there would be some deficit remaining in patients with previous strokes which would no longer be amenable to therapy; consequently, those patients would improve less than the patients who had no previous stroke. This difference in recovery potential is well bourne out in the literature and many of the results have been highly significant, but the question of relative vs. absolute gain is not generally discussed (Bourestom, 1967; Bruell and Peszczynski, 1958; Ford and Katz, 1966; and Lee et al. 1958).

The last variable to be discussed here is age. There is much reference to it in the literature; the assumption is that older patients improve to a lesser extent and at a slower rate than younger patients. This would be expected because of generalized neural and muscular weakening resulting in less capacity to heal and compensate for the effects of stroke. It has generally been found to be so (Bruell and Simon, 1960; Carroll, 1962; Ford and Katz, 1966; Lee et al. (1958); Peszczynski, 1963; and Wylie, 1968). Only Bourestom (1967) and Anderson, Bourestom, and Greenberg (1970) have supported the view that age is not important for hemiplegics. Bourestom (1967) found age failed to show any significant relationship to the criterion(self-care status), or, in other words, the relative gain in self-care status was equal regardless of age.

Other variables have been studied in relationship to rehabilitation progress. They include a long list of physiological signs, most of which have been associated with recovery, and other factors such as sex, pre-morbid educational level, and ethnic origin, most of which have not been associated with recovery.

On the basis of the preceding discussion, the following preliminary sampling criteria were established:

1. Right hemiplegia.
2. Aphasia.
3. No previous crippling disorder.
4. No more than three months post-stroke.
5. No bilateral cerebral disease or severe brain stem involvement.

6. An available spouse.

7. One month minimum time in therapy (PT, OT, and ST).

8. No medical complications.

With these tentative criteria, a check of medical records was made in order to estimate the usual rate of flow and thereby refine the above criteria.

All admission to Stroke Wards 803 and 804 at Rancho Los Amigos Hospital are listed as they arrive, and a rough description is provided. This rough description provided the investigator with the necessary information to examine the completed records of all right hemiplegic and aphasic stroke patients admitted during the six-month period between January 1 and June 30, 1969. For that time period it was found that thirty-one patients could be tabulated and examined in detail.

In the matter of time post-stroke, these thirty-one patients ranged from less than one month to over one year. When the number of patients who did not complete full programs was subtracted from the total, only twelve patients with time periods post-stroke less than six months could be eligible for inclusion in the study. Increasing the post-stroke time to one year would add only one patient. Decreasing the post-stroke time to three months would reduce the twelve to five. Thus, six months was deemed necessary in order to produce sufficient subjects during a projected study period of eighteen months or less. Of the twelve patients six were married and six were single; this criteria would also have to be changed. Since so few patients were eligible, age would have to be disregarded as a sampling criteria.

Following the medical records check, and a brief pilot study of the instrumentation (three spouses were the informants), the following sampling criteria were established:

A. Patients:

1) No record of a crippling disorder such as hemiplegia, severe arthritis, or polio existing prior to the present stroke or its onset.
2) No evidence of a pre-existing communications disorder.
3) No evidence of severe diffuse cerebral disease, i.e., a history of gradual mental deterioration, intellectual impairment, and/or regressive behavior.
4) No evidence of severe bilateral cerebral disease or severe brain stem involvement.
5) No more than six months post-onset (beginning of continuous symptoms of hemiparesis and/or communications disorder).
6) Right hemiplegia or hemiparesis post-stroke.
7) A communications disorder post-stroke.
8) No complicating medical problems that would appreciably delay or limit participation in therapy.
9) An available and willing spouse, or other family member when no spouse is available, meeting the criteria presented below.

B. Spouses:

1) No evidence of past or present emotional problems of sufficient severity to warrant psychiatric intervention.
2) At least a sixth-grade education or comparable Wide Range Achievement Test reading ability.
3) Comprehensible speech.
4) Married to, and having lived with, the patient during the previous two years, and not currently sueing for divorce.
5) Willing to sign a consent and privacy form.

C. Family Member:

1) Natural father, mother, son, daughter, brother or sister provided they:
   a) have lived in the same community, e.g., the Los Angeles area, as the patient during two of the five years immediately preceding the onset of the patient's stroke.

b) evidence knowledge of the major events in the life of the patient, e.g., education, work, family, and children.
c) express an interest in the patient and a desire to visit or provide support.

2) In cases where more than one family member meets the above criteria, the person appearing to have the closest relationship to the patient will be selected. The investigator may also choose a family member instead of a spouse should it appear that a family member has had a closer, more sustained relationship with the patient, or if one is more competent to supply information.
3) Ability to meet the spouse criteria 1, 2, 3, and 5.

In conducting the study, all incoming stroke patients to the Neurology Service at Rancho Los Amigos Hospital were examined regarding these selection criteria. The ward physician was the primary consultant and his opinion was crucial regarding A1, 2, 3, 4, and 8. In several cases, insufficient data were on hand to make such decisions on admission. In such cases, selection was either deferred until the Evaluation Conference, where other medical opinions were available, or until laboratory data were available, or the patient was selected on a provisional basis. Despite this procedure, the determinations regarding severity were at times rather subjective; there was occasional disagreement among the medical staff, and the investigator sometimes found it necessary to be the final arbiter. However, in the process of collecting the data some sub-criteria were developed which proved to be reasonably adequate (see Sample section of this chapter).

A maximum therapy time of three months was used. Although patients often remain on therapy programs longer than three months, a cutoff time was advisable because of the fact that the rehabilitation staff of the hospital judges when to discharge patients primarily on

the basis of whether they have plateaued in their progress. Since patients frequently plateau and then later begin to improve, those patients who do not plateau, but continue their recovery at a steady pace, would be unduly favored unless there was a time correction. Unfortunately, there are no guidelines for this in the literature and the cutoff had to be established arbitrarily. Three months was chosen because it is somewhat longer than the average time on therapy, and quite probably most patients who have extended beyond three months were then on decelerating learning curves (see T-JTA discussion in Instrumentation and Testing Procedures).

Patients absent from a program longer than two weeks due to medical or surgical developments and complications were to have a corresponding addition (days in excess of two weeks) to the basic one month. If patients were absent from programs longer than one month before completing the one month minimum, they were to be deleted from the study.

Instrumentation and Testing Procedures

Taylor-Johnson Temperament Analysis

The T-JTA is a revision and restandardization of the Johnson Temperament Analysis originally published in 1941. The question booklet consists of 180 items equally divided among the nine traits measured by the test. The items may be answered as applying to the respondent or to someone else such as fiance, spouse, parent, sister, or son. There is a blank space in each item where the individual may

mentally insert his own name or the name of the person he is describing.

The answer sheet provides a place for one of three possible alternative responses to each item: plus (+) meaning "decidedly yes" or "mostly so," MID meaning "undecided," minus (-) meaning "decidedly no" or "mostly not so." In scoring, all MID's are counted as one point and either the (+) or (-) is given a two depending on whether or not it contributes to its specified trait. Thus, a maximum raw score of forty can be obtained for any given trait. In addition, Attitude Scale scores, based on correlation with the Minnesota Multiphasic Personality Inventory K scale, are derived in order to indicate the attitude of the person taking the test. High attitude scores suggest the possibility of distortion in a favorable direction; low attitude scores suggest the possibility of distortion in an unfavorable direction. Separate norms have been established for the self-rating and other ratings.

The nine traits used in the T-JTA were chosen to "represent attitudes and feelings which play a significant role in personal adjustment and interpersonal relationships (Taylor et al., T-JTA Manual, 1968, p. 4)." Each trait is paired with its opposite and, on the basis of statistical evidence presented in the manual, they are independent traits. With the high end of the scales first, the traits are described in the manual as follows:

1. Nervous vs. Composed: Nervous is defined as a state or condition frequently characterized by a tense, high-strung, or apprehensive attitude. Composed is characterized by a calm, relaxed, and tranquil outlook on life.

2. Depressive vs. Lighthearted: Depressive is defined as being pessimistic, discouraged or defeated in feeling, tone, or manner. Lighthearted is characterized by a happy, cheerful, and optimistic attitude or disposition.

3. Active-Social vs. Quiet: Active-Social is defined as being energetic, enthusiastic, and socially involved. Quiet is characterized by socially inactive, lethargic, and withdrawn attitudes.

4. Expressive-Responsive vs. Inhibited: Expressive-Responsive is defined as being spontaneous, affectionate, demonstrative. Inhibited is portrayed by restrained, unresponsive, or repressed behavior.

