THE PROCESS - REACTIVE DIMENSION AND ITS RELATIONSHIP TO THOUGHT DISTURBANCE IN SCHIZOPHRENIA

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CONTENTS

SUMMARY

Under the term 'cognitive deficit in schizophrenia' numerous authors have made the phenomenon of schizophrenic thought disorder a subject of special investigation. The prolific research that has been conducted on this topic has clearly demonstrated the relative incapacity of this patient group on a wide variety of laboratory tasks. Although numerous interpretations of this cognitive deficit have been proposed it appears that Interference Theory provides the most promising and parsimonious approach, Lang and Buss 1965, Buss and Lang 1965, Broen 1968.

However this conclusion is somewhat tempered by the fact that many of the studies ostensibly demonstrating the susceptibility of schizophrenic patients to cognitive interference have not matched their tests on discriminating power, Chapman and Chapman 1973. Hence the well documented interference effects may merely reflect a statistical artefact produced by differences in test characteristics. In view of this fact future research is well advised to employ adequately matched tests to establish that their schizophrenic samples are indeed pathologically susceptible to interference effects.

Succinctly Interference Theory ascribes the schizophrenics' disordered cognition to an abnormal susceptibility to interference from concurrent, competing response tendencies. It is because of the schizophrenics' inability to shut out these interfering response tendencies, and to focus only on situationally relevant responses, that his behaviour suffers disorganisation.

Broen and Storms 1966, 1967, Broen 1968 and Storms and Broen 1969 have presented a detailed theoretical formulation which attempts to provide an aetiological basis for the observed interference effects.

On the basis of physiological evidence they conclude that schizophrenics are more 'aroused' than normals. They argue that this state of hyperarousal corresponds to a

heightened drive state, which in the light of Hull's 1943 theory, provides remote associations with increased response strength. Concomitantly they propose that schizophrenics have abnormally low 'response strength ceilings'. This response strength ceiling represents the upper limit beyond which the multiplicative effect of drive on the habit strength of a response is nullified. This means that although increased drive initially increases the strength of dominant responses, these responses are soon restricted by the ceiling and that the only subsequent effect of drive is to increase the strength of competing responses lower in the response strength hierarchy. The interactive effect of heightened drive and an abnormally low response strength ceiling collapses the schizophrenics' response hierarchy, resulting in a gross state of response competition and increasing the probability of incorrect responses.

Because of the abnormal response equivalence engendered by the collapse of their response strength hierarchies, schizophrenics frequently respond with inappropriate normally non-dominant responses. Broen and Storms 1966 therefore assert that

> 'Normal appropriate behaviour is characterised ... by the use of dominant responses ... (and that) ... a decrease in dominant responses reduces appropriate behaviour.' pp.266.

However this implied equivalence of dominant and appropriate responses is probably incorrect. That is, there are many situations where the dominant response is not appropriate and, instead some sort of self-editing process must operate in order to conserve appropriateness via the selective facilitation of non-dominant responses. The existence of such a process is not only intuitively obvious but represents a fundamental construct in the field of retrieval mechanisms in memory, Adams 1967, Kleinmuntz 1967, Neiser 1967, Norman 1970, Tulving and Donaldson 1972.

Within the ambit of schizophrenic psychological deficit there has been some specific work done in which the dominant response is not appropriate. From their

results Chapman 1958, Chapman, Chapman and Miller 1964, Chapman and Chapman 1965 concluded that, compared to normals, schizophrenics are especially prone to misinterpret words that have more than one meaning in situations where the weaker response is more appropriate. That is, errors were prompted by a bias towards the stronger response. These authors considered that this response bias occurred

> 'because of (the schizophrenics') frequent failure to screen, that is, accept or reject responses on the basis of their appropriateness.' Boland and Chapman 1971, pp.52.

The process of selectively suppressing dominant in favour of weaker but more appropriate responses was considered by Cohen and Camhi 1967, who proposed a 'two-stage model' to explain the schizophrenics' associational difficulties. Paralleling research evidence on organisational and retrieval processes in memory their theory proposes that: during the first stage ('sampling' or 'search') the person samples a response from a hypothetical hierarchical set of responses and then (implicitly) proceeds to the second 'editing' (decision) stage, called comparison. During the editing stage the subject compares certain properties of the sampled response with the criteria required for the emission of a correct response. The subject either emits the sampled response or rejects it depending upon how closely the sampled response approximates the required criteria. If the sample item is rejected the two-stage cycle is repeated.

Applying this model to schizophrenia it appears that the prevalence of deviant responses is a consequence of impaired self-editing in the comparison stage, Lisman and Cohen 1972, Smith 1970, Cohen, Nachmani and Rosenberg 1974, Putterman 1975.

If one extends this model to Chapman et al.'s 1964 proposal it seems reasonable to assume that dominant responses will be sampled first since they are foremost in a person's response strength hierarchy and that the schizo-

phrenic cannot reject these responses to continue the two-stage cycle. That is, the schizophrenic cannot edit out these dominant but inappropriate responses in favour of less dominant, appropriate responses. Hence the postulated overinfluence of dominant meaning in schizophrenia.

Quite a considerable body of research has been addressed to an evaluation of the contrasting predictions generated by these three aforementioned research groups, Deckner and Blanton 1969, Neuringer et al. 1969, 1972, Boland and Chapman 1971, Leavitt et al. 1972, Lisman and Cohen 1972, Storms and Broen 1972, Broen and Nakamura 1972, Mourer 1973, Blaney 1974, Cohen, Nachmani and Rosenberg 1974, Strauss 1975. The results of these studies unanimously support the Cohen-Camhi and Chapman models, whilst affording little or no confirmation of Broen and Storms' theoretical position.

However the evidence against the latter authors cannot negate the formidable empirical support for interference theory in general. The problem one now encounters is the reconciliation of apparently divergent, yet empirically valid, accounts of schizophrenic disorganisation. A possible solution to this dilemma appears to lie in the composition of the research samples recruited by the various research groups.

The studies by Chapman and his colleagues all employed chronic schizophrenics. Thus their findings are specific to a sample of chronically hospitalised patients with poor prognoses and cannot be meaningfully extrapolated to account for dysfunction in the schizophrenic population as a whole. Moreover, the evidence accrued from the experiments of the Cohen group of researchers has compelled these authors to modify their model according to schizophrenic patient subgroup. It appears therefore that the contradictory findings may reflect the influence of a subgroup variable: namely the Process-Reactive dimension.

A review of the relevant literature reveals quite considerable differences in the performance capabilities

of process and reactive schizophrenics, Higgens 1964, 1969, Higgens and Peterson 1966, Heron 1962, Broen 1968, De Wolfe 1974. It appears that process patients generally perform more poorly than their reactive counterparts. This trend is so marked that the aforementioned authors strongly recommend subclassifying patients according to process-reactive status in order to reduce heterogeneous and contradictory findings.

It is the contention of the present author that these behavioural differences may reflect differences in the scanning functions of the two subgroups created by the institution of an interference reduction defensive system by process patients. There is ample evidence to suggest that process schizophrenics appear to restrict their active monitoring of the environment (both internal and external) in an endeavour to reduce the disorganisation produced by cognitive interference, Freeman 1960, Venables 1963, 1964, Broen 1968, 1973, Cromwell 1972, Neale and Cromwell 1972, Silverman 1972. Translated into the Cohen-Camhi two-stage model, this means that process schizophrenics would be expected to prematurely terminate their scanning operations. By doing so they restrict the number of responses generated and thereby reduce the number of possible competing information units.

It is assumed that the motivation to reduce scanning to a minimum is provided by the prolonged aversive effects of disorganisation, McGhie and Chapman 1961, Chapman 1966, Chapman and Freedman 1973, Freedman 1974. Hence reactive schizophrenics, who generally do not suffer a protracted illness with its concomitant adversities Turner and Zabo 1968, Higgens 1969, Neale and Cromwell 1970, Rosen, Klein and Gittleman-Klein 1971, Strauss 1973, are not expected to develop an equivalent interference reduction system.

If one now considers Chapman et al.'s hypothesis in the light of the above formulation - could it not be that process schizophrenics are particularly susceptible to the overinfluence of dominant meaning because this patient

group has learned to stop the sampling of responses early in the two-stage process ? Given the hierarchical structure of memory storage, Miller 1956, Cohen and Bousfield 1956, Mandler 1967, 1968, Bower et al. 1969, Segal 1969, Preusser and Handel 1970, Collins and Quillian 1972, it seems reasonable to suppose that such restricted scanning will only recover the more dominant responses. By the same token, less dominant responses, which require a more comprehensive memory search, will be largely neglected.

In summary it is clear that a considerable degree of confusion has arisen from the conflicting predictions of the Broen-Storms, Cohen-Camhi and Chapman models of schizophrenic cognitive disturbance. It seems however that the contradictory findings reported may reflect the contaminatory influence of a subgroup variable: namely the process-reactive dimension.

Aims and Hypotheses of the Present Study

The intention of the present study is

(a) to attempt to assess the relative merits of three contradictory models of thought disturbance in schizophrenia, and to effect

(b) a reconciliation of these models by recourse to proposed differences in the scanning functions of process and reactive schizophrenics.

The main hypotheses to be examined are as follows :

(1) Schizophrenic patients as a whole should be pathologically susceptible to the effects of associative interference, whilst non-psychotic but psychiatrically disturbed persons and normals should reveal no such susceptibility.

(2) Process schizophrenics should make significantly more stronger meaning response errors on Chapman et al.'s 1964 Lexical Ambiguities Test than either reactive schizophrenics, non-psychotic psychiatric patients or normals.

(3) Process schizophrenics should have significantly shorter response latency times on Chapman et al.'s 1964 Lexical Ambiguities Test than reactive schizophrenics, non-psychotic psychiatric patients or normals.

This latter hypothesis reflects a corollary to the concept of an interference reduction defense system amongst process patients. Response latency times have been employed as a rough measure of the extent of cognitive scanning. If process patients do discontinue scanning and editing early on in the two-stage process they should make their judgements sooner than reactives, and possibly normals and other psychiatric patients.

Method

The research sample comprised 40 White, English speaking males. This number was made up of 10 Process schizophrenics, 10 Reactive schizophrenics, 10 Non-psychotic but personally disturbed patients requiring psychiatric hospitalisation and 10 hospitalised, psychiatrically normal medical and surgical patients. No subjects were selected if their records revealed any disease of the central nervous system, alcoholism or drug abuse. All groups were matched for age and verbal intelligence. Analysis of covariance was employed to statistically control for significant differences between the groups for percentage of lifetime hospitalised, De Wolfe 1968, 1971, 1973. Particularly stringent selection criteria and control measures were employed in the case of schizophrenic patients. The most important of which were the exclusion of paranoid patients and the control of 'severity of current cognitive symptoms', De Wolfe 1973. Each subject was tested individually, and completed all the tests at a single sitting.

Results

The research hypotheses were largely confirmed.

The results provided conclusive evidence that the schizophrenic group as a whole was abnormally susceptible to the effects of associative interference $F(1,70) - 7.04$, $p < .01$, whilst non-psychotic psychiatric patients and normals revealed no such susceptibility. The assumption that out of the four experimental groups process schizophrenics would show the greatest tendency to commit errors prompted by a bias towards the stronger meaning response was also corroborated TUKEY HSD $(4,35) = 3.82$, $p < .05$. The third hypothesis pertaining to reaction times of the four groups was not fully substantiated. Although process schizophrenics had shorter response latency times than reactive schizophrenics TUKEY HSD $(4,35) = 4.75$, $p < .01$, this group was not found to differ significantly from the normal and non-psychotic patient groups. However this latter result is not entirely surprising. In spite of their brief scanning and editing operations it is unlikely that process patients would be capable of performing faster than non-thought disordered persons. This is due to the fact that their performance is debilitated by the effects of cognitive disorganisation.