5. Sympathetic vs. Indifferent: Sympathetic is defined as being kind, understanding, and compassionate. Indifferent is characterized by unsympathetic, insensitive, and unfeeling attitudes.

6. Subjective vs. Objective: Subjective is defined as being emotional, illogical, self-absorbed. Objective is defined as being fair-minded, reasonable, and logical in attitude.

7. Dominant vs. Submissive: Dominant is defined as confident, assertive, and competitive. Submissive is defined as passive, compliant, and dependent.

8. Hostile vs. Tolerant: Hostile is defined as being critical, argumentative, punitive. Tolerant is defined as being accepting, patient, and humane in attitude.

9. Self-Disciplined vs. Impulsive: Self-Disciplined is defined as being controlled, methodical, persevering. Impulsive is defined as being uncontrolled, disorganized, and changeable.

The T-JTA Manual reports test-retest reliabilities for the nine scales ranging from .71 to .87 (N=81). Internal consistency was determined by the split-half method and by analysis of variance (those figures also range from .71 to .90). However, there is some evidence of skewing in the various distributions which could produce spuriously high correlations. Such skewing could affect the purposes of this study.

Validity has been determined through comparison of the scale extremes and ideal teachers ratings (they were in the expected direction), and through comparison with the Edwards Personal Preference Scale (EPPS) and the Minnesota Multiphasic Personality Inventory (MMPI). With the EPPS, thirty-nine of 135 correlations were significant (.05 level or better), and with the MMPI, eighty-five of 117 were significant (.05 level or better).

Criss-Cross norms (other ratings) were based on a sampling of 1,274 individuals who completed the T-JTA on themselves and also on other persons. The sample included premarital couples, cooperating members of the general population, and couples in counseling for marital problems.

In this study the relatives completed a T-JTA under instructions to rate the patient as he was prior to the stroke. The T-JTA was administered by the investigator under controlled conditions at the hospital. An effort was made to have it completed as soon after admission as possible; in all cases it was done before the end of the first month of hospitalization. Relatives were told that the purpose of the research was to investigate ways of obtaining useful pre-stroke personality information. They were also told that the information obtained would not bear in any way on whether or not the patient would receive hospital treatment. The relatives were asked to sign research authorizations pertaining to confidentiality and the use of tape recordings (see Appendix B).

Stress Management Scale

A stroke must be considered a stressful life event despite the apparent lack of awareness of some stroke patients. Stresses require the mobilization of defenses or coping abilities to protect the individual from the possibility that he might no longer be able to maintain his status quo (Fink, 1967). When this is accomplished he can then move into the stages of acknowledgement and adaptation or reality testing and renewed purposeful activity. In this study these stages have been combined under the heading "coping ability," and the retrospective measurement of the patient's demonstrated coping ability has been assigned to an experimental instrument labeled the Stress Management Scale.

In attempting to estimate the manner in which a person coped with stress in the past, one must first face the idiopathic vs. nomethetic issue. What may be stress for one person may not be as stressful for another. On the other hand, there may be certain agreed upon stresses; most people, for example, would view the death of a loved one a severe stress, while they would consider being spoken to rudely by a stranger as a minor stress (Dumont, 1971). Several investigators have actually attempted to isolate and compare those life situations most likely to be stressful for the greatest number of people. A relative could state whether or not any of the usually stressing events had been stressful for the patient. Then he could describe how the patient had coped with that stress. This logic formed the basis for development of the SMS.

Holmes and Rahe (1967), Darbonne (1967), and Michaux et al. (1967) have studied stressing events in an effort to systematize them. The Holmes and Rahe list was especially helpful perhaps because they took pains to select items that "usually evoked or was associated with some adaptive or coping behavior on the part of the involved individual (p. 217)."

Adapting from these lists, a structured interview format was devised to facilitate the listing of the patient's pre-morbid stress situations (see Appendix B). Five broad categories were established: Educational-Vocational, Marriage, Family, Society, and Personal. In order to foster candor and spontaneity in the relatives, a form of the "contingent-item" questionnaire method was used (McMahon and Hunt, 1964). In other words, certain leading questions were asked, within the categories, such as "Did he have any problems related to jobs?" Then, regardless of the relative's answer, more specific questions were asked within that category. This would help the relative examine the area and guard against oversight or lack of cooperation. All told, forty-seven questions were asked including an unspecified question designed to elicit other problems.

The relative was told that a problem was anything that upset, bothered, or concerned the patient (see Appendix B). Sometimes more questioning was necessary to ascertain that the problem was consequential. Michaux et al. (1967) discussed the matter of problem definition in connection with their interview stress indices: "There must also be a clear-cut subjective factor [italics in the original] in the form of distress, anxiety, or the like on the part of the patient--not

necessarily hopelessness or panic, but something more than a mild or passing concern (p. 366)." In this study, pre-set examples were provided if the relative had further doubt about the use of the word, problem.

In some cases, further questioning on the part of the investigator was necessary in order to find the most appropriate title for the problem and distinguish it from other overlapping problems. Sometimes relatives had to be coached on "putting themselves in the shoes" of the patient, and they had to be guided away from reporting problems secondhand or too speculatively.

In order to translate the listing of problem areas into terms relevant to this study, a method was devised to assess the ways in which the patients had reacted to or coped with each of his life stresses. The most satisfactory approach appeared to be the semantic differential (Osgood, Suci, and Tannenbaum, 1957). After reviewing the literature (Freud, 1946; Gross, 1967; Haan, 1963; Howard and Scott, 1965; and Lazarus, 1966), and refining the phraseology in the pilot study, thirteen oppositional pairings were devised (see Appendix B). Some were obviously more precisely opposite than others. For example, the opposite of anxious could have been stated as calm instead of indifferent (calm was used as the opposite of angry).

The thirteen pairs were arranged into five groups to facilitate scoring. With the low end of the scales first, the five groups were labeled: Approach-Avoidance; Independence-Dependence; Rigidity-Flexibility; Emotional Involvement-Detachment; and Internalization-Externalization. With groups, the instrument could be more flexible;

relatives were allowed to respond to only one pair in each group if they found that the wording of some pairs was inappropriate for a particular problem. This was frequently the case when the problem required acceptance instead of action.

The instructions to the relative (see Appendix B) specify that a complete listing of the thirteen pairs (on a one-page form) will be filled out for each specific problem. A suitable title was to be given each problem and placed at the top of each form. A check mark was to be placed on one of the seven spaces between each pair according to how closely that response resembled the patient's response to that problem. Since some problems have reoccurred over time the relative was instructed that 0, 1, and 2 responses could either be absolute or average. Allowing this use of the semantic differential dulls its precision while making it more relevant to the present usage.

In view of the fact that some relatives might report many problems while others might have difficulty reporting any, a simple averaging procedure was used in computing the five coping scores. It made no difference whether ten problems were reported or whether one was reported; the important element was coping style, not the number of stresses a patient might have had. The final coping scores could range from one to seven with intermediate scores rounded to tenths.

The SMS was administered to the relative no later than two weeks following completion of the T-JTA. All of the interviews were tape recorded. A listing of the problems reported by the relatives is provided in Appendix B, but the tape recordings are too voluminous to transcribe.

Several major difficulties arose in administering the SMS. First, relatives were occasionally confused by the task. The categories were often too large for them to deal with; for example, in cases of many marital problems, it was quite challenging to sort them out, i.e., is the problem that of drunkenness or that of the fights that follow. This ambiguity then produced difficulty with the semantic differential; at times relatives were possibly rephrasing the problem mentally as they completed the form (verbal exchanges were allowed between the investigator and relative during completion of the semantic differential, although the relative was encouraged to do it by himself after he evidenced understanding of it). The investigator attempted to counteract that tendency by watching for glaring inconsistencies as the forms were completed.

Second, there were occasions when the relative could not decide to make even the minimum one check mark for a given category. In those cases, one arbitrary zero check was made. Possibly such arbitrary zeros were different from intentional zeros, thus tending to invalidate the data. Also, in one case the relative could find no problems to report. In that case a hypothetical problem was treated in the prescribed manner.

Third, examination of the SMS protocols revealed the presence of skewing especially in certain of the categories, e.g., most patients were described as facing their problems.

Kenny Self-Care Evaluation

A number of methods have been devised for evaluating self-care status of the physically handicapped. For example, there is the Barthel index described by Wylie (1967). For this study, however, the Kenny Self-Care Evaluation was chosen because the Kenny Rehabilitation Institute in Minneapolis is noted for its work with stroke patients and because of the comprehensive detail of the KSCE. It also has the advantage of an objective scoring system lacking in many self-care evaluations.