The feature of greatest import is the evidence indicating that process schizophrenics respond quicker than their reactive counterparts. This finding provides, albeit rough and indirect, confirmation of differences in the decision making processes of the two schizophrenic subgroups.

Discussion

The present research is consistent with the wealth of evidence identifying response interference as a major source of schizophrenic thought disturbance. It also confirms the heuristic and empirical value of the process-reactive dimension. In particular the results have been consistent with the hypothesis of qualitatively distinct modes of thinking in process-reactive schizophrenics, De Wolfe 1974. Support is afforded for the Cohen-Camhi 1967

two-stage model of the response selection process, and for Chapman et al.'s 1964 response bias hypothesis. However the latter hypothesis is considered to be applicable only to process schizophrenia. A review of research into the memory functions of schizophrenics corroborates inferences made by the present research concerning differences in the scanning and editing functions of process and reactive patients, Bauman and Murray 1968, Nachmani and Cohen 1969, Bauman 1971, Koh, Kayton and Berry 1973, Traupman 1975. Although addressed to the response selection stage, the present study acknowledges the presence of schizophrenic difficulties at the input and processing end of the information processing continuum. Predictions made from the present project pertaining to these stages have been confirmed by the findings of other authors, Broen 1968, 1973, Cromwell 1972, Neale and Cromwell 1972, Silverman 1972. The present study also indicates that theories which postulate schizophrenic dysfunction only in the input-processing stages, McGhie 1969, 1970, Payne 1960, 1962, 1966, 1971, Yates 1966, offer a restricted explanation of schizophrenic disorganisation. In addition it serves a warning that unless these authors consider process-reactive categorisation in their future research the generality of their conclusions will be restricted further.

CHAPTER 1

INTRODUCTION

> 'I feel that everything is sort of related to everybody and that some people are far more susceptible to this theory of relativity than others because of either having previous ancestors connected in some way or other with places or things, or because of believing, or by leaving a trail and all sorts of things go like that.' (Quoted from Mayer-Gross, Slater and Roth, 1972).

The speaker is a schizophrenic. The symptom he manifests is a classical feature of the illness, but one which is better illustrated than described. It is the symptom of schizophrenic thought disorder.

More specifically schizophrenic thought disorder refers to an abnormality of the ideas which he may express. This disturbance in thought processes is by no means equally severe in all schizophrenic patients. In early cases it often appears as a 'woolly' vagueness, or an inconsequential following of side issues which lead away from the main topic of conversation. The effect may be very puzzling if a suspicion of schizophrenia is not already in mind; and the clinician may only became aware that there is something amiss when ten minutes of earnest enquiry have lead nowhere. In more severe cases the patient's thought is directed by alliterations, analogies, clang associations, associations with the accidents of his environment and symbolic meanings. The schizophrenic clings to unimportant detail; he permits the aim of his thinking to slip out of sight, and ideas with relationships tangential to the main

theme intrude, interfering with the organised continuity of the theme. Finally his thought may become totally derailed, producing what may be best described as 'word salad'. However, although cases of gross disturbance of syntax have been reported, it seems quite clear that most of the disturbances of language found amongst schizophrenic patients are almost entirely a matter of semantic or lexical error.

Under the term 'cognitive deficit in schizophrenia' numerous authors have made the phenomenon of schizophrenic thought disorder a subject of special investigation. During the past years a voluminous literature has appeared on the topic, and the relative incapacity of this patient group has been demonstrated by a host of laboratory tasks. There have been numerous interpretations of this cognitive deficit which would appear to fall into four broad categories. The first of these can be roughly described as social or interpersonal in emphasis: the deficit being variously ascribed to social censure, oversensitivity to affective stimuli, or lowered social motivation. The second approach holds that the cognitive deficit is a consequence of regression. A third view argues that the fundamental thinking disorder in schizophrenia is due to an inability to form abstract concepts. The final formulation posits that associative interference underlies the many instances of the schizophrenic language disturbance.

INTERPERSONAL THEORIES OF SCHIZOPHRENIC COGNITIVE DISORDER

(a) Social Censure

Rodnick and Garmezy 1957 have been the most forceful advocates of the censure hypothesis. Observing that the clinical psychiatric reports stress the sensitivity of schizophrenic patients to the threat of criticism or rebuff inherent in almost any social situation they hypothesised that :

> 'If such criticism does accentuate the patient's difficulties (in cognitive functioning) then it

> would follow that the experimental introduction of censure should produce greater cognitive decrements in schizophrenic patients than in normals.' p.118.

Rodnick and Garmezy attempted to confirm this statement in a series of experiments conducted by themselves or by their students: Garmezy 1952, Webb 1955, Bleke 1955, Smock and Vancini 1962. More recently other authors have attempted to assess the veracity of the censure hypothesis: Clarke 1964, Goodman 1964, Magaro 1967, Cicchetti et al. 1967, Fontanna et al. 1967, Klein et al. 1967, Kopfstein and Neale 1971, Magaro 1972.

The findings have been contradictory but the predominant trend has been to indicate that what evidence there is favouring the censure hypothesis is weak and that the individual experiments are open to a variety of interpretations.

Indeed the thesis that censure invariably disrupts performance is clearly untenable when evidence from studies concerned with the effects of motivational incentives (reward and punishment) are considered. Both negative evaluation and specific verbal or physical punishment have been found to significantly improve schizophrenics' performance rather than produce further deficit. Such findings are incompatible with the social censure hypothesis.

(b) Oversensitivity to Affective Stimuli

Many theorists regarded the censure hypothesis as being too narrowly defined to be an efficacious explanatory concept of deficit in schizophrenia. They proposed rather that schizophrenics are adversely affected by all affective stimuli, not merely those connoting censure.

Experimental studies have again produced mixed findings. Evidence to show that schizophrenics' accuracy is lowered by affective stimuli has been reported by Richman 1957, 1964, Brodsky 1962, Wood 1961, De Wolfe 1962, Lewinsohn and Riggs 1962, Storms et al. 1967, Bannister and

Salmon 1969 and McPherson and Buckley 1970. In contrast Feldstein 1962, Deering 1963, Blumenthal 1964, Williams 1964, Nathan 1964 and Hamlin and Lorr 1971 have produced contradictory results.

One of the central problems with this hypothesis is to define the term affective. The operational definitions given in the studies are so diverse that there appears to be no clear referent for the term.

Furthermore the findings are extremely difficult to interpret due to the fact that in most of the studies the affective and neutral items differ in ways other than affectivity. For instance, in complexity and in number of stimulus characteristics. Both of these factors radically affect the discriminating power of the tests used. Chapman and Chapman 1973 severely criticise research into cognitive deficit in schizophrenia on the grounds that many of the findings are artefacts of tests unmatched in discriminating power. In their own study to assess the influence of affect laden stimuli on thought disorder in schizophrenia they conclude :

> 'with subtests matched on discriminating power ... schizophrenics were no less accurate on the affective subtest than on the neutral subtest.' Chapman et al. 1974 pp.616.

It is clear therefore that whatever evidence does exist in confirmation of the 'affective stimuli' hypothesis, it must be viewed with considerable caution.

(c) Insufficient Social Motivation

Clinical descriptions of schizophrenics typically include lack of volition and isolation, or at least a tendency to withdraw from interpersonal contacts. Cameron 1938, 1939 has attempted to relate these features causally to thought disturbance in schizophrenia. His basic premise is that the schizophrenic is left with disorganised, competing thoughts

because of a loss of the organising factors that are inherent in the need to communicate with others. He contends that the natural tendency in speaking or thinking is for loosely related ideas to occur together, and that appropriate selection is learned or occurs only because of a desire to make oneself understood by others.

> 'Any normal adult must be able to define his terms to a reasonable degree on demand. That is, he must be able to become more exact by limiting the reference of the term or phrase he uses, and to accomplish this end he must be able to discard whatever is unimportant or only partially relevant. Such a capacity is just what is absent in schizophrenic disorganisation.' 1939, pp.265.

Without appropriate organisation and selection from among loosely related thoughts, the schizophrenic is often unintelligible to others '... yet he is quite satisfied with his product, and indicates no uneasiness concerning his own unintelligibility. This is the core problem.' 1938 pp.23. In other words, the normal subordination of competing associations to appropriate, socially clear thoughts does not occur. This originates from the schizophrenics' general lack of social concern. His disinterest in interpersonal contacts make it unimportant whether he is understood or not.

If lack of social concern is basic to schizophrenic thought disorder then it follows that such patients should be impervious to the effects of social incentives such as rewards or punishments. However, relevant research by Buss et al. 1956, Stotsky 1957, Olson 1958, Cavanaugh 1958, Benton et al. 1960, Isaacs et al. 1960, Topping and O'Connor 1960, Brown 1961, Aitkinson and Robinson 1961, Losen 1961, D'Alessio and Spence 1963 indicates that schizophrenics are responsive to social incentives. This data does not support a motivational interpretation of deficit.

REGRESSION AND SCHIZOPHRENIC THINKING

Several clinical writers have stated that schizophrenic thought disorder consists of a regression to infantile levels of thought. This is the theoretical position of such psychopathologists as Sullivan 1924, Levin 1936, Fenichal 1945, Freud 1950 and Arieti 1955. Cognitive theorists who have also endorsed this view include Piaget 1923, Vigotsky 1934, Goldman 1962 and von Domarus 1964.

However empirical support is poor. Goldman 1962 cites qualitative findings with children and schizophrenics. Unfortunately these lack quantification and adequate controls. Feifel 1949, Ellsworth 1951, Burstein 1959, 1961 have also provided tentative confirmation of regressive thinking in schizophrenia. Latterly these studies have been found to be methodologically unsound. Chapman et al. 1961.

At best, regression may be employed merely as a descriptive term referring to similarities observed between the verbal behaviour of children and schizophrenics. Regression as an explanatory principle implying retrogression to childlike thinking is untenable since such a usage would require the demonstration of a fairly blanket similarity between schizophrenics and children. This has not been done.

LOSS OF ABSTRACTNESS AND SCHIZOPHRENIC THOUGHT DISORDER

Drawing an analogy from his research with brain damaged patients Goldstein 1944 suggested that the fundamental thinking disorder in schizophrenia was the inability to form abstract concepts. He postulated that the 'abstract attitude' developed gradually being preceded by the 'concrete attitude'. The concrete attitude was said to be marked by a binding to immediate experience in the explanation of an object or situation. The individual is considered 'stimulus bound', and responds primarily to the literal and unique qualities of a specific object. The abstract attitude on the other hand, involves the ability to transcend the immediate aspects or literal qualities of

an object, permitting generalisation to a larger class.

Goldstein proposed that normal persons combined both attitudes in their behaviour and were capable of shifting between them according to situational demands. However both organic brain damaged patients and schizophrenics were assumed to have lost the abstract attitude and could function in thought and language only at the concrete level. Goldstein 1944, 1959 was careful not to conclude that schizophrenia is the same as organic brain damage. He explicitly stated that the deficit in schizophrenics was secondary to their psychological deterioration and did not arise from intracranial damage as was the case in neurological conditions.

Goldstein cited as evidence for his theory the relatively poor performance of schizophrenics on the Goldstein - Schreerer Test. Bolles and Goldstein 1938, Goldstein and Schreerer 1941. Similar results were obtained by Hanfmann and Kasanin 1937, 1942 and Kasanin 1946.

However these earlier studies are inconclusive due to methodological faults. Later investigations have demonstrated conclusively that schizophrenics are not abnormally concrete. Fey 1951, McGaughran and Moran 1956, 1957, Chapman and Taylor 1957, Lothrop 1960, Williams 1964, Maher 1966, Shimkunas 1972. They revealed that schizophrenics are capable of responding with abstract concepts but that the concepts are often unusual and idiosyncratic. The problem with the schizophrenic is not a loss of abstract attitude but a tendency to verbalise concepts that are deviant and difficult for normals to understand.