The KSCE covers the categories of bed activities, transfers, locomotion, dressing, personal hygiene, and feeding. Within the categories are specific activities that the patient either performs without assistance (independent), with assistance and/or supervision, or he cannot perform them (dependent). Accordingly, the patient is rated +, ±, or - in the specific activities; then the combination of +'s, ±'s, and -'s is converted to a numerical score for that category. The scores range from zero through four, with four representing complete independence. The conversion is accomplished in such a way that the typical signoid learning curve of hemiplegics (initial acceleration, then gradual deceleration) is flattened out thereby creating equal intervals (Schoening and Iversen, 1968). Although that does not correct for the patient who starts low and hence can improve more than the patient who starts high, there is less inequity. (Actually Bourestom and Howard (1968) found that patients with initial scores in the middle range made the greatest improvement.) Finally the scores in each category

are added to form one overall self-care score which may range from zero to twenty-four.

According to Bourestom (1967) the inter-observer reliability (two raters) of the KSCE is .86 (rank-order correlation) for admission ratings, for discharge ratings, .96, and for the difference scores, .89. Schoening et al. (1965) found, as predicted, an inverse relationship between functional capacity (as measured) and the amount of active staff participation in performing transfers (one of the self-care categories), which gives some validity to the instrument.

A KSCE form (Appendix B) was prepared and mimeographed for use in this study since the KSCE material has not been officially distributed as yet and only the manual and a few of their rating forms were available. In the process of duplicating the Kenny form, several minor changes were made. The following are worth noting:

1. The sitting transfer was eliminated; it is not taught at RLAH.

2. The three and four ratings of stairs (Locomotion) were modified to allow repeating a flight of six stairs since no longer flights were immediately available.

3. The elevator exercise in walking (Locomotion) was eliminated as none was immediately available.

The KSCE ratings were made by a registered nurse assigned to the stroke service. Due to illness and transfer, three nurses were involved in the ratings during the length of the study. Each rater was briefed on the exceptions, and they completed at least one practice rating. All the testing was done on the basis of direct observation of the patient except in a few instances where this was not

possible. Ratings were made in the morning when the activities normally occurred insofar as it was practical.

The initial ratings were made as soon after the sampling criteria were met as possible. An effort was made to have them completed during the first two weeks that the patient was active on PT and OT. However, it was difficult to determine precisely when therapy began; the records obtained were only estimations. A requirement of the study was that each patient should be on both therapies simultaneously; no patients were allowed to continue one therapy without the other more than two weeks without receiving a final evaluation. For various reasons not all patients received equally intense therapy either within or between services.

During the study period certain questions arose regarding the scoring and they were resolved by conversation with Mr. Iver Iversen of the Kenny Rehabilitation Institute, or by the judgment of the investigator. For example, what should be done when the patient's usual appliances, e.g., braces, were unavailable at the time of the testing?

Final ratings were made during the last week of hospitalization or therapy or as close as possible to that period. Improvement scores were then derived by subtracting the initial and final ratings and rounding to tenths. The use of the test for improvement scores is expressly suggested by advocates of the instrument (Schoening and Iversen, 1968). An improvement study by Bourestom (1967) found the range of scores was minus eight to plus eleven, and the median improvement score was four.

Minnesota Test for Differential Diagnosis of Aphasia

Although several reliable tests of speech functioning exist, the MTDDA was chosen because of its comprehensiveness and the likelihood that it would be a more sensitive barometer of change over a short period of time. The only disadvantage appeared to be the fact that no total score of speech functioning is provided by this instrument.

The MTDDA is used routinely by the speech therapists at RLAH. The MTDDA evaluates the following aspects of the communication disorder: auditory disturbances, visual and reading disturbances, speech and language disturbances, visuomotor and writing disturbances, and disturbances of numerical relations and arithmetic processes. All areas are tested both on the basis of auditory stimulation and visual stimulation. All areas are tested from the most basic level to the most complex.

Norms are provided by the research edition, although more recently the test has been structured to emphasize the clinical interpretation of the error scores in order to increase the differentiating power of the sub-categories. Since differential diagnosis seemed less relevant to this study than the reliability of the test (several raters were used), the norm tables were used. The norm tables convert the error scores to a seven-point scale: 0 = no impairment; 1 = minimal; 1.5 = mild; 2 = moderate; 2.5 = moderately severe; 3 = severe; and 3.5 = extremely severe. Sub-category error scores are converted and then averaged resulting in category scores that vary within the seven steps. The intra-step variations were limited to one place beyond the decimal point.

Reliability has been established through use of the phi coefficient and Guttman analysis (Schuell and Jenkins, 1959). All subtests with phi coefficients below .57 were discarded; the remainder ranged from .57 to .78. The Guttman coefficient of reproducibility was found to be 89.9 percent. Factorial analysis has established the independence of the categories (Schuell, Jenkins, and Carroll, 1962). No validity data has been published although Schuell states that the MTDDA effectively discriminates between aphasic and non-aphasic subjects, and that the patterns of impairment identified on the MTDDA correlate significantly with findings obtained on neurological examinations (Schuell, 1965b).

The initial tests were administered by the speech therapist assigned to perform the routine hospital evaluation of the patient. The final tests were performed by the therapist with primary responsibility for treatment. Schuell cautions that patients must be medically stable before tests of predictive significance can be administered (Schuell, 1965a and 1965b). She advises that reliable tests cannot often be obtained less than three months post-stroke for this reason. In general, her admonitions were followed and medically unstable patients were not tested; however, it was not possible to routinely honor the three months waiting period due to hospital pressure for treatment. On the other hand, this factor was alleviated to some extent by the practice of terminating the testing when patients began to show fatigue or poor tolerance for the testing. The examiners were encouraged to complete such broken testing within one week and so far as is known that was accomplished.

During the study three subtests and one of the categories, arithmetic, were deleted. Arithmetic was deleted because most patients could not perform more than half of it, and frequently the examiners felt that patients were too fatigued to perform well at that point. Another practice was begun by the examiners without the prior knowledge of the investigator, namely the discontinuation of a subtest or the omission of subtests (with an automatic failure score for the omitted items) if the examiner was convinced that the patient would be unable to pass any of the omitted items. In this way some clinical judgment was exercised by the examiners. In some cases the failing scores, and cumulative 3.5 scores, were given for lack of cooperation or because of emotional interference rather than for lack of ability. On one or two occasions there was a time lag of more than one week between the initial test and the onset of therapy (as with the KSCE), but no practical means were available for controlling such occurrences.

Six patients were deleted from the study because of problems related to the speech testing: Two for unwillingness to take the final test, three for failure to participate in therapy, and one for discharge prior to completion of the one-month minimum time on therapy.

The Sample

Twenty-six subjects made up the total sample. They were admitted and the data collection was completed during the period between December 24, 1969, and May 21, 1971. Of the twenty-six, fifteen were women, eleven were men, eighteen were Caucasian, eight were Negro, eighteen were married and eight were single (that is, divorced or

widowed). The ages ranged from thirty-eight to seventy-one with the median age being fifty-three. The medical diagnoses were distributed as follows: thrombosis--seven definite and four possible; embolism--six definite and one possible; hemorrhage--five definite (most common cause was aneurysm); no final diagnosis--four.

The average therapy program (PT is considered as representative) lasted eighty-one days. Six subjects were tested at or before the three-month limit while their actual programs lasted more than ninety-seven days. The over-runs for those six subjects averaged thirty-four days. The average time on therapy (PT) between initial and final KSCE testing for all twenty-six subjects was sixty-four days. A slight trend toward more lengthy therapy programs was noted as the study progressed. That may be attributed to changing staff conceptions of the nature of rehabilitation.

In the course of the data collection additional guidelines for some of the selection criteria were necessary and also some exceptions were allowed in order to insure adequate sample size.

Additional guidelines were especially necessary for the stroke criteria: bilateral damage and brain stem involvement. In order to uniformly rule out patients with severe bilateral damage, two sub-criteria were established: (1) Moderate or severely abnormal electro-encephalograph findings for the right hemisphere of the brain; (2) Mobility problems in the left arm or leg that could affect the patient's ability to perform the KSCE self-care activities. The determination of severe brain stem involvement remained primarily a matter of medical

judgment; however, it was established that the presence of swallowing difficulty would automatically rule out the patient. The other modifications and exceptions are included in Appendix A.

A procedural change regarding speech therapy also became necessary. Due to staffing problems some patients could not be accepted for speech therapy until later in their hospital stay and in some of those cases speech therapy was subsequently continued post discharge on an outpatient basis. In order to meet the minimum thirty-day therapy requirement in this study, it became necessary to allow for final speech testing after discharge. However, the speech therapists were encouraged to make their final evaluations as soon as possible after the thirty-day minimum had been reached in order to limit the possible influence of non-hospital factors.