INTERFERENCE THEORY

As has already been mentioned the characteristic feature of schizophrenic thought disorder is the patient's inability to focus on the mainstream of his thought. There seems to exist an inability to express himself with the correct words although he is quite conscious and without

obvious impairment of articulation or hearing. It is as if the schizophrenic is incapable of concentrating only on the relevant aspects of his communication and to exclude whatever is inappropriate or irrelevant. In other words he appears to be abnormally susceptible to interference from stimuli (both internal and external) which seem to intrude and disorganise the continuity of his speech.

Translated into the terminology of Interference Theory :

> the schizophrenic appears especially susceptible to interference from concurrent competing response tendencies. It is because of his inability to shut out these interfering response tendencies that his behaviour suffers disorganisation.

The study of normal speech, Zipz 1949, Chomsky 1965, Perfetti 1972 and its interrelationship with the organisational structure of memory, Mander 1967, 1968, 1972, Collins and Quillian 1969, 1970, Kintsch 1970, 1972, Shiffrin 1970, Bower 1970, Tulving 1972 and Rumelhardt et al. 1972, indicates that coherent speech may be seen as the result of the successful and instantaneous inhibition of associated elements in an utterance. Each element of an utterance (syllable, word or phrase) may automatically activate associated elements in much the same way that single words activate associations when given in the word association technique. However these activated associations do not enter consciousness during the course of organised utterance. They do not enter because they are inhibited: the utterance of a sentence is thus an extremely complex act which involves, amongst other things,the continuous inhibition of distracting associations. It appears that the schizophrenic makes a uniquely poor bargain in this respect. The selective inhibition of associated elements necessary for coherent speech does not occur. Consequently the patient is constantly at the mercy of ideas subsidiary to the mainstream of his thinking.

A digression is necessary at this juncture. Implicit

in the above analysis is the fact that associated elements are the disruptive force in schizophrenic thought and speech. What then of the often cited bizarre and idiosyncratic responding of schizophrenics ? Research addressed to this issue, Chapman 1956 (a),(b), 1958, 1961, Chapman and Taylor 1957, Burstein 1961, Lang and Luoto 1962, Gottesman 1964, Moran et al. 1964, Spence and Lair 1964, 1965, Chapman and Chapman 1965, Boland and Chapman 1971, Roberts and Schuham 1974, is unanimous in its conclusion that schizophrenic errors are the result of the intrustion of elements which are normal associates evoked by the task situation. They state that the major difference between schizophrenics and normals is the increase of incorrect but associated responses that intrude sporadically in a general context of correct responding in schizophrenics. Thus the schizophrenic errors are deviant but associated errors and not simply random, idiosyncratic responses.

It is precisely this feature of associative interference and the inability of the schizophrenic to suppress these inappropriate associations that is the concern of interference theory.

> 'The associations of schizophrenics ... deteriorate performance because they serve as distractors. Schizophrenics have difficulty in focusing on relevant stimuli and excluding irrelevant stimuli ... (thus) ... Their ongoing response tendencies suffer interference from irrelevant external cues and internal stimuli which consist of deviant thoughts and associations.' Lang and Buss 1965 pp.97.

(a) Observational Studies

Several authors have made a systematic study of the early symptoms of schizophrenia by obtaining self reports from schizophrenic patients. McGhie and Chapman 1961, Chapman 1966, Freedman and Chapman 1973, Freedman 1974. Their

results consistently reveal that the interference effects described above are pervasive, disturbing not only speech and thought, but perceptual and motor functioning as well.

However since these latter two areas are only peripheral to the focus of the present research let it suffice to say that these areas also suffer interference effects and as such supply additional support for interference theory as an explanatory concept of schizophrenic disturbed behaviour.

With regards to the schizophrenics' disturbance in speech and thought, the patients' reports provide remarkable illustrations of interference effects :

> 'My thoughts get all jumbled up. I start thinking or talking about something but I never get there. Instead I wander off in the wrong direction and get caught up with all sorts of different things that may be connected with the things I want to say but in a way I can't explain.' McGhie and Chapman 1961 pp. 108.

> 'Often I have to go through two or three things in my head before I find the thought I want - the words I don't want come out - not the correct words - not the words I wanted for the meaning I wanted to give. I have to pick out thoughts and put them together. I can't control the actual thoughts I want.' Case 22, Chapman 1966 pp. 236.

One patient summed up his difficulties with the following telling comment :

> 'When I'm trying to think of something I'm like a railway engine, running along a line where someone keeps changing the points.' McGhie 1969 pp. 49.

These accounts certainly appear to confirm the basic postulates of interference theory. However any firm conclusions

about the value of the theory must depend on experimental evidence.

(b) Experimental Data

Exhaustive reviews conducted by Buss and Lang 1965, Lang and Buss 1965, Broen 1968 amply demonstrate the empirical usefulness of interference theory in accounting for psychological deficit in schizophrenia. The studies examined in these reviews represented research covering a wide range of perceptual, motor and cognitive tasks.

Broen 1968 summarises his findings with the following comment :

> 'There is strong, almost unanimous support for the idea that schizophrenics show more interference among alternate responses than either neurotics or normals. This susceptibility to response interference seems to be an important aspect of schizophrenic deficit ... Important firstly in that its consequences are so pervasive ... and secondly because relative schizophrenic deficit varies as a function of the presence of competing responses.' pp. 24.

The most striking feature of recent research is its almost exclusive concern with various aspects of interference theory. Studies based on other theoretical orientations are meagre; and those that there are can, more often than not, be more parsimoniously interpreted by interference theory. However pure bulk is not a reliable index of efficacy. A review of recent research (1969-1975) undertaken by the present author indicates that the results of these studies consistently confirm Broen's 1968 conclusions, and accentuate the continuing heuristic and empirical value of interference theory.

(c) Is associative interference a 'specific differential deficit' amongst schizophrenics or is it a result of a 'generalised performance deficit' ?

Most studies purporting to demonstrate associative interference in schizophrenia have usually compared the performance of patient and control subjects on both a neutral and an associative distractor task. Schizophrenics typically perform less adequately than controls in both conditions. This result alone is not particularly surprising given the general inefficiency of schizophrenics. More important is the finding that the decrement in schizophrenic performance is significantly greater in the associative distractor condition. This differential deficit has been taken to mean that the specific ability mediating performance on the associative distractor task (i.e. the capacity to select the situationally appropriate response, whilst ignoring associated but situationally inappropriate responses) is a particularly important area of loss, and one that may be central to our understanding of the disorder.

However in an important paper in 1973 Chapman and Chapman exposed a major methodological flaw in previous research. They emphasise that schizophrenics generally perform less adequately than most comparison groups on almost any cognitive task. That is, they manifest a 'generalised performance deficit'. They they point out that the magnitude of the performance deficit obtained by such a handicapped group, in comparison to another group, is a direct function of the discriminating power of the test(s) employed. That is, the more difficult and discriminating the task, the larger the discrepancy between the two groups. Yet despite this fact most studies have neglected to match their neutral and associative distractor tasks on conventional psychometric indices affecting the discriminating power of a test (i.e. test reliability and mean and variance of item difficulty). In point of fact the associative distractor task has consistently (and seemingly by definition) been more difficult than the neutral task.

Quite obviously this means that the results of many of these studies are equivocal as they may merely reflect a statistical artefact produced by differences in test characteristics: a situation which has been further compounded by the schizophrenics' general inefficiency. It follows, therefore, that the well documented associative disturbance, previously reputed to be a specific differential deficit amongst schizophrenics, may be simply a result of a generalised performance deficit in which all mental abilities are degraded.

There is certainly considerable evidence to the effect that schizophrenics with cognitive pathology typically obtain low scores on almost any measure of cognitive functioning i.e. a generalised performance deficit. Indeed several prominent authors cite evidence that the schizophrenic illness produces a decline in intellectual functioning. Payne 1960, Foulds and Dixon 1962, Yates 1966, Schooler and Friedman 1967. Concluding his review of intellectual functioning in schizophrenia, Savage 1970 states:

> 'The position would appear that for most schizophrenics, intellectual deterioration is a slow process commencing long before hospitalisation and often complete on entry. For other smaller groups deterioration may continue after hospitalisation, particularly after two years, and progressing to an untestable level.' pp. 48.

Returning then to associative intrusion as a specific differential deficit amongst schizophrenics it may be reasonably argued that, because the tests used in research have often not been matched on discriminating power, it is impossible to ascertain whether the increased errors of associative intrusion are a specific result of over-responsiveness to associates or are instead a consequence of a general deficit in intellectual functioning.

However Rattan and Chapman 1973 have developed two multiple choice vocabulary subtests matched on discriminating power which permit the assessment of associational distraction

as a differential deficit in ability amongst schizophrenics independent of generalised intellectual deficit.

The vocabulary subtests were constructed in similar format except that one subtest (the with-associates subtest) contained items with an associative error built in as an alternative whilst items in the other subtest (the no-associates subtest) did not offer associates as incorrect alternatives. It was expected that schizophrenics would make more errors than normal subjects on both of these subtests. However the authors hypothesised that,

> 'since the subtests were matched on discriminating power for normal subjects, schizophrenics should make as many errors on one subtest as the other unless they have a greater susceptibility to associative distraction than normal subjects.' Rattan and Chapman 1973 pp. 170.

The results of their study revealed a highly significant ($p < .001$) difference between the mean scores for schizophrenics on the two subtests, with scores on the with-associates subtest being markedly lower than scores on the no-associates subtest. The increased schizophrenic error on the with-associate subtest was significantly related to their choosing the associative alternative ($p < .001$).

This evidence corroborates previously cited research and confirms that schizophrenics are indeed abnormally susceptible to associative distraction, and that this phenomenon is not merely the outcome of a generalsed performance deficit.

CONCLUSIONS

In summary it would seem that interference theory provides the most promising and parsimonious approach towards an explanation of psychological deficit in schizophrenia. Interpersonal theory interpretations are either untenable or are based on dubious empirical validity. Regression as an explanatory principle implying retrogression

to childlike thinking is totally unsubstantiated. Similarly the constructs of motivation theory and those based on the abstract-concrete concept receive little empirical corroboration.

CONTEMPORARY MODELS OF PSYCHOLOGICAL DEFICIT IN SCHIZOPHRENIA

In its present state interference theory is so broadly conceived and its predictions so loosely formulated that it provides little more than a satisfactory descriptive account of schizophrenic language disorder. However Broen and Storms 1966, 1967, Broen 1968, Storms and Broen 1969 have presented a detailed theoretical formulation which attempts to provide an aeteological basis for the observed interference effects. To this end they have drawn considerably on the work of Mednick 1958.

This latter author was particularly concerned with the effects of drive on language disturbance in schizophrenia. In brief Mednick 1958 proposed that the schizophrenics' 'typically high anxiety level' corresponds to a heightened drive state, which in the light of Hull's 1943 theory, provides remote associations with increased response strength. Once these remote associations are strong enough to clear a hypothetical evocation threshold they can compete successfully with more common responses. Hence the occurrence of competing response tendencies which causes disorganised thinking in schizophrenia.

However Mednick's conclusions concerning schizophrenics' anxiety levels were based primarily on the impressions of clinical-descriptive literature and were not founded on empirical observation. This fact undermines Mednick's fundamental aeteological construct, and the plausibility of his theoretical position suffers in consequence.