Data Analysis

When completed tests were obtained for twenty-three subjects, the tests were scored and then rescored by someone other than the original scorer. The scores for all four instruments were then recorded on IBM Fortran Coding Forms and the figures were rechecked with the original data. IBM cards were then punched and verified at the Rancho Los Amigos Hospital Computer Facility.

Next, a trial run of four regression analyses was programmed, using University of California at Los Angeles Biomedical Programs and processed at the University of Southern California Computer Center. On the basis of that trial run it was determined that sampling could be terminated because the addition of a few more subjects would be

unlikely to affect materially the amount of error variance obtained. That decision was supported by the generally held view, e.g., Guilford (1965, p. 307), that correlations obtained by the small sample rank order method (rho) are not substantially different than those obtained by the Pearson Product-Moment method.

The data on three more subjects became available shortly after the above computer run, so it was added to the basic card deck. Then, with a total sample of twenty-six subjects, the regression analyses were re-programmed and all the subproblems were processed at the University of Arizona Computer Center. Several additional statistical procedures, discussed in the following paragraphs, were also performed at the University of Arizona Computer Center.

The following statistical procedures were accomplished by computer:

1. Stepwise regression analysis to test Hypotheses 1-4. Twenty-two regression analyses were performed in order that each of the two sets of predictor variables (T-JTA and SMS) could be pitted against each of the eleven individual criteria (KSCE and MTDDA). The computer procedure included computation of Pearson Product-Moment correlations between all twenty-five variables (625 correlations), analysis of variance computations, and partial and overall F tests to determine that variables meet admission and deletion standards and allow for testing of significance. The .05 confidence level was used in establishing significance.

Each problem ran as long as variables continued to meet admission standards, that is add a minimum amount of variance. The computer program standards for admission and deletion, however, are very low (F = .01 and .005). Consequently, the best regression equation that might be derived from that procedure would not necessarily include all the variables included in the computer print out.

2. Histograms and scattergrams to verify normality and linearity, the assumptions underlying use of regression analysis. A histogram was prepared for each of the twenty-five variables. The scattergrams plotted the relationship between each predictor variable and each criterion variable (154 correlations).
3. Logarithmic transformation ($\log x + 1$) of all the predictor data in order to force normality, and re-run of the twenty-two regression analyses.
4. Analysis of variance for the difference between the means of those patients with most time post-stroke at testing (of relative or patient), and those with the least time post-stroke at testing in order to test Hypothesis 5. The .05 confidence level was used.

The other statistical procedures described in Chapter IV were performed by hand.

CHAPTER IV

RESULTS

This chapter presents the results of the study: the testing of the hypotheses, the testing of the statistical assumptions underlying the use of regression analysis with the data in the study, and additional statistical analyses of the data. The means, standard deviations, and the intercorrelation matrix of the twenty-five variables are presented in Appendix C.

Major Hypotheses

Hypothesis 1 stated that there is no significant predictive relationship between the T-JTA personality traits and improvement in the performance of the KSCE self-care activities of stroke patients. Of the seven regression analyses that were performed (one for each of the KSCE categories), significant results were found in two. These results are shown in Table 1. Significance is determined by the magnitude of the F ratio (Draper and Smith, 1966), and those variables which did not contribute toward significant regression equations are not shown in the table. In Tables 1-4 the relationships are all stated in the positive direction, although some of the original correlations are negative.

Hypothesis 2 stated that there is no significant predictive relationship between the T-JTA personality traits and improvement in

TABLE 1

The two significant multiple regression analyses found with the T-JTA traits as predictors and the KSCE categories as the criteria

T-JTA trait	KSCE category	R	R^2	Increase in R^2	F value to enter or remove	F ratio	significant F (.05α)
1. Quiet	Bed activity	.4233	.1792	.1792	5.2398	5.240	4.26
2. Expressive-Responsive	Locomotion	.3751	.1407	.1407	3.9305	3.930	4.26
Active-Social	Locomotion	.5033	.2533	.1126	3.4678	3.901	3.42

TABLE 2

The two significant multiple regression analyses found with the T-JTA traits as predictors and the MTDDA categories as the criteria

T-JTA trait	MTDDA category	R	R^2	Increase in R^2	F value to enter or remove	F ratio	significant F (.05α)
1. Self-disciplined	Speech production	.4130	.1705	.1705	4.9343	4.934	4.26
Objective	Speech production	.4844	.2347	.0642	1.9281	3.527	3.42
2. Dominant	Writing ability	.5348	.2860	.2860	9.6115	9.611	4.26
Self-disciplined	Writing ability	.5756	.3314	.0454	1.5615	5.699	3.42
Lighthearted	Writing ability	.6051	.3661	.0348	1.2077	4.236	3.05
Objective	Writing ability	.6928	.4800	.1138	4.5957	4.845	2.84
Nervous	Writing ability	.7686	.5907	.1108	5.4122	5.773	2.71
Indifferent	Writing ability	.7730	.5975	.0068	.3218	4.701	2.63
Hostile	Writing ability	.7806	.6093	.0118	.5443	4.011	2.58
Active-Social	Writing ability	.7813	.6104	.0010	.0449	3.329	2.55

TABLE 3

The one significant multiple regression analysis found with the SMS coping abilities as predictors and the KSCE categories as the criteria

SMS coping ability	KSCE category	R	R^2	Increase in R^2	F value to enter or remove	F ratio	significant F (.05α)
Dependence	Feeding	.4567	.2086	.2086	6.3243	6.324	4.26
Externalization	Feeding	.5250	.2757	.0671	2.1307	4.376	3.42
Detachment	Feeding	.6232	.3884	.1127	4.0553	4.657	3.05
Flexibility	Feeding	.6404	.4101	.0217	.7737	3.650	2.84
Approach	Feeding	.6444	.4153	.0051	.1760	2.841	2.71

TABLE 4

The two significant multiple regression analyses found with the SMS coping abilities as predictors and MTDDA categories as the criteria

SMS coping ability	MTDDA category	R	R^2	Increase in R^2	F value to enter or remove	F ratio	significant F (.05α)
1. Avoidance	Auditory comprehension	.4446	.1977	.1977	5.9129	5.913	4.26
2. Independence	Reading ability	.5111	.2613	.2613	8.4879	8.488	4.26
Emotional Involvement	Reading ability	.5383	.2898	.0285	.9236	4.692	3.42
Avoidance	Reading ability	.5636	.3177	.0279	.8998	3.414	3.05

the MTDDA communication abilities of stroke patients. Of the four regression analyses that were performed (one for each of the MTDDA categories), significant results were found in two. These abbreviated results are shown in Table 2.

Hypothesis 3 stated that there is no significant predictive relationship between the SMS coping abilities and improvement in the performance of KSCE self-care activities of stroke patients. Of the seven regression analyses performed, significant results were found in one. The results of that regression analysis are shown in Table 3.

Hypothesis 4 stated that there is no significant predictive relationship between the SMS coping abilities and improvement in the MTDDA communication abilities of stroke patients. Of the four regression analyses performed, significant results were found in two. The abbreviated results of those regression analyses are shown in Table 4.

Table 5 breaks down the above significant regression analyses to show that a relatively few significant correlations, seven in fact, were responsible for most of the high partial F's that produced the significant F ratios. These seven significant correlations accounted for six of the seven significant regression analyses. In addition, the total number of significant correlations found was proportionately very small when compared with the total number of predictive correlations used in the regression analyses. All told, there were only eight significant correlations out of 154. The .05 significance level for twenty-four degrees of freedom is .388 (Garrett, 1958, p. 201).

TABLE 5

The distribution of significant r's in the regression analyses summarized in Tables 1-4

Table	Correlated Variables	r	F value to enter or remove	Ratio of significant to non-significant correlations
1	Active-Social/Bed Activity	-.42	5.24	1 : 62
2	Impulsive/Speech Production	-.41	4.93	3 : 33
	Submissive/Writing Ability	-.54	9.61	
	Impulsive/Writing Ability	-.41	1.56	
3	Dependence/Feeding	.46	6.32	1 : 34
4	Approach/Auditory Comprehension	-.45	5.91	2 : 18
	Independence/Reading Ability	.51	8.48	

Note: The one other significant r found in the data was Expressive-Responsive/Bed Activity, -.40.

Based on the above, Hypotheses 1-4 must be accepted. The significant correlations and the significant regression analyses could have occurred by chance. If all the data were significantly related the probability of obtaining only eight significant correlations out of 154 is about .05. In other words, the likelihood that type II errors have been made in this study is extremely small.