In addition, reviews of relevant research by Lang and Buss 1965, Buss 1966, Broen 1968, Lapidus and Schmolling 1975 have failed to confirm additional postulates generated by Mednick's theory. Buss 1966 concludes,

> 'What appears to be wrong with the theory is its identification of anxiety as the crucial drive that leads to schizophrenia. Although

> many schizophrenics do appear anxious, this could be a reaction to incapacity rather than a cause of it. Moreover, many schizophrenics are not anxious but apathetic or depressed. The theory is further embarrassed because the predictions from anxiety theory are not supported. The fault, then, seems to lie in placing an excessive burden of explanation on anxiety. It is possible that schizophrenics suffer from excessive drive, but limiting drive to anxiety is simply not consistent with the evidence.' pp.280.

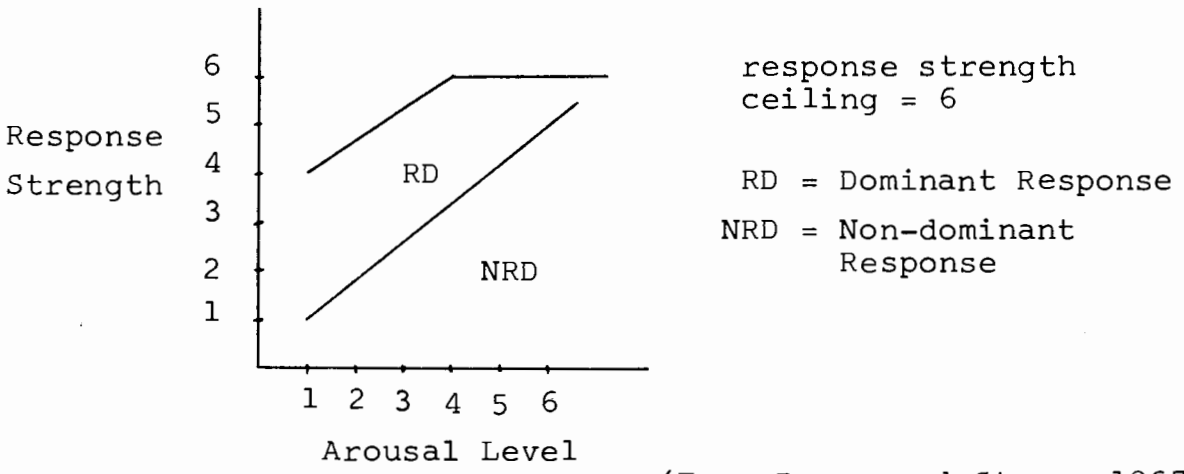
Broen and Storms 1966, 1967, acknowledge the deficiencies inherent in a unifactorial drive concept, especially one without empirical substantiation. In preference they chose the more general notion of 'arousal'. A term denoting a state of physiological activation which could be experimentally assessed. Indeed the fact that schizophrenic patients do appear to be hyperaroused on measures of physiological activation has considerable support, Zahn 1964, Venables 1964, Lang and Buss 1965, Broen 1968, Ax et al. 1970, De Wolfe et al. 1975.

Proceeding along lines similar to Mednick, they proposed that schizophrenics are both more aroused and have lower 'response-strength ceilings' than normals. This latter concept (an elaboration of Mednick's 'response threshold') was first posited to account for the inverted-U-shaped performance curves of normal subjects working under increasing levels of drive. The authors continually discovered that

> 'high drive facilitated dominant responses at the beginning of learning, but this facilitative action did not hold until the end.' pp. 78.

Their solution was to postulate a response-strength ceiling which was lower than the multiplicative effect of drive times habit strength. This means that when the habit

strength of a dominant response is low the multiplicative influence of drive favours the dominant response. However once this dominant response reaches the hypothetical response-strength ceiling the multiplicative effect of drive on this response is nullified. The only effect of drive, then, is to increase the strength of competing responses lower in the response-strength hierarchy. This effectively collapses the response hierarchy against the response-strength ceiling thereby increasing the probability of incorrect responses. This process is graphically illustrated below :



(From Broen and Storms 1967).

As a result of subsequent experimentation with schizophrenic patients Broen and Storms concluded that these individuals reveal unduly low response strength ceilings. This fact, in interaction with their heightened arousal, results in a gross state of response competition.

> 'The response strengths of dominant and competing responses are equalised as all collapse against an abnormally low ceiling ... (Thus the schizophrenics') ... word association performance becomes functionally random.'

Because of this response equivalence schizophrenics frequently respond with inappropriate, normally non-dominant responses. Broen and Storms 1966 assert therefore that

> 'normal appropriate behaviour is characterised ... by the use of dominant responses ... (and that) ... a decrease in dominant responses reduces appropriate behaviour.' pp.266.

However this implied equivalence of dominant and appropriate responses is probably incorrect. That is, there are many situations where the dominant response is not appropriate and, instead, some sort of self-editing process must operate in order to conserve appropriateness via the selective facilitation of non-dominant responses. The existence of such a process is not only intuitively obvious but represents a fundamental construct in the field of retrieval mechanisms in memory, Adams 1967, Kleinmuntz 1967, Neiser 1967, Norman 1970, Tulving and Donaldson 1972.

Within the ambit of schizophrenic psychological deficit there has been some specific work done in which the dominant response is not appropriate. From their results Chapman 1958, Chapman, Chapman and Miller 1964, Chapman and Chapman 1965 concluded that, compared to normals, schizophrenics are especially prone to misinterpret words that have more than one meaning in situations where the weaker response is more appropriate. That is, errors were prompted by a bias towards the stronger response.

Their formulation, succinctly stated, is as follows. A person responds to a word with a hierarchical sequence of meaning responses, each of which expresses an aspect of the denotive meaning of the word. These hierarchies are essentially the same for schizophrenics and normals. The misinterpretations of schizophrenics arise in part from their excessive reliance on the strongest meaning response with a relative neglect of weaker meaning responses. On the other hand normal persons interpret words by reflecting on both the weaker and stronger meaning responses. Thus the schizophrenics' response bias

> 'apparently occurs because of a frequent failure to screen, that is, accept or reject responses on the basis of their appropriateness.' Boland and Chapman 1971, pp. 52.

The basic tenets of this theory have been verified by the above authors, Klorman and Chapman 1969, Boland and Chapman 1971 and by various independent workers, Deckner and Blanton 1969, Neuringer et al. 1969, 1972, Leavitt, Garron and Gale 1972, Mourer 1973, Blaney 1974, Strauss 1975.

The process of selectively suppressing dominant in favour of weaker but more appropriate responses was considered by Cohen and Camhi 1967, who proposed a 'two-stage model' to explain schizophrenics' associational difficulties.

Paralleling research evidence on organisational and retrieval processes in memory (see Adams 1967, Neiser 1967, Kleinmuntz 1967, Norman 1970, Tulving and Donaldson 1972 amongst others) their theory proposes that : during the first stage ('sampling' or 'search') the person samples a response from a hypothetical hierarchical set of responses and then (implicitly) proceeds to the second 'editing' (decision) stage, called comparison. During the editing stage the subject compares certain properties of the sampled response with the criteria required for the emission of a correct response. The subject either emits the sampled response or rejects it depending upon how closely the sampled response approximates the required criteria. If the sample item is rejected the two-stage cycle is repeated. Ultimately an item is sampled, judged to be acceptable, and emitted as a response.

Applying this model to schizophrenia it appears that the prevalence of deviant responses amongst this group of patients is a consequence of impaired self-editing in the comparison stage, Liseman and Cohen 1972, Smith 1970, Cohen, Nachmani and Rosenberg 1974, Putterman 1975.

If one extends this model to Chapman et al.'s 1964 proposal it seems reasonable to assume that dominant responses will be sampled first since they are foremost in a person's response strength hierarchy and that the schizophrenic cannot reject these responses to continue the two-stage cycle. That is, the schizophrenic cannot edit out

these dominant but inappropriate responses in favour of less dominant, appropriate responses. Hence the postulated over-influence of dominant meaning in schizophrenia.

CONTRASTING PREDICTIONS BASED ON THESE MODELS

It is important to note certain fundamental differences that exist between the formulations of Broen and Storms and Cohen and Camhi. In summary :

A. The model proposed by Broen and Storms is entirely deterministic. It proposes that the momentary strength of a response, relative to other potential responses in a person's associative repertoire, is the sole determinant of it being emitted. It is based upon the rather simplistic assumption that response threshold is the sole determinant of response emission.

B. Cohen and Camhi's model is probabilistic. It acknowledges the greater complexity of memory processing and retrieval and emphasises that the individual exerts selective control over response emission. Emission of a response depends upon efficient sampling (memory search) and accurate editing. Responding is not merely a matter of whether the response is above threshold or not.

Lisman and Cohen 1972, Cohen, Nachmani and Rosenberg 1974 have addressed their recent research to contrasting predictions based on these two models. Concomitantly, similarly oriented research has been conducted using Chapman's response bias hypothesis, Boland and Chapman 1971, Deckner and Blanton 1969, Neuringer et al. 1969, 1972, Leavitt et al. 1972, Mourer 1973, Blaney 1974, Strauss 1975. The results of these studies unanimously confirm the Cohen-Camhi and Chapman models. Even Storms and Broen 1972 in a solitary study investigating predictions based on their own theory, were forced to conclude,

> 'The very high reliability of errors (in this study) poses a problem for Broen and

> Storms ... If associative intrusions are due to collapsed or disorganised hierarchies, making the strengths of various response tendencies more nearly equal, error tendencies should be shifting and unstable ... in this study the error tendencies ... were clearly dominant so that the same errors occurred a second time.' pp.283.

Thus it certainly seems as if the available data contradicts Broen and Storms theoretical position.

However the trend of evidence against these authors cannot nullify the formidable empirical support for interference theory in general. The problem one now encounters is the reconciliation of apparently divergent, yet empirically valid, accounts of schizophrenic disorganisation. A possible solution to this dilemma lies in the composition of the research samples. The studies by Chapman et al. 1964, Chapman and Chapman 1965, Boland and Chapman 1971, Neuringer et al. 1969, 1972, Roberts and Schuham 1974 all employed chronic schizophrenics. Thus their findings are specific to a sample of chronically hospitalised patients with poor prognoses and cannot be meaningfully extrapolated for dysfunction in the schizophrenic population as a whole. Moreover, the evidence accrued from the experiments of the Cohen group of researchers has compelled these authors to modify their model according to schizophrenic patient subgroup. It appears therefore that the contradictory findings may reflect the influence of subgroup variables.

THE PROCESS-REACTIVE DIMENSION

The search for subgroup parameters was prompted by the extreme heterogeneity of behaviour found amongst schizophrenics in all forms of research. Eventually two salient subgroup factors emerged. One was derived from traditional psychiatric nomenclature; the paranoid - non-paranoid concept, whilst the other reflected differences in premorbid

adjustment; the process-reactive dimension. The former category is not relevant at this point but is more comprehensively discussed at a later stage, (see page 52).

In essence the Process-Reactive distinction is based upon the adequacy of the patients' premorbid adjustment. Process schizophrenia involves a long term progressive deterioration of the adjustment pattern of the individual with little chance of recovery, while reactive schizophrenia indicates a good prognosis based on a history of generally adequate socio-sexual development with notable stress precipitating the psychosis. A number of other terms - malignant-benign, chronic-acute, typical-atypical - have appeared in the literature, but research into these constructs indicates that they are essentially describing the process-reactive dimension. Becker 1959, De Wolfe 1962, Johannson et al. 1963, Strauss 1973.

Studies attesting the prognostic power of the dimension reveal that poor premorbid subjects suffer a greater number of readmissions, longer durations of hospitalisation and make a poor response to drug treatment. Conversely good premorbid subjects have a substantially higher probability of discharge, significantly shorter durations of hospitalisation at admission or readmission, are less likely to require admission to inpatient facilities, and respond well to drug treatment.