The testing of the assumptions underlying the use of regression analysis with the data in this study cast further doubt on the significant results that were obtained. Table 6 shows the results of Hartley's

F max test (Winer, 1962), which verifies the assumption of homogeneity of variance; the variance ratios are all less than the .95 probability level at which the assumption should be rejected. N-1 was arbitrarily set at thirty which is a conservative figure with regard to the total size of the sample obtained in this study.

TABLE 6

Homogeneity of variance in the test data as measured by Hartley's F max test

	Test	Smallest σ^2	Largest σ^2	$\frac{\sigma^2 \text{ largest}}{\sigma^2 \text{ smallest}}$	$1-\alpha=.95$
1.	SMS	1.12	2.34	2.09	2.78
2.	KSCE	.45	1.14	2.52	2.91
3.	MTDDA	.18	.39	2.25	2.61
4.	T-JTA	34.69	81.54	2.35	3.21

Visual inspection of histograms constructed to verify normality indicates that about half of the histograms suggest normality. In the others, normality either could not be seen or non-normality was clearly evident. Skewing was found in some of the variables involved in significant correlations, and this may have contributed toward that significance. Inspection of the histograms also indicated some lack of range in the data.

Examination of scattergrams constructed to verify linearity revealed that this assumption was tenable. In many cases the scatter

was too great to afford specificity concerning linearity, but in no case was there sufficient indication of non-linearity to violate the assumption.

In an effort to force normality a logarithmic transformation was performed on the independent variables (Box and Tidwell, 1962) and the twenty-two regression analyses were recomputed. These results were not essentially different from the raw data computations; in some cases, F ratios were increased while in others they were decreased. No implications can be drawn from that procedure, and the acceptance of the hypotheses remained the same.

Examination of the significant correlations and multiple regression analyses revealed no general patterning in the relationships. There was no appreciable evidence of the stroke-prone personality, and those characteristics found to be generally adaptive in rehabilitation were not present to a very large extent.

Minor Hypotheses

Hypothesis 5 stated that there is no significant difference in pre-morbid personality between those subjects tested shortly after stroke and those tested after a specified minimum time post-stroke. It also stated that there is no significant difference in pre-morbid coping ability between those subjects tested shortly after stroke and those tested after a specified minimum time post-stroke.

Table 7 shows the results of the analysis of variance procedure for the difference between the means of the two groups on each of the T-JTA subscales and each of the SMS scales. In addition each

of the criterion variables was similarly analysed by admission time grouping. The .05 confidence level was used. None of the predictor variables (T-JTA and SMS) was significant and only one of the criterion variables was significant (MTDDA 4-Writing Ability). One out of twenty-five is clearly within the realm of chance. Consequently this study accepted Hypotheses 5a and 5b.

TABLE 7

Analysis of variance of test scores of thirteen subjects with the least time post-stroke and thirteen subjects with the most time post-stroke

Variable	F ratio	P
T-JTA 1	1.79	.1913
T-JTA 2	.08	.7756
T-JTA 3	1.94	.1740
T-JTA 4	1.94	.1740
T-JTA 5	1.66	.2082
T-JTA 6	.11	.7450
T-JTA 7	.91	.6479
T-JTA 8	.42	.5279
T-JTA 9	.00	.9809
SMS 1	.24	.6318
SMS 2	.13	.7232
SMS 3	1.40	.2465
SMS 4	.39	.5452
SMS 5	.11	.7451
KSCE 1	.02	.8822
KSCE 2	.01	.9173
KSCE 3	1.75	.1957
KSCE 4	.28	.6103
KSCE 5	1.83	.1863
KSCE 6	.59	.5454
KSCE 7	1.18	.2876
MTDDA 1	1.40	.2470
MTDDA 2	1.34	.2583
MTDDA 3	.08	.7813
MTDDA 4	11.27	.0029*

*Significant at the .003 level

Hypothesis 6 stated that there is no significant difference between the pre-morbid personality traits of stroke patients and the personality traits of the general population. Table 8 shows the results of the comparison of mean T-JTA raw scores for each trait obtained in the study with the .95 confidence interval surrounding the mean raw score obtained in a sample of eighty-one persons reported in the test manual.

TABLE 8

Comparison of T-JTA subscale means (raw scores) in this study and those reported in the T-JTA Manual

Trait	Published Mean	and SE_M	.95 Confidence Interval	Study Mean
1. Nervous/Composed	12.2	.78	13.7-10.7	14.2*
2. Depressive/ Lighthearted	9.6	.89	11.3-7.9	9.9
3. Active-Social/Quiet	29.1	.72	30.5-27.7	23.6*
4. Expressive-Responsive/ Inhibited	27.8	.63	29.0-26.6	29.2*
5. Sympathetic/ Indifferent	32.6	.56	33.7-31.5	31.6
6. Subjective/Objective	12.2	.78	13.7-10.7	10.8
7. Dominant/Submissive	23.3	.76	24.8-21.8	20.8*
8. Hostile/Tolerant	9.8	.74	11.3-8.3	10.0
9. Self-disciplined/ Impulsive	23.8	.99	25.7-21.9	27.2*

*Exceeds the confidence limits

Five of the nine study means exceeded the confidence limits. The five traits associated with these means are: Nervous, Quiet, Expressive-Responsive, Submissive, and Self-disciplined. This group of traits is suggestive of the stroke-prone personality described in the literature. The two traits Indifferent and Objective, which came within .1 point of their confidence limits, are also consistent with the stroke-prone personality, as are the remaining two means which indicate emotional control. Nevertheless, Hypothesis 6 must be accepted, since five out of nine significant differences could be expected to occur by chance.

Other Analyses of the Data

Comparing the objectivity of spouses with the objectivity of other relatives (T-JTA Attitude Scale), it was found that five of the seventeen spouses produced non-objective protocols (Sten scores three or below or eight or above). One of the nine other relatives produced a non-objective protocol. Using Garrett's formula (1958, p. 236) for the significance of the difference between uncorrelated percents, it was found that the ratios were not significantly different (CR = 1.04 and t at the .05 level with 24 degrees of freedom is 2.06). From this it was concluded that spouses and other relatives are not significantly different in their objectivity.

Table 9 compares the spouses with non-objective attitudes toward the patient with the patient's overall KSCE improvement. These results suggest that neither non-objective attitude (favorable or critical) is more associated with improvement than the other. On the other hand, both non-objective attitudes were associated with less KSCE

improvement than that made by the average patient. The mean KSCE total score was 5.2. Perhaps the non-objectivity of relatives is a negative factor in rehabilitation.

TABLE 9

Spouses with non-objective attitudes (T-JTA) and their KSCE total improvement scores

Non-objective Favorable		
Subject No.	KSCE Total	Mean Improvement
7	+8.8	
10	-1.6	+3.6
Non-objective Critical		
Subject No.	KSCE Total	Mean Improvement
8	- .9	
16	+6.1	
21	+3.2	+4.0

The correlation between number of SMS problems and amount of KSCE total score improvement was found to be quite small, r = .13. Patients who had few or many problems during their lifetimes were presumably no better or worse in their ability to cope with the stress of stroke. The average number of SMS problems reported by relatives was 4.5.

Examination of the correlations between the SMS coping abilities and the T-JTA traits revealed a wide range of correlations and most were low. Only four were above .50. Of those four, one (-.598) was the correlation between Emotional Involvement/Detachment and Nervous/Composed. A high negative correlation could be expected for

that pair, if the instruments are valid, but the other paired characteristics lack obvious similarity. Among other pairings that might possess some similarity the correlations were generally either low or in the wrong direction. If the underlying statistical assumptions regarding these instruments are valid, they are to a large extent independent.

Summary

This study was designed to answer three questions. Chapter IV presented the results of the study in answer to those questions.

Question 1 asked: Are pre-morbid personality traits and coping abilities predictive of the rehabilitation progress of stroke patients? Of the 154 predictive correlations, eight were above the significance level of .388. Those eight correlations accounted for most of the significant F ratios found in the twenty-two regression analyses. There were no significant F ratios in fifteen of the twenty-two regression analyses.

Examination of the procedures undertaken in order to verify the statistical assumptions suggests weakness insofar as normality is concerned. Probably some of the significant correlations found were due to skewing.

Question 2 asked: Does the passage of time post-stroke affect the nature of the characterizations of a stroke patient's pre-morbid personality and coping abilities? Grouping the informant's ratings (SMS and T-JTA) by time post-stroke produced no significant differences. The probabilities showed no trend toward significance.