More importantly reviews of the recent and prolific research in the area of process-reactive schizophrenia, Higgens 1964, 1969, Higgens and Peterson 1966, Herron 1962, Broen 1968, De Wolfe 1974 are unanimous in concluding that sub-classifying schizophrenic patients according to this dimension has successfully reduced the heterogeneity and contradictory findings in research studies.

What is more the evidence available suggests that these two groups of patients display qualitatively different kinds of thinking, Broen 1968, De Wolfe 1974. Briefly it would seem that 'process' patients reveal :

(a) a reduced focus of attention
(b) an apparent underresponsiveness to task relevant information
(c) extreme deficit in response interference paradigms
(d) a greater performance decrement than reactives or normals
(e) a tendency to take the path of least resistance, apparently concentrating effort on noninterference stimuli whilst ignoring both low and high interference situations.

Reactives on the other hand exhibit :

(a) abnormally broad attention
(b) disorganised and fragmented thinking resulting from interference of relevant and irrelevant stimuli
(c) generally better performance than process schizophrenics but worse than normals.

How then does the aeteology of these tentative differences relate to the patients' premorbid status ?

AN INTERFERENCE REDUCTION DEFENSIVE SYSTEM

The self reports of reactive schizophrenics clearly describe the extreme disorganisation accompanying the onset of the illness. Various phenomena related to disturbances in attention, perception, memory, speech and motility are emphasised, and it is suggested that these phenomena may be subjectively experienced long before signs of the established illness appear overtly, McGhie and Chapman 1961, Chapman 1966, Chapman and Freedman 1973, Freedman 1974. In addition these reports stress a change in the intensity of unimportant stimuli. It seems quite possible that any factor disorganising attention will affect the apparent intensity of stimuli. Egeth 1967 concluding a review on selective attention in animals states :

> 'although the evidence does not constitute convincing proof because of the need for research in humans, the hypothesis that

> unfocused attention can raise the actual level of nervous system 'noise' from trivial stimulation, is quite tenable.' pp.50.

Taken together this abnormal susceptibility to interfering responses, increased intensity of incidental stimuli and the other disruptive phenomena noted above, represents quite a considerable alteration in the way the environment (both internal and external) is experienced. In point of fact schizophrenics describe this disorganisation as aversive, even at times terrifying. If this is the case, then it appears reasonable to assume that those behaviours that reduce the confusion are likely to become habituated over time. The major implication of this statement is that the schizophrenic feels himself to be in a state of over-stimulation and his desire is to reduce this to manageable proportions. The most effective way to achieve this end is to curtail interaction and active monitoring (scanning) of the environment (both internal and external). This assumption receives some support from Freeman 1960 and Chapman 1966,

> 'It seems that the (schizophrenic) patient will be much less disturbed if he restricts all forms of sensory-motor activity, and it may be inferred from many of the patients' statements that this is what they try to accomplish.' Chapman 1966, pp.245.

Applying this hypothesis to the process-reactive concept it would seem logical that scanning would be less extensive in more experienced schizophrenics (process) than in reactives or normals. Process patients should begin to scan, but should have learned to stop their scanning before absorbing the amount of information they 'realise' they may not be able to organise adequately.

The postulation of an interference-reduction defensive system in process patients provides a tentative explanation of the qualitatively different thinking found

in process and reactive schizophrenics. The process schizophrenics' extreme deficit in response interference paradigms can be seen as a product of errors produced by the operation of the defense system which prevents adequate examination of task material. That is, if scanning is terminated early under conditions conducive to interference, then the individual is precluded consideration of all data necessary for accurate responding. The reduced focus of attention, apparent underresponsiveness to task relevant information and tendency to take the path of least resistance, all reflect the operation of the defensive system.

The abnormally broad attention and fragmented thinking of reactives is a direct result of interference effects. The fact that they show less deficit than process schizophrenics can be ascribed to the absence of an established defensive system in this group of patients. This enables them at least to scan all the data necessary for accurate responding. However, although the potential information for appropriate responding is available to reactive schizophrenics, this cannot be fully utilised due to their incapacity to shut out interfering response tendencies. This abnormal susceptibility to interference effects renders their performance worse than normals.

Consider Chapman et al.'s 1964 hypothesis in conjunction with Cohen and Camhi's 1967 two-stage postulate - could it not be possible that process patients are particularly susceptible to the overinfluence of dominant meaning because this patient group has learned to stop the sampling and editing of responses early in the two stage process to protect themselves from excessive response disorganisation ? Reactives on the other hand should not have developed this narrowed observation of alternate meanings and therefore should not be as influenced by errors prompted by a bias towards dominant responses. However since their thought is still disorganised by response interference they should make more errors than normals.

SUMMARY

In brief this critical overview attests the superiority of interference theory over other theoretical formulations of schizophrenic cognitive disorder. However within the ambit of interference theory itself there exists a degree of confusion. This arises from conflicting predictions generated by different models pertaining to the origin of the observed interference effects. It seems however that the contradictory findings reported may reflect the contaminatory influence of a subgroup variable, namely the process-reactive dimension. The intention of the present study is to attempt a clarification of the situation.

A departure from protocol is necessary at this juncture. Under normal circumstances the aims and hypotheses of the research would be presented at this point. However, since several of the hypotheses may be incomprehensible without the reader having adequate knowledge of the tests administered in the present research, it has been decided to proceed directly to the methodology, which includes a description of the research instruments.

CHAPTER 2

METHODOLOGY
AND
AIMS AND HYPOTHESES

DESCRIPTION OF PSYCHOLOGICAL TESTS UTILISED

A. MORAN'S SCALE OF ASSOCIATIVE DISTURBANCE

This test was chosen (a) to provide an objective measure of the presence of schizophrenic thought disorder. The selection of patients purely on the basis of clinical impressions of the existence of thought disorder was considered unacceptable. Consequently it was felt necessary to obtain an additional objective and empirical estimate of cognitive disturbance. The Moran scale of Associative Disturbance was selected in preference to the Bannister-Fransella Grid of Schizophrenic Thought Disorder because the Moran scale addresses itself directly to disturbances in word association structure which is the focus of the present research.

(b) as a control for the 'severity of current cognitive symptoms' De Wolfe 1973 (see page 57).

The Test :

The test is a 38 word, word-association task. The list is one of seven alternate forms produced from the 400 words used by Moran and his associates, 1953, 1964.

The word associations themselves are scored on a five point scale of disturbance in association. In the scale healthy (normal) associations are rated 3 or 4 and deviant (pathologically poorly related) responses are scored 0, 1 or 2.

This test has been validated as a measure of severity of current cognitive symptoms in schizophrenia by

Meffert et al. 1960, Moran et al. 1964 and De Wolfe 1973, and has been used effectively by Moran et al. 1960 (a), (b), De Wolfe 1971, De Wolfe and MacDonald 1972, De Wolfe 1973, De Wolfe and Youkilis 1974. Indeed the test has proved sufficiently sensitive to monitor changes in degree of thought disturbance during the longitudinal study of single individuals Moran, Meffert and Kimble 1960 (a), 1964, De Wolfe et al. 1971.

B. THE MULTIPLE CHOICE VOCABULARY SUBTESTS

The two multiple choice vocabulary subtests are constructed in similar format except that one subtest (the with-associates subtest) contains items with an associative error built in as an alternative, whilst items on the other subtest (the no-associates subtest) do not offer associates as an incorrect alternative. The following is an example of an item from the with-associates subtest :

POOL means the same as :

(a)	Puddle	(Correct)
(b)	Note Book	(Irrelevant)
(c)	Swim	(Associate)
(d)	None of the Above.	

The following is an example of an item from the no-associates subtest :

POINT means the same as :

(a)	Burn	(Irrelevant)
(b)	Aim	(Correct)
(c)	Sing	(Irrelevant)
(d)	None of the Above.	

The irrelevant alternatives are included as measures of random responding. For example, schizophrenics might be unco-operative or have difficulty taking the test, and so might mark randomly. Such random markings should result as often in a marking of the irrelevant alternative as in marking the correct alternative. Therefore to obtain a relatively pure measure for each subject the number of markings of the irrelevant alternative is subtracted from the number of markings of the correct alternative.

There is one additional experimental control. Some subjects might not understand the 'None of the Above' alternative, and would be disinclined to choose it. As a check on this the test includes 20 additional control items, similar in format to the 120 experimental items, but in which none of the alternatives was the same as the stimulus word. Subjects who chose an alternative other than 'None of

the Above' on as many as 5 of these control items were dropped from the study on the grounds that they were not taking the test in a meaningful manner. In all, then, 60 no-associate items, 60 with-associate items, and 20 filler items were randomly ordered in a single 140 - item instrument.

Using a standardisation sample of normal subjects with average and below average IQ both subtests were matched on psychometric characteristics that affect the power of a test to discriminate among ability levels. That is, co-efficient alpha, mean and standard deviation of test score, mean and standard deviation of item difficulty and shape of the distribution of item difficulty. Rattan and Chapman 1973.

South African Replication Study

Since the two multiple choice vocabulary subtests were constructed and standardised in America it was essential to ensure that the tests functioned with equal efficacy when administered to a South African sample.

The specific hypothesis to be examined was

(a) since the two vocabulary subtests are reputedly matched on discriminating power and

(b) assuming that normal persons are not pathologically susceptible to associative distraction, then normal subjects should score equally on both the with-associate and the no-associate subtests.

Subjects

The replication sample comprised 40 male English speaking subjects from widely different socio-economic and occupational backgrounds. 10 subjects were recruited from the office staff of a city firm, 10 were firemen from the Cape Town Central Fire Station, 10 were students from a campus residence and 10 were Groote Schuur Hospital medical patients. As recommended by Chapman and Chapman 1973, these individuals represented a fairly wide range of verbal ability as measured by the Mill Hill Vocabulary Test (VIQ range 90 - 118). The means and standard deviations of ages and verbal IQ levels are reported in Tables 2a and 2b.

Table 2a: Means and standard deviations of the Verbal IQ variable for the four experimental groups.

Groups	$\bar{X}$	Sd.
Office Staff	106.6	8.32
Firemen	104.2	4.57
Students	107.9	3.41
Hospital Patients	101.4	7.34

Table 2b: Means and standard deviations of age level for the four experimental groups.

Groups	$\bar{X}$	Sd.
Office Staff	30.2	3.99
Firemen	28.4	3.41
Students	29.1	2.13
Hospital Patients	28.5	3.60

Procedure

Before testing commenced all subjects were informed of the purpose of the replication study.

> 'The test you are about to complete was initially constructed in America. As you are most probably aware, there exists quite a considerable cultural and language difference between American and South African people. Because of this fact it is necessary for us to see if this test is equally as accurate when used by people in South Africa as it is when used by Americans.'

All subjects were tested individually. The sequence of administration of the experimental instrument and Vocabulary Test were randomly interchanged. The average time taken for each test session was 30 minutes.

Results and Discussion

Table 2c: Means and standard deviations for the four experimental groups on the two vocabulary subtests.

Subjects	N	With-associate scores		No-associate scores	
		$\bar{X}$	Sd.	$\bar{X}$	Sd.
Office Staff	10	40.4	3.21	40.5	7.78
Firemen	10	40.2	4.32	40.0	4.54
Students	10	40.8	5.65	40.6	5.99
Hospital Patients	10	40.3	4.22	40.3	4.42

Table 2d : Summary of Two-way analysis of variance of vocabulary subtest score for the four experimental groups.