Question 3 asked: Are the pre-morbid personalities of stroke patients different from those of people in general? Five out of nine study means for the T-JTA traits exceeded the .95 confidence limits surrounding a sample of means reported in the test manual. That is suggestive, but not statistically significant, evidence for the existence of a stroke-prone personality pattern.

CHAPTER V

CONCLUSIONS

Summary

Personality mediates behavior and the manner in which a person responds to certain stimuli persists over time. This assumption is basic to this research, although it was not made without reservation. Catastrophic illness may so disrupt personality that it does not function in any way like it did before the illness. The challenges of rehabilitation may be significantly different from those challenges faced before onset of the illness.

A variety of methodological problems makes it difficult to answer these questions. Pre-morbid personality information is not consistently available and post-morbid testing is often unreliable due to the effects of the disability. In addition a vast array of physical and environmental factors impinge on the criteria of rehabilitation progress creating a need for large yet specific samples which often cannot easily be obtained.

This study explored one method of circumventing the problem of how to obtain pre-morbid personality information. Close relatives of the patient were interviewed and tested regarding their conceptions of the patient's personality before the illness. Then the relationship between that data and rehabilitation outcome was studied.

A stroke invariably injures or destroys portions of brain tissue. Typically, head injury produces disinhibition insofar as personality and behavior are concerned. Disinhibition can result in either exaggeration of pre-morbid patterns or it can result in the release of more primitive, often opposing, behaviors. Which of these occurs, if they do occur, may depend on the type, the location, and the severity of the stroke. Likewise, it may depend on the strength of the old behavior patterns, or on the amount of repressed personality material. Depending on the point of view, these factors are emphasized in different ways in the literature.

A review of the literature revealed that a particular personality pattern has been associated with persons who later had stroke. The stroke-prone personality is said to be conformist, active and sociable at the overt level and tense and volatile at the covert (repressed) level. The review of the literature also indicated which personality characteristics, in stroke patients (post-morbid) as well as in other disabled persons, are generally adaptive and maladptive in rehabilitation. Combining these two findings revealed that a mild form of the overt stroke-prone personality appeared to overlap quite a bit with those personality characteristics that are generally adaptive.

Thus, stroke patients whose pre-morbid personalities resembled those of the mild overt stroke-prone personality, and whose disabilities do not produce undue exaggeration or release (the covert stroke-prone personality is maladaptive), might make the most rehabilitation progress. Specifically, that personality pattern is: fairly energetic and reasonably self-confident, conscientious without being compulsive,

adequately sociable without being flamboyant, realistic in self-appraisal, expressive of the emotions but not too volatile or inclined toward anxiety or depression.

Despite these specifics regarding an adaptive personality pattern, the researcher considered it inappropriate to state specific directional hypotheses. Instead they were stated in broad, null form, i.e., there is no significant predictive relationship. This form was used for several reasons. First, there was the question of whether or not the available instruments for measuring personality would really measure those characteristics suggested in the literature (which are in themselves somewhat vague). Also, only a minority of the stroke patients might actually have had stroke-prone personalities. Second, other personality characteristics than the ones specified above may be better able to resist the effects of disinhibition. Third, unknown factors related to the nature of the stroke disability incurred may interact with personality producing new and unpredictable behaviors.

In this study two instruments for measuring pre-morbid personality were used. One, the T-JTA, was selected because it had been developed for rating other persons besides the respondent, and because of its apparent overlap with some of the traits found in the literature. The other instrument was constructed by the investigator for evaluating pre-morbid stress-coping because stress is associated with hypertension and coping is associated with the rehabilitation process.

The criteria selected for the study were self-care functioning and communication skill. Self-care functioning is a primary goal for

the severely disabled patients found in an in-patient hospital setting. The KSCE was used to obtain that data. Communication skill was relevant to the study since the sample was restricted to right hemiplegic, aphasic stroke patients. The MTDDA was used to obtain that data.

The main results of the study were as hypothesized: no significant predictive relationships were found. The hypotheses were accepted because a very small proportion of the predictive correlations reached significance (eight out of 154), and those few correlations were primarily responsible for the relatively little significance found in the multiple regression analyses. Although the literature suggests the possible existence of certain relationships, many researchers have pointed out the difficulty in establishing these relationships in fact.

The eight significant correlations obtained, and the significant regression equations which they produced, may in fact not be due to chance, but the finding of skewing in the data tends to further remove that possibility. When the skewing in both sets of data is of the same type, spuriously high correlations result. The skewing may have been due to either limitations in the instruments or to small sample size.

The minor hypotheses 5 and 6 were also accepted. The amount of time between onset of stroke and personality testing made no difference in the nature of the appraisals. Also, the time factor did not relate to the criteria. That finding was contrary to that expected from the literature. Patients admitted to therapy programs soon after their strokes should make greater improvement than those admitted later. Either the RLAH population is different than those described elsewhere,

or the optimum time interval lies near the cutting point between the two groups (approximately forty-five days). The latter seems to be the more likely explanation.

Although five (out of nine) significant differences were found between the T-JTA means obtained in this study and the T-JTA means reported in the test manual, it is conceivable that they could have occurred by chance. On the other hand, those differences offer suggestive evidence for the existence of the stroke-prone personality pattern described in the literature.

Other findings were that: (1) spouses and other relatives are not significantly different in their ability to assess the patient's pre-morbid personality objectively; (2) spouses with overly favorable attitudes were not associated with more patient self-care improvement than spouses with overly critical attitudes; (3) the number of SMS problems reported for each patient was not associated with more or less self-care improvement; and (4) the T-JTA and SMS instruments were not correlated to any great extent.

Conclusions

The following conclusions are drawn from the results of this study.

1. There is no relationship between pre-morbid personality and rehabilitation progress in right hemiplegic stroke patients. Predictions based on pre-morbid personality are likely to be no better than predictions based on chance or on the initial criterion testing (mean of y). No improvement on present RLAH

stroke patient screening procedures can be offered.

2. There is no simple relationship between time post-stroke and the way in which pre-morbid personality is characterized or the way patients respond to rehabilitation.
3. There may be a stroke-prone personality pattern distinguishable from other personality patterns.

Recommendations

The results of the study suggest the following recommendations for further research in predicting stroke patient rehabilitation progress on the basis of pre-morbid personality.

The study should be repeated with directional hypotheses based on the significant and near significant correlations found in the study. Before that is done an attempt should be made to refine the instruments to reduce skewing and to increase their discriminating powers. A larger sample should be obtained. The best way of increasing the sample size would be to obtain data from several rehabilitation hospitals. The sampling criteria might well be enlarged to increase the amount of variance in the data. Also, it would be advisable to shorten the amount of time during which the samples are collected, if that is possible.

Other instruments for measuring pre-morbid personality should be tried in this manner, possibly with different criteria measures. Non-personality variables might well be combined with personality variables to increase the likelihood of obtaining significant multiple R's.

Any significant findings should then be compared with other methods now in use for screening patients and making predictions. That is generally done by clinical experience, and the clinical method may well be better than the actuarial method.

APPENDIX A

ADDITIONS TO THE SAMPLING CRITERIA

I. Definitions

1. "Crippling disorders" was interpreted so as to exclude only those disorders that might affect KSCE functioning.

2. "Severe diffuse cerebral disease" was interpreted as obvious mental impairment and not those diseases or impairments presumed to have existed on the basis of post-stroke findings, e.g., atherosclerosis and hypertensive encephalopathy.

3. "Psychiatric intervention" was interpreted as treatment and/or hospitalization beyond the mere prescription of psychotropic medications.

4. "Sixth-grade education" was interpreted as applying only to United States schooling. Informants that had immigrated to this country were given the Wide Range Achievement Test vocabulary test only when their academic level and present verbal ability made their research usefulness questionable.

II. Elaboration and Exceptions

1. Patients could be included in cases where post CVA surgery (endarterectomies) had been performed.

2. One patient was admitted whose embolic stroke etiology was possibly related to drug ingestion and/or physical assault.

3. Therapy initiated prior to the patient's arrival at Rancho Los Amigos Hospital was not grounds for exclusion.

4. One patient was admitted even though he had not lived with his spouse during the preceding two years (they had lived together during the preceding ten months).

5. One patient was admitted who also failed to meet the above requirement because his spouse claimed frequent and friendly contact with the patient during the preceding two years.

6. One relative was included even though he and the patient did not have a close relationship, because he was the only one available.

7. The lower age limit for children as informants was set at seventeen.

8. One patient was admitted even though he was illiterate and his speech therapy and speech testing would have to omit reading exercises.