Source	SS	df.	MS.	F Ratio	
Between Subjects					
A	2.83	3	0.94	0.001	N.S.
Subjects within groups	2350.06	36	65.28		
Within Subjects					
B	0	1	0	0	N.S.
AB	0.21	3	0.01	0.003	N.S.
B x Subj. within groups	100.23	36	2.78		

The means and standard deviations for the groups on the two vocabulary subtests are presented in Table 2c. A two-way analysis of variance with repeated measures failed to reveal any significant interaction effect $F(3,36) = 2.87$, $p > .05$, nor any significant main effects for either Groups $F(3,36) = 2.87$, $p > .05$, or Vocabulary Subtest $F(1,36) = 4.12$, $p > .05$. These results confirm Rattan and Chapman's 1973 findings indicating that normal subjects are not abnormally susceptible to associative distraction, and that the two subtests are almost perfectly matched in discrimin-

ating power.

In fact the mean accuracy scores for the four groups on the with-associates (W-A) and the no-associates (N-A) subtests in the present research (W-A mean 40.42, N-A mean 40.35) are higher than Rattan and Chapman's mean accuracy scores (W-A mean 36.39, N-A mean 35.26). This is no doubt due to the higher average verbal IQ of the subjects employed in the present research Rattan and Chapman used prison inmates of below average IQ and education in their standardisation sample. Therefore, although these subjects scored similarly on the two subtests (W-A mean 27.89, N-A mean 28.00) their scores fell ten points below the mean accuracy scores for the other subjects (W-A mean 39.92, N-A mean 38.28). These latter scores notably correspond with the mean accuracy scores of the present study.

C. LEXICAL AMBIGUITIES TEST

This test was devised by Chapman et al. 1964, Experiment 1 to test their theory concerning schizophrenics' misinterpretation and misuse of words.

The test was constructed by asking normal judges to indicate and rank order the three most prominent aspects of meaning of 19 multimeaning words in everyday usage. An index of the relative strength of the meanings of a word was computed by averaging across judges the ranks for each statement of meaning. The investigators used these judgements of strength of meaning to construct the Lexical Ambiguities Test.

For each of the 19 multimeaning words there were two test items. One of these required a correct interpretation mediated by a stronger meaning response and offered a misinterpretation mediated by a weaker meaning response. An example follows for the word 'bark'.

> After the noise was over, Janet said 'The bark is bad but it won't hurt you'.
>
> This means :
>
> (a) She was talking about the sound made by a dog
>
> (b) She was talking about the colour of a house
>
> (c) She was talking about the outer covering on a tree.

Alternative (a), which is based on the stronger meaning of bark, is correct. Alternative (c), which is based on the weaker meaning of bark, is incorrect.

A parallel item required a correct interpretation mediated by the weaker meaning response and offered a misinterpretation mediated by the stronger meaning response.

> The gardener said 'Here is an unusual bark'.
>
> This means :
>
> (a) He was talking about the sound made by a dog

(b) He was talking about the outer covering of a tree

(c) He was talking about the colour of a house.

In this item, the correct choice is (b), the alternative based on the weaker meaning of bark. Alternative (a), which is based on the stronger meaning of bark, is incorrect.

Three error scores are obtained from the 36 test items :

(a) the number of strong meaning responses when the weak meaning is correct (strong meaning error)

(b) the number of weak meaning responses when the strong meaning is correct (weak meaning error), and

(c) the number of unassociated alternative responses (unassociated error).

From these the stronger meaning bias can be calculated. The formula for this purpose is :

(the sum of responses erroneously favouring the stronger response minus the sum of irrelevant responses on items where stronger response errors could occur)

Minus

(the sum of responses erroneously favouring the weaker response minus the sum of irrelevant responses on items where weaker responses could occur).

AIMS AND HYPOTHESES OF THE PRESENT RESEARCH

Aims of the Study

(a) To attempt to assess the relative merits of three contradictory models of thought disturbance in schizophrenia, and to effect

(b) a reconciliation of these models by recourse to proposed differences in the scanning functions of process and reactive schizophrenics.

Hypothesis of the Study

Main hypothesis : Number 1

1. Since schizophrenic patients are susceptible to associative interference, the schizophrenic group as a whole should make significantly more errors on the with-associates subtest than the no-associates subtest.

Subsidiary Hypotheses:

1a. Normal and non-psychotic but psychiatrically disturbed persons should score equally on the with-associates and no-associates subtests.

1b. The low scores of the schizophrenic group on the with-associates subtest should be significantly related to their selection of the erroneous associative alternative.

Main hypothesis : Number 2

2. Process schizophrenics should make significantly more errors prompted by a bias towards the stronger meaning response on the Lexical Ambiguities Test than the reactive schizophrenics, non-psychotic psychiatric patients or normals.

Subsidiary Hypotheses:

2a. Reactive schizophrenics should make significantly more stronger meaning response errors than either the non-psychotic patient group or normals.

2b. The non-psychotic patients and normals should not differ significantly in errors prompted by a bias towards the stronger meaning.

Main hypothesis : Number 3

3. Process schizophrenics should have significantly shorter response latency times on the lexical ambiguities test than the reactive schizophrenics, non-psychotic patients or normals.

Subsidiary Hypotheses :

3a. Reactive schizophrenics should have significantly longer response latency times than the other three comparison groups.

3b. The non-psychotic patient and normal groups should not differ significantly in response latency times.

Hypotheses number 3, 3a and 3b reflect a corollary to the concept of an interference reduction defense system amongst process patients.

Response latency times have been employed as a rough measure of the extent of cognitive scanning. If process patients discontinue scanning and editing early on in the two stage process then they should make their judgements sooner than reactives and possibly normals and other pscyhiatric patients. Reactives on the other hand are still trying to cope with the cognitive disorganisation wrought by interference effects and hence should take longer than process and non-psychotic patients, as well as normals in coming to a decision.

Thus far there have been promising results exhibiting significant differences in response latency times between reactives, process and normals on a variety of perceptual and language tasks. Draguns 1963, Johannsen et al. 1963, Cohen et al. 1974, Smith 1970, Lisman and Cohen 1972.

STATISTICAL ANALYSIS OF CONTROL VARIABLES

Table 2e: Means and standard deviations of age level for the four experimental groups.

Groups	$\bar{X}$	Sd.
Normals	28.5	3.60
Non-psychotic patients	27.7	3.65
Reactive schizophrenics	27.6	2.68
Process schizophrenics	28.7	4.32

Table 2f: Summary of analysis of variance of the age variable for the four experimental groups.

Source	SS.	df.	MS.	F Ratio	
A	9.28	3	3.09	0.237	N.S.
Error	469.10	36	13.03		

N.S. - Non Significant

Table 2g: Means and standard deviations of Verbal I.Q. for the four experimental groups.

Groups	$\bar{X}$	Sd.
Normals	101.4	7.34
Non-psychotic patients	103.6	4.25
Reactive schizophrenics	101.7	5.06
Process schizophrenics	99.0	5.77

Table 2h : Summary of analysis of variance of the Verbal I.Q. variable for the four experimental groups.

Source	SS	df.	MS.	F Ratio	
A	106.88	3	35.63	1.090	N.S.
Error	1176.87	36	32.69		

N.S. - Non Significant

Table 2i: Means and standard deviations of %LPH for the four experimental groups.

Groups	$\bar{X}$	Sd.
Normals	0.78	0.52
Non-psychotic patients	1.62	1.75
Reactive schizophrenics	3.10	1.29
Process schizophrenics	4.45	2.69

Table 2j: Summary of analysis of variance of the %LPH variable for the four experimental groups.

Source	SS.	df.	MS.	F Ratio	
A	79.04	3	26.35	8.635	xx
Error	109.84	36	3.05		

xx $p < .01$

Table 2k: Means and standard deviations for the experimental groups on the Moran's scale of associate disturbance.

Groups	$\bar{X}$	Sd.
Normals	119.6	7.82
Non-psychotic patients	117.9	5.72
Reactive schizophrenics	88.0	10.32
Process schizophrenics	82.9	14.33

Table 2l: Summary of One-way analysis of covariance of scores on Moran's scale of associative disturbance for the four comparison groups.

Source	SS.	df.	MS.	F Ratio	
A	5947.09	3	1982.36	19.597	xx
Error	3540.54	35	101.16		

xx $p < .01$

METHODOLOGY

Subjects :

The research sample comprised 40 White, English speaking males. This number was made up of 10 Process Schizophrenics, 10 Reactive Schizophrenics, 10 Non-psychotic but personally disturbed patients requiring psychiatric hospitalisation and 10 Normal Controls.

General Selection Criteria

All subjects were matched on chronological age and level of verbal intelligence. Sets A and B of the Mill Hill Vocabulary Test were employed as estimates of verbal functioning. This vocabulary measure was considered especially useful because the main experimental tasks are themselves measures of knowledge of words. The means and standard deviations for the four groups on these two variables can be found in Tables 2e and 2g. Analysis of variance of group differences for age was not significant $F(3,36) = 2.87$, $p > .05$ nor for verbal intelligence $F(3,36) = 2.87$, $p > .05$.

In an attempt to overcome the methodological complications caused by inadequate matching of comparison groups with regards to institutionalisation, Cash 1973, all groups were compared for the percentage of lifetime hospitalised (%LPH). This measure is more sensitive to the total impact of institutionalisation than the length of current hospitalisation, De Wolfe 1967, 1971, 1973. As would be expected analysis of variance revealed a significant difference between the groups for %LPH $F(3,36) = 4.39$, $p < .01$. Since duration of hospitalisation has bedevilled much research into schizophrenic psychological deficit these differences cannot be simply neglected. In order to control for this variable it was decided to examine the results of the present research by analysis of covariance, using %LPH as the covariate measure.

No subjects were selected if their records revealed any disease of the central nervous system, alcoholism or drug abuse.

The normal and non-psychotic but psychiatrically ill groups

The controls were hospitalised, psychiatrically normal medical and surgical patients at Groote Schuur Hospital, Cape Town. The non-psychotic comparison group contained those diagnostic subtypes commonly subsumed under the rhubric of the Psychoneurotic Disorders. These patients were obtained from Groote Schuur and Valkenberg Hospitals, Cape Town.

The schizophrenic patient group

(a) Diagnosis:

The schizophrenics were all recently hospitalised persons with an official diagnosis confirmed by at least three psychiatrists and a clinical psychologist at a treatment planning conference. Diagnosis also included agreement that the patient manifested the symptoms of language and thought disorder and a predominantly non-paranoid symptom picture.

This latter stipulation was prompted by research indicating that the paranoid-nonparanoid distinction is a parameter of considerable import in research into schizophrenic psychological deficit, Lester 1960, Johannsen et al. 1963, Silverman 1964 (a),(b), Venables 1964, Nuttal and Solomon 1965, 1970, Broen 1968, Eisenthal et al. 1972, Strauss 1973, and that it is distinct from the process-reactive dimension, Johannsen et al. 1974. Thus the failure to control for this variable cannot but confound the results of the research concerned.

In addition no patients were accepted if their records indicated a history of conflicting diagnosis, or of electro-convulsive therapy in the past three months.

(b) Drug status and schizophrenic symptomatology

Ideally one would prefer a non-medicated schizophrenic sample. However even this strategy is fraught with difficulties as it is quite certain that those patients

that can be withdrawn from phenothiazenes for research purposes represent an atypical group, Chapman 1963, Bauman 1971 and Spohn 1973.

All schizophrenics in this study were receiving at least one of the phenothiazene related compounds at the time of testing. Both Spohn 1973 and Cash 1973 warn against the possible confounding effect of drug status on psychological deficit in schizophrenia. However examination of the literature indicates that phenothiazenes have no significant effect on the cognitive tasks used as dependent measures in the present research, Gardiner et al. 1966, Mason-Brown et al. 1957, Daston 1959, Vestre 1961, Helper et al. 1963, Chapman 1965, Strauss 1975.

Nevertheless one must accept that these drugs do act effectively to reduce or remove the primary symptoms of the schizophrenic psychosis, Casey et al. 1960, NIMH - Psychopharmacology Service Center Collaborative Study Group 1964, Goldberg et al. 1965, May 1968, Klein and Davis 1969.

In view of this fact each patient was administered Moran's Scale of Associative Disturbance 1964 at the time of testing. This procedure ensured (a) the presence of manifest thought disorder and (b) provided an assessment of the 'severity of current cognitive symptoms' De Wolfe 1973. As can be seen from Table 21 analysis of covariance revealed a significant difference between the groups on this measure $F(3,35) = 4.41$, $p < .01$. Multiple comparisons conducted on the means revealed no significant differences in degree of cognitive disturbance between the normal and non-psychotic patient groups TUKEY HSD $(4,35) = 3.82$, $p > .05$ nor between the process and reactive groups TUKEY HSD $(4,35) - 3.82$, $p > .05$. However a comparison of the normal and non-psychotic patient group means against those of the process and reactive groups revealed a highly significant difference SCHEFFE $F(3,35) = 4,41$, $p < .01$. These results confirm that the schizophrenic patients were indeed thought disordered at the time of testing despite receiving chemotherapy.

(c) Criteria for the selection of Process-Reactive Schizophrenics

Classification was based upon information from the General Information Questionnaire (G.I.Q.) De Wolfe 1968. This is an amplified and standardised version of the Phillips 1953 Scale of Premorbid Adjustment. Whilst the reliability and validity of the original scale, together with its superiority over other measures, has been amply demonstrated, Herron 1962, Higgens and Peterson 1966, Higgens 1969, this revised form has succeeded in increasing the precision of the instrument, De Wolfe 1966, 1968, Farina et al. 1963.

The G.I.Q. may be administered as a self report measure, or completed by the clinician from information extracted from patients' case histories. Both methods of using the Questionnaire have been well standardised. In the present study the latter method was employed. Any relevant information which was not available from case history material was elicited during clinical interviews with the patient.

The Questionnaire comprises 58 items, 53 of which are in multiple choice format. The other five questions concern such issues as 'What was your last job?', 'What groups or organisations do you belong to ?'. The G.I.Q. evaluates each patient in five areas: recent premorbid sexual adjustment, social aspects of sexual life during adolescence and immediately beyond, social aspects of recent sexual life, history of personal relations, recent adjustments in personal relations.

In each area the subject is rated on a 6 point scale of adjustment. Higher scores indicate greater pathology. The scores for each area are summed to give a quantitative measure of adequacy of premorbid adjustment. Cut-off scores for the groups were based on the recommendations of the above authors. All Reactive schizophrenics received scaled scores of 12 or less, and only patients with scores of 18 or above were classified Process.

Whilst it is recognised by the present author that the Process - Reactive concept refers to a dimensional construct, with the 'typical' process schizophrenic at the one pole and the 'typical' reactive at the other, subdivision into discrete groups was considered necessary for statistical purposes.

PROCEDURE

Subjects that had satisfied the various selection criteria were administered all research instruments; that is, the Lexical Ambiguities and Multiple Choice Vocabulary Tests, and the Moran's Scale of Associative Disturbance, at a single sitting. The latter test was administered during this session to ensure that the schizophrenic patients were indeed thought disordered at the time of assessment. Each subject was tested individually and the order of test administration was randomised for each subject.

This last procedure proved essential since the average duration of the test session was one and a half hours. In view of the fact that schizophrenics readily fatigue when submitted to any form of protracted interview it is conceivable that their performance would be more impaired during the latter stages of testing than earlier on in the procedure. A randomised test presentation design was therefore imperative in order to obviate this possible source of bias.

In order to assess the reaction time of subjects on the Lexical Ambiguities Test each item was displayed through an aperture cut out of a piece of cardboard. There were display cards for each of the 38 test items. The aperture on each card corresponded to the size and place of each item in the test. This ensured that at no time were other items visible to the subjects. More importantly it provided a relatively efficient method of estimating the time spent on each item.

Advantages of the experimental design

An especial feature of this project is its concern with the 'severity of current cognitive symptoms'. Lang and Buss 1965, Chapman 1966, Reis 1968, Higgens 1969 and De Wolfe 1971 emphasise that the severity of current cognitive symptoms and AMOUNT of psychological deficit are closely related. Furthermore they point out that there are not only

> 'inter-individual differences in degree of symptom severity, but also a wide range of intra-individual disturbance because patients show a good deal of fluctuation in degree of disturbance, sometimes almost on a day to day basis.' De Wolfe 1973,pp.11.

They warn, therefore, that studies that compare subtypes of schizophrenia have been, and will continue to be, confounded if severity of current cognitive symptoms are not controlled. To this end the present author has employed the highly recommended Scale of Associative Disturbance developed by Moran and his associates (see page 38).

A further advantage relates to the attempt to control for the effects of length of hospitalisation. Although this variable has long been recognised as a potential source of bias in psychological research, it is still often neglected by many authors.

Finally, the present study's use of multiple comparison groups circumvents a major methodological imperfection in previous research. Cash 1973 concludes a review of recent research in schizophrenia with the distressing comment that :

> 'In only 11% of the research were schizophrenics compared with normal controls AND other types of psychiatric patients.' pp.283.

Clearly by failing to use adequate comparison groups the research findings previously ascribed to be behaviourally unique to schizophrenia, cannot be regarded with much confidence.

CHAPTER 3

RESULTS

All results of the present research were examined by Analyses of Covariance, using percentage of lifetime hospitalised (% LPH) as the covariate measure. This procedure was adopted in an attempt to statistically control for the significant differences found to exist between the comparison groups for % LPH.

EVIDENCE FOR THE RELATIVE EFFECTS OF ASSOCIATIVE INTERFERENCE

Table 3a: Summary of means and standard deviations for Groups (A) on Vocabulary Subtest (B)

	A1 Normals		A2 Non-psy-chotic patients		A3 Reactive schizos.		A4 Process Schizos.		
	$\bar{X}$	Sd.	$\bar{X}$	Sd.	$\bar{X}$	Sd.	$\bar{X}$	Sd.	Means
B1 W-A Sub-test	40.3	4.22	40.1	2.88	27.4	6.29	29.3	4.55	34.28
B2 N-A Sub-test	40.3	4.42	40.0	2.31	33.8	5.81	37.0	5.10	37.78
	39.79		39.79		30.78		33.74		
	Adjusted Means								

Table 3b: Summary of Two-way analysis of covariance of Vocabulary Subtest score (A) for the four Comparison Groups (B)

Source	SS.	df.	MS.	F Ratio	
Between Subjects					
A	899.49	3	299.83	7.449	xx
Subjects within groups	1408.78	35	40.25		
Within Subjects					
B	245	1	245	79.673	xx
AB	256.29	3	85.43	27.781	
B x Subj. within groups	110.70	36	3.08		

xx $p < .01$

Table 3c: Summary of Analysis of Simple Main Effects conducted on mean scores of Vocabulary Subtest (A) and Comparison Groups (B)

Source	SS.	df.	MS.	F Ratio	
A at B1	1422.46	3	474.15	21.888	xx
A at B2	277.27	3	92.42	4.266	xx
Within Cell	1559.73	72	21.66		
B at A1	0	1	0	0	
B at A2	0.005	1	0.005	0.002	
B at A3	204.80	1	204.80	66.599	xx
B at A4	296.45	1	296.45	96.405	xx
BxSubj.W.G.	215.26	70	3.08		

xx $p < .01$

A preliminary but fundamental concern of this study was to establish that thought disordered schizophrenics are indeed pathologically susceptible to associative interference. Without proof of this fact any subsequent conclusions drawn from this research would be based primarily on conjecture.

Examination of the data in Table 3b reveals a significant interaction effect between the groups and vocabulary subtest $F(3,36) = 4.39$, $p < .01$. Analysis of simple main effects indicates that there were no significant differences between with-associate and no-associate subtest scores for the normal and non-psychotic psychiatric patient groups. Conversely a highly significant difference was found between the two subtest scores for the process and reactive schizophrenics $F(1,70) = 7.04$, $p < .01$. This effect was due to the fact that for both these schizophrenic groups, scores on the with-associate subtest were significantly lower than those on the no-associate subtest.

The significant difference found to exist between all the subgroups on the no-associates measure $F(3,72) = 4.1$, $p < .01$ was anticipated. Inspection of the mean scores for the subgroups reveals that this result stems from the

low scores of the two schizophrenic samples. Their inferior performance on this subtest is to be expected however, since these patients generally perform poorly on any cognitive task.

Table 3d: Means and Standard deviations of the experimental groups for associative errors on the With-associates Vocabulary Subtest

Groups	$\bar{X}$	Sd.
Normals	1.4	2.01
Non-psychotic patients	1.1	1.20
Reactive schizophrenics	8.0	3.30
Process schizophrenics	11.0	8.37

Table 3e: Summary of One-way analysis of covariance of associative error scores for the experimental groups on the With-associates Vocabulary Subtest

Source	SS.	df.	MS.	F Ratio	
A	491.40	3	163.80	7.408	xx
Error	773.84	35	22.11		

xx $p < .01$

A one-way analysis of covariance revealed a significant difference between the four comparison groups for errors mediated by the selection of the associative alternative $F(3,35) = 4.41$, $p < .01$. Multiple comparisons failed to produce significant differences between either the normal and non-psychotic patient groups TUKEY HSD $(4,35) = 3.82$, $p > .05$, or between the schizophrenic subgroups TUKEY HSD $(4,35) = 3.82$, $p > .05$. However a significant difference was found between the two control groups and the schizophrenic sample SCHEFFE $F(3,35) = 4.41$, $p < .01$ for associative errors. This was the consequence of the schizophrenics committing significantly more errors mediated by

the selection of the associative alternative (Table 3d).

In sum, this data provides conclusive evidence that the schizophrenic group as a whole is abnormally susceptible to the effects of associative interference.

EVIDENCE FOR AN INTERFERENCE REDUCTION DEFENSIVE SYSTEM AMONGST PROCESS SCHIZOPHRENICS

It was postulated that the cognitive disorganisation engendered by associative interference would prompt the development of an interference reduction defensive system amongst process schizophrenics. Since the operation of this system entails the premature termination of scanning and editing functions these patients should make inaccurate responses based on a limited evaluation of task relevant material. The hierarchical structure of memory storage makes it reasonable to assume that such limited scanning will only retrieve the prominent (dominant) elements in the hierarchy. Thus on the Lexical Ambiguities Test, which specifically requires the evaluation of both dominant and non-dominant semantic elements for appropriate responding, process patients were expected to make more errors mediated by a bias towards the dominant meaning response than any of the other three comparison groups.

Table 3f: Means and standard deviations of the experimental groups for dominant response errors on the Lexical Ambiguities Test

Groups	$\bar{X}$	Sd
Normals	0.1	0.32
Non-psychotic patients	0.1	0.32
Reactive schizophrenics	1.8	1.75
Process schizophrenics	3.6	1.43

Table 3g: Summary of One-way analysis of covariance of dominant response errors for the experimental groups on the Lexical Ambiguities Test

Source	SS.	df.	MS.	F Ratio	
A	52.6	3	17.53	12.847	xx
Error	47.77	35	1.37		

xx $p < .01$

Table 3g evidences a significant difference between the comparison groups on errors prompted by a bias towards the stronger meaning response $F(3,35) = 4.41$, $p < .01$. Contrasting the mean scores for the four groups produced significant differences between the process and reactive schizophrenics TUKEY HSD $(4,35) = 3.82$, $p < .05$, and between the reactive schizophrenics and the normal and non-psychotic patient groups TUKEY HSD $(4,35) = 3.82$, $p < .05$. No significant difference was found between the mean scores of the two control groups TUKEY HSD $(4,35) = 3.82$, $p > .05$. These findings are consistent with hypotheses 2, 2a and 2b.