9. Patients who might have difficulty in speech therapy because of foreign language background were not excluded if English had also been learned or if assistance could be provided at their level in their native tongue.

10. Speech therapy was interpreted as individual meetings with a therapist on a regular basis.

11. One patient was excepted from the above; she received only group speech therapy on a weekly basis.

12. One patient was admitted even though there was a delay of several weeks between the initial speech testing and the beginning of speech therapy.

13. Two spouses were allowed to complete the T-JTA in two sittings.

14. Minimal assistance was provided for informants having difficulty understanding certain words and idioms on the T-JTA.

15. One spouse was allowed to pose a hypothetical problem for the SMS because he claimed that the patient had had no outstanding problems.

16. Several informants who could not decide where to place a specific check mark on the SMS Check Form were allowed to check the zero space.

17. One patient was evaluated on the KSCE three days following discharge from the hospital by conferring with ward personnel regarding his self-care status.

APPENDIX B

FORMS AND TESTING MATERIALS

The Research Authorization Signed by Informants

Research Authorization

I herewith give my permission for the tape recording of this interview. I also give my permission that the information from this interview, and the questionnaire, may be used for research purposes. It is understood that the information will be kept in confidence and used anonymously in all reports or publications.

Signed:_____

Patient's Name_____

Witness:_____

Date:_____

The SMS Interview Questions

I. Educational-Vocational

1. Has he (she) had any problems related to schooling?
2. Has he (she) had any problems related to jobs?
   a. Has he (she) had any problems related to unemployment and job hunting?
   b. Loss of job or demotion?
   c. Intolerable job responsibilities or conditions?
   d. Interpersonal trouble at work?
   e. Business difficulty or reverses?
   f. Retirement?

II. Marriage

Any marital problems?
a. Weddings?
b. Infidelity?
c. Marital disagreements?
d. Separation or divorce?
e. Trouble with sex relations?
f. Pregnancies?
g. Wife's seeking work?

III. Family

Any problems related to family life (immediate, his/her parents, children's family)?
a. Any problems with children growing up?
b. Addition of child or other to the family?
c. Son or daughter leaving home?
d. In-law trouble?
e. Illness, injury, or death--parents, sibs, or children?
f. Bills or debts?
g. Unfavorable change of residence?
h. Chores around the house?
i. Your irresponsibility?

IV. Society

1. Any problems getting along with people outside of family and work? Problems with friends?
2. Any problems with community organizations? Any problems with church?
3. Any problems with the law?
4. Any problems with loss of status in the community or public embarrassment?

V. Personal

1. Any problems related to his/her illnesses or injuries?
   a. Her pregnancies?
   b. Sleeping problems?
   c. Weight problems?
   d. Obtaining or following medical advice?

2. Can you think of any problems we haven't covered?
   a. Drinking or drugs?
   b. Frustration in pursuit of a hobby?
   c. Religious problems?
   d. Loneliness?
   e. Inability to buy a desired article?
   f. Valuable possession lost or damaged?
   g. Home or automobile?
   h. Personal failure or frustrated ambition?
   i. Advancing age?

The SMS Interview Instructions

I am going to ask you to tell me about the kinds of problems (name of patient) may have had before the stroke. I will ask you questions about specific problem areas, things that often produce problems, but if you think of some other problem I would appreciate knowing about it. Your descriptions can be very brief; I will ask for more information if it is necessary.

I realize that this may be a somewhat difficult task; it requires some willingness to make rough estimations about the things that were actually problems for (name of patient), not just what he should have been concerned with. What things bothered him, upset him, or preoccupied him with finding solutions?

When we have listed the various problem areas, we will go back to each one and I will ask you to select from various alternatives the ways he responded to each problem. To some extent it is impossible to think about (name of patient) problem areas without also thinking about how he handled them, so you will probably be developing those ideas right from the start.

If you have any doubt about what I mean by a particular problem area, please say so and I'll give examples. Do you have any questions?

The SMS Check Form

	3	2	1	0	1	2	3	
faces it	___	: ___	: ___	: ___	: ___	: ___	: ___	avoids it
tries harder	___	: ___	: ___	: ___	: ___	: ___	: ___	tries less
does it now	___	: ___	: ___	: ___	: ___	: ___	: ___	does it later

	3	2	1	0	1	2	3	
wants to be alone	___	: ___	: ___	: ___	: ___	: ___	: ___	wants to talk of it
does not seek help	___	: ___	: ___	: ___	: ___	: ___	: ___	seeks help

	3	2	1	0	1	2	3	
continues same way	___	: ___	: ___	: ___	: ___	: ___	: ___	looks for new ways
resists help	___	: ___	: ___	: ___	: ___	: ___	: ___	welcomes help
argues	___	: ___	: ___	: ___	: ___	: ___	: ___	discusses

	3	2	1	0	1	2	3	
gets tensed up	___	: ___	: ___	: ___	: ___	: ___	: ___	relaxes
becomes anxious	___	: ___	: ___	: ___	: ___	: ___	: ___	becomes indifferent
becomes angry	___	: ___	: ___	: ___	: ___	: ___	: ___	keeps calm

	3	2	1	0	1	2	3	
looks for his mistake	___	: ___	: ___	: ___	: ___	: ___	: ___	looks for other's mistake
angry at self	___	: ___	: ___	: ___	: ___	: ___	: ___	angry at others

Instructions for the SMS Check Form

We will complete one of these forms for each of (name of patient) problem areas. I would like you to make one check mark (✓) for each of the pairs. The check will be on one of the spaces between each of the alternatives. The spaces are numbered 3-0 and 0-3. A 3 means that the reaction on that side is very close to the way (name of patient) usually handled that kind of a problem. A 2 either means "quite close" or it may represent a kind of averaging of reactions on both sides. A 1 means a reaction only slightly in that direction or it could also represent an average reaction. A 0 means either a reaction halfway between, or an average of reactions on both sides. If you feel that a pair is completely irrelevant to that particular problem, leave it blank; however, at least one pair should be checked for each of the five groups. Any questions?

List of SMS Problems Reported

Educational-Vocational

1. Work problems.
2. Work.
3. Dust problem on the job.
4. Had to work late--contributed to wife's drinking--bothered him.
5. Problem with employers.
6. Losing jobs.
7. Problem with business venture (brother-in-law).
8. Personality problems at work.
9. Job pressure and leaving.
10. Bad breath.
11. Job frustrations.
12. Job difficulties.
13. Job problems.
14. Pressure of job orders.
15. Job problems.
16. Worried of layoff.
17. P. O. job problems.
18. Job pressure.
19. Recent job concern, possible loss of job.

Marriage

1. Difficult marriage.
2. Problem of my drinking.
3. Husband loses income (JOBS).
4. Husband's heart attack and operation.
5. Your irresponsibility.
6. Getting married.
7. My not fixing things at home.
8. Marital disagreements.
9. First marriage (problems related to first marriage).
10. Alimony problem.
11. Marital disagreements (e.g., flying).
12. Problems holding together first marriage.
13. Her marriage problems.
14. Disagreements over child rearing.
15. Husband's death.
16. My eye problem.

17. Concern about wife's being late.
18. His dissatisfaction with the separation.
19. Jealousy.
20. Problems with wife (both).
21. Separations and divorce problems.
22. Wife taking car.
23. His arrest.

Family

1. Son-in-law.
2. Problem of bills.
3. Bills.
4. Mother's death.
5. Family criticisms of her.
6. Irresponsible relatives--sex.
7. Brother's insanity and mother's diabetes.
8. Money shortages.
9. Daughter's disappointing behavior.
10. Worries (problems) with sister.
11. Aunt's coming.
12. Aunt's nervous breakdown.
13. Dad's death.
14. Death certificate.
15. Lack of support from husband's relatives.
16. Living with sister.
17. Cousin's overstaying.
18. Son's bowleggedness.
19. Mother-in-law at home.
20. House and family frustrations.
21. Inferiority thing--husband's family.
22. Difficulty with sister's husband.
23. Malpractice.
24. Concern about money and insecurity.
25. Mother's death.
26. Sister's being killed in Houston.
27. Problem with her niece.
28. Child's death.
29. Problems with brother and sister.
30. Dolly misbehaves.
31. Deaths of family members.
32. Spats with sister.
33. Problem with wife's sister's family.
34. Debts.
35. Mother-in-law.
36. Getting along with first wife's mother.
37. Problems with children.
38. Money problems.
39. Problems with son (truancy).

Society

1. Church minister's replacement.
2. Neighbors with guns.

Personal

1. Problem of doctors.
2. The stolen TV; feelings of loss.
3. Concern about dying.
4. Seeking medical advice.
5. Not following advice in doing anything about medical problem.
6. Wife's death and loneliness.
7. Wanting pregnancy and child.
8. Feelings about American medicine.
9. Loneliness because of out of own environment.
10. Wanting house.
11. Drinking and desire to stop.
12. Not going to eye doctor.
13. Frustrated ambition.
14. Not following medical advice.
15. Mechanical problems.
16. Problems with mechanical things.
17. Regret that she was unable to bring up her daughter.
18. Legs--problem.
19. Decisions over animals.
20. Weight problems.
21. Weight problems.
22. Loneliness and fear of
23. Back problems.
24. Sleeping problem.
25. Medical problems.
26. Drinking problem.
27. Sleeping problem.
28. Loneliness and left out feelings.
29. Disc operation.
30. Problem with gadgets.
31. Second heart attack.
32. Weight problems.
33. Loneliness (work on road).

General

One spouse used a hypothetical general problem.

The KSCE Scoring Form Prepared for this Research

NURSING SELF-CARE SHEET

NAME: INITIAL RATING DATE: FINAL RATING DATE:

BED ACTIVITIES	INITIAL	FINAL
Move in Bed		
Supine to side-lying and back	____	____
Supine to prone	____	____
Prone to supine	____	____
Rise and Sit on Edge		
Grasp rail, rope, trapeze, etc	____	____
Pull into long or short sitting position	____	____
Swing legs over side	____	____
Remain balanced	____	____
TRANSFERS		
Standing Transfer		
Position wheelchair	____	____
Lock brakes	____	____
Move foot pedal aside	____	____
Slide forward	____	____
Stand	____	____
Pivot	____	____
Sit	____	____
Toilet Transfer		
Position wheelchair	____	____
Lock brakes	____	____
Move foot pedal aside	____	____
Slide forward	____	____
Stand	____	____
Pivot	____	____
Sit	____	____
LOCOMOTION		
Walking	____	____
Stairs	____	____
Wheelchair	____	____
DRESSING		
Upper Trunk and Arms		
Eyeglasses	____	____
Hearing aid	____	____
Undershirt or brassiere	____	____
Overshirt or blouse	____	____
Braces, prosthesis, corset	____	____
Lower Trunk and Arms		
Pants or dress	____	____
Skirt	____	____
Underpants	____	____
Long leg brace	____	____
Prosthesis	____	____
Belt (if used)	____	____

Code: + = Independent

± = Requires Assistance and/or Supervision

- = Dependent

The KSCE Scoring Form (Continued)

	INITIAL	FINAL
Feet		
Shoes	___	___
Stockings	___	___
Braces	___	___
PERSONAL HYGIENE		
Face, Hair, Arms		
Shaving	___	___
Make-up	___	___
Wash face	___	___
Wash hands	___	___
Wash arms	___	___
Comb hair	___	___
Brush teeth	___	___
Nail care	___	___
Trunk and Perineum		
Wash back	___	___
Wash buttocks	___	___
Wash chest	___	___
Wash abdomen	___	___
Wash groin	___	___
Lower Extremeties		
Wash upper legs	___	___
Wash lower legs	___	___
Wash feet	___	___
Care for toenails	___	___
Bowel Program		
Dressing and undressing needed	___	___
Inserting suppository (if used)	___	___
Applying, cleansing bed pans, etc. (if used)	___	___
Cleansing self	___	___
Bladder Program		
Dressing and undressing needed	___	___
Assembling, applying, cleansing and caring for urinal or other device	___	___
FEEDING		
Cut meat	___	___
Drink from cup or glass or use straw	___	___
Use spoon or fork or finger feed	___	___
Butter bread	___	___
Pour from a container	___	___
Apply adaptive equipment (if used)	___	___

Code: + = Independent

± = Requires Assistance and/or Supervision

− = Dependent

Name of Rater: _____

APPENDIX C

MEANS, STANDARD DEVIATIONS AND THE CORRELATION MATRIX

The Means and Standard Deviations of the Variables

Variable No.	Mean	S. D.
1. SMS-Approach/Avoidance	2.258	1.058
2. SMS-Independence/Dependence	5.108	1.505
3. SMS-Rigidity/Flexibility	5.165	1.118
4. SMS-Emotional Involvement/ Detachment	2.927	1.149
5. SMS-Internalization/ Externalization	4.285	1.532
6. KSCE-Bed Activities	.635	.672
7. KSCE-Transfers	.981	.954
8. KSCE-Locomotion	1.481	1.068
9. KSCE-Dressing	.931	.957
10. KSCE-Personal Hygiene	.746	.855
11. KSCE-Feeding	.423	.758
12. KSCE-Total	5.235	3.674
13. MTDDA-Auditory Comprehension	.581	.418
14. MTDDA-Speech Production	.362	.478
15. MTDDA-Reading Ability	.650	.628
16. MTDDA-Writing Ability	.454	.541
17. T-JTA-Nervous/Composed	14.154	7.750
18. T-JTA-Depressive/Lighthearted	9.885	7.464
19. T-JTA-Active-Social/Quiet	23.615	8.040
20. T-JTA-Expressive-Responsive/ Inhibited	29.231	7.179
21. T-JTA-Sympathetic/Indifferent	31.615	6.795
22. T-JTA-Subjective/Objective	10.769	5.888
23. T-JTA-Dominant/Submissive	20.769	9.035
24. T-JTA-Hostile/Tolerant	10.000	8.338
25. T-JTA-Self-disciplined/Impulsive	27.192	8.971

The Intercorrelation Matrix of the Fourteen Predictors, and the Eleven Criteria

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1. SMS-Approach/Avoidance	—	-57	-64	31	-24	11	-07	-20	-17	-05	-26	-15	-45	-24	-38	13	01	22	-43	-19	-33	-14	-23	-14	-28
2. SMS-Independence/Dependence		—	71	-12	07	-09	16	10	24	35	46	28	37	11	51	04	-21	-22	45	37	42	-23	03	-30	11
3. SMS-Rigidity/Flexibility			—	-14	-09	-01	15	03	17	08	34	16	32	05	37	-28	-06	-29	58	48	63	-15	20	-22	21
4. SMS-Emotional Involvement/Detachment				—	-50	01	-03	-17	10	08	11	01	-17	-05	11	05	-60	-23	-06	03	-07	-40	-02	-39	03
5. SMS-Internalization/Externalization					—	08	16	36	28	28	29	36	-03	29	09	07	56	05	10	09	-05	45	18	36	-11
6. KSCE-Bed Activities						—	54	-16	25	49	40	56	-25	-13	-27	-12	13	21	-42	-40	-24	06	-17	23	12
7. KSCE-Transfers							—	23	52	63	59	84	13	-08	-08	-01	00	-08	-05	22	-01	-03	-11	-09	22
8. KSCE-Locomotion								—	03	25	15	42	65	47	31	14	20	02	10	38	05	-07	01	-10	-10
9. KSCE-Dressing									—	45	50	67	-12	-10	-15	08	-01	-24	02	05	-03	-02	-00	-06	09
10. KSCE-Personal Hygiene										—	75	86	10	00	12	22	-01	-07	-05	10	16	-20	-20	-24	-01
11. KSCE-Feeding											—	79	09	21	29	18	03	18	21	23	22	-00	07	-11	-03
12. KSCE-Total												—	18	11	06	13	09	-08	-05	16	03	-07	-11	-10	05
13. MTDDA-Auditory Comprehension													—	51	57	15	-15	-05	13	23	24	-12	-11	-35	11
14. MTDDA-Speech Production														—	62	42	19	26	02	-01	09	31	-12	-04	-41
15. MTDDA-Reading Ability															—	16	00	03	31	35	31	04	00	-29	-14
16. MTDDA-Writing Ability																—	-06	18	-20	-21	02	26	-54	-26	-41
17. T-JTA-Nervous/Composed																	—	46	-04	00	06	66	-02	41	-37
18. T-JTA-Depressive/Lighthearted																		—	-67	-47	-17	53	-56	15	-36
19. T-JTA-Active-Social/Quiet																			—	80	43	-20	58	-11	13
20. T-JTA-Expressive-Responsive/Inhibited																				—	42	-27	40	-31	04
21. T-JTA-Sympathetic/Indifferent																					—	-10	-17	-60	-09
22. T-JTA-Subjective/Objective																						—	-12	43	-13
23. T-JTA-Dominant/Submissive																							—	48	40
24. T-JTA-Hostile/Tolerant																								—	06
25. T-JTA-Self-disciplined/Impulsive																									—

Note: Decimal points have been omitted.

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