REACTION TIME

Table 3h: The means and standard deviations of the four experimental groups for reaction time

Groups	$\bar{X}$	Sd.
Normals	344.7	44.03
Non-psychotic patients	351.4	38.83
Reactive schizophrenics	492.3	83.73
Process schizophrenics	368.1	52.79

Table 3i: Summary of One-way analysis of covariance of reaction time scores for the four experimental groups

Source	SS.	df.	MS.	F Ratio	
A	143778	3	47925.9	14.357	xx
Error	116835	35	3338.14		

xx $p < .01$

An analysis of covariance indicated significant differences between the groups on reaction time $F(3,35) = 4.41$, $p < .01$. Main hypothesis number 3 was not fully substantiated by multiple comparison procedures SCHEFFE $F(3,35) = 2.88$, $p > .05$. Although process schizophrenics had shorter response latency times than reactive schizophrenics TUKEY HSD $(4,35) = 4.75$, $p < .01$, this group was not found to differ significantly from the normal and non-psychotic patient groups. This latter result is not surprising. In spite of their brief scanning and editing operations it is unlikely that process patients would be capable of performing faster than non-thought disordered persons. This is due to the fact that their performance is debilitated by the effects of cognitive disorganisation.

The feature of greatest import to arise from these results is the evidence indicating that process schizophrenics respond quicker than their reactive counterparts. This occurs despite equal levels of severity of current cognitive symptoms TUKEY HSD $(4,35) = 3.82$, $p > .05$, and susceptibility to associative distraction (cf. Hypothesis number 1). This finding provides, albeit rough and indirect, confirmation of differences in the decision making processes of the two schizophrenic subgroups.

The fact that reactive schizophrenics displayed the longest response latency times (Hypothesis number 3a, SCHEFFE $F(3,35) = 4.41$, $p < .01$), is consistent with the

assumption that this group has not reduced its cognitive operations, but is struggling futilely against the effects of cognitive disorganisation.

Hypothesis number 3b is also supported by statistical analysis TUKEY HSD (4,35) = 4.75, $p < .01$. As expected the two control groups did not differ significantly in decision making times, implying similarly efficient decision making processes.

CHAPTER 4

DISCUSSION

Any research conducted into schizophrenic thought disturbance effectively evaluates the cognitive processing capabilities of these individuals. Cognitive processing may be described as an information flow that passes through an input stage, to a processing stage and finally to a response stage, Neiser 1967, Sternberg 1970.

The present research project has been addressed to the latter stage of the information processing system: that is, the response selection processes of schizophrenic persons. More specifically it has focused on the effects of response interference on the scanning and editing functions (retrieval operations) of process and reactive patients.

The findings emphasise the importance of response interference as a source of deficit in schizophrenic performance, Broen and Storms 1966, 1967, Broen 1968, but otherwise provide no further support for the model proposed by the aforementioned authors. However the formulations of both Chapman et al. 1964 and Cohen and Camhi 1967 are corroborated by the data. The qualitatively distinct errors and divergent reaction times found to exist between process and reactive schizophrenics substantiates inferences made concerning differential scanning and editing operations amongst these subgroups. Moreover these latter findings cannot merely be ascribed to variations in degree of cognitive symptoms. Both schizophrenic subgroups revealed equal levels of severity of current cognitive symptoms and of susceptibility to associative interference. The comparability of the groups on these two measures effectively excludes degree of disorganisation as a possible contributory factor.

The onus of the present formulation rests heavily upon the assumption of impaired retrieval functions in

schizophrenics. To assess the generality of this assumption it is essential to examine other evidence pertaining to the memory functions of schizophrenic patients. Especially the performance of the two schizophrenic subgroups in experiments evaluating 'recall and recognition' functions. The importance of these two parameters lies in the fact that 'recall' is assumed to require both search and decision processes whereas 'recognition' requires only the decision process, Kintsch 1970, Shiffrin 1970, Adams 1967, Peterson 1967, Cofer 1967, Melton 1967, Anderson and Bower 1972.

According to the tenets of the present study process schizophrenics are assumed to prematurely terminate their scanning operations. By doing so they restrict the number of responses generated, thereby diminishing the number of possible competing responses. However if scanning is truncated, the response possibilities necessary for accurate performance are unavailable. One would predict therefore that process schizophrenics should exhibit a gross deficit on a recall task which requires the efficient functioning of both retrieval systems. Contrastingly, on a recognition task, which essentially bypasses the scanning process (all the information for accurate responding is given), and which requires only the decision mechanism, their performance should be less impaired.

Since there is no reduced scanning amongst reactive schizophrenics this group should obtain better scores than process patients on a recall task. However on a recognition test the performance of the two schizophrenic subgroups should be comparable.

It is perhaps pertinent to reiterate that the editing (decision) process amongst schizophrenics is also conceived to be dysfunctional to varying degrees. The failure to edit accurately leads to the inappropriate but associatively related errors commonly encounted in the schizophrenics' communication and performance. It is well documented that the decision process is influenced primarily by information discriminability, Paivio 1967, 1971, Paivio

et al. 1969, Smith 1968, Briggs et al. 1969 (a),(b), 1970, and it is equally well documented that schizophrenic deficit increases radically with increases in the ambiguity of task information, Broen 1968, Marshall 1973. Hence all thought disordered schizophrenics should obtain poorer performance levels than other comparison groups on tasks manipulating the degree of information discriminability.

Returning to recall and recognition, several investigators, Bauman and Murray 1968, Nachmani and Cohen 1969, Bauman 1971, Koh, Kayton and Berry 1973, have reported that schizophrenia is associated with a deficit in recall memory, but it is not associated with a deficit in recognition memory. Unfortunately these authors have only used heterogeneous schizophrenic groups. However Traupman 1973, in a study specifically designed to evaluate the scanning and editing functions of process and reactive schizophrenics, concluded that :

> 'whereas search is not dysfunctional for reactive schizophrenics ... process schizophrenia is associated with a search deficit.' pp.312, 313.

In addition he found that the recognition results for the reactive and process groups were similar but that the latter group attained poorer recall scores. This data is consistent with predictions generated by the present study.

Another factor of some import which arose from Traupman's research was the failure of both schizophrenic subgroups to 'subjectively organise or encode information' when presented cf. Adams 1967, Norman 1970, Tulving and Donaldson 1972. Similar findings have been reported by numerous other authors, Koh, Kayton and Schwarz 1974, Depue and Fowles 1974, Taylor and Hirt 1975, Russell, Bannatyne and Smith 1975, Oltmanns and Neale 1975. This evidence primarily concerns the input and processing stages of cognitive functioning. Although not specifically addressed to these functions the present research can account for these findings.

The self reports of schizophrenics clearly describe a dysfunction in focused attention whereby all sensory imput is perceived as a mass of disorganised, unstructured and unrelated bits of information, McGhie and Chapman 1961, Chapman 1966, Chapman and Freedman 1973, Freedman 1974. It is a logical extension of the present research to assume that process schizophrenics should attempt to reduce this source of disorganisation by reduced scanning of external information. Indeed there is ample evidence suggesting that process schizophrenics filter out excessive amounts of incoming information in an attempt to avoid a bombardment of external stimulation, Venables 1963, 1964, Broen 1968, 1973, Cromwell 1972, Neale and Cromwell 1972, Silverman 1972.

The combined effect of input disorganisation and reduced scanning precludes efficient processing of information and must, in turn, prohibit the efficient organisation or encoding of the information. Hence the above findings.

It is interesting to speculate on the relationship between the impaired encoding capacity of schizophrenics and the well-documented cognitive deterioration of long term (process) schizophrenic patients. Research on normals stresses that the failure to impose organisational schemes on information prevents efficient encoding of data into long term memory and impairs effective retrieval of whatever information is stored, Mandler 1967, Craik and Lockhart 1972, Martin 1975, Tulving and Donaldson 1972. Thus if disorganised schizophrenics are incapable of efficient organisation and encoding some degree of memory impairment is inevitable. It seems logical to assume therefore that the more severe and the more protracted the psychosis the greater the cognitive impairment.

The assumption of differing cognitive strategies in the scanning of external information by process and reactive schizophrenics also has considerable relevance to the information processing theories of McGhie 1969, 1970, Payne 1960, 1962, 1966, 1971 and Yates 1966. As yet these authors have paid scant attention to subgroup variables: a fact which may

well restrict the generality of their theoretical conclusions. This criticism taken in conjunction with evidence undermining Broadbent's 1958 model of information processing (upon which the above mentioned theorists base their inferences) Gray and Wedderburn 1960, Triesman 1964, Deutsch and Deutsch 1963, Greenwald 1970 (a),(b), Norman 1969, constitutes a considerable indictment of their theoretical position.

CONCLUSIONS

The present research is consistent with the wealth of evidence identifying response interference as a major source of schizophrenic thought disturbance. It also confirms the heuristic and empirical value of the process-reactive dimension. In particular the results have been consistent with the hypothesis of qualitatively distinct modes of thinking in process-reactive schizophrenics, De Wolfe 1974. Support is afforded for the Cohen and Camhi 1967 two stage model of the response selection process, and for Chapman et al.'s 1964 response bias hypothesis. However the latter hypothesis is considered to be applicable only to process schizophrenia. A review of research into the memory functions of schizophrenics corroborates inferences made by the present research concerning differences in the scanning and editing functions of process and reactive patients, Bauman and Murray 1968, Nachmani and Cohen 1969, Bauman 1971, Koh, Kayton and Berry 1973, Traupman 1975. Although addressed to the response selection stage, the present study acknowledges the presence of schizophrenic difficulties at the input and processing end of the information processing continuum. Predictions made from the present project pertaining to these stages have been confirmed by the findings of other authors, Broen 1968, 1973, Venables 1965, Cromwell 1972, Neale and Cromwell 1972, Silverman 1972. The present study also indicates that theories which postulate schizophrenic dysfunction only in the input - processing stages, McGhie 1969, 1970, Payne 1960, 1962, 1966, 1971, Yates 1966, offer a restricted explanation of schizophrenic disorganisation. In addition it serves a warning that unless these authors consider process-reactive categorisation in their future research the generality of their conclusions will be restricted further.

RECOMMENDATIONS FOR FUTURE RESEARCH

The greatest limitation of the present project is its cross-sectional design. To study the changes of cognitive functioning such as those postulated by the present study it would be preferable to conduct a longitudinal investigation of first admission cohorts.

A second point concerns the process-reactive experimental groups. For the purposes of the present research these groups were regarded as categorically distinct entities. However if more than lip service is to be paid to process-reactive schizophrenia as a dimensional construct future research should use correlational rather than mean difference paradigms.

Further research should also focus on the efficacy of the Multiple Choice Vocabulary Subtests when administered to other cognitively disordered patient groups. Special attention should be paid to the performance of manic patients on this test. Notably this patient group has created considerable difficulties for proponents of the Bannister-Fransella Grid of Schizophrenic Thought Disorder, Melsop et al. 1971, Breaky and Goodell 1972.

Although Chapman et al.'s 1964 Lexical Ambiguities Test has proved useful, generalisations made from the examination of a few words in isolation may be limited. An approach which emphasises the interaction of words in sentences may provide a profitable extension of research efforts.

Finally, since the present research only recruited male schizophrenics the findings and generalisations are strictly only applicable to one sex. Future research should therefore use both male and female patients to allow a legitimate, broader application of findings. This advice is reinforced by clearly demonstrated sex differences amongst schizophrenics, Holzberg 1963, Cheek 1964, McClelland and Watt 1968.

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APPENDIX 1

MORAN'S SCALE OF ASSOCIATIVE DISTURBANCE

MORAN'S SCALE OF ASSOCIATIVE DISTURBANCE

WORLD .....
LOVE .....
FATHER .....
HAT .....
BREAST .....
CURTAINS .....
TRUNK .....
DRINK .....
PARTY .....
BOWEL MOVEMENT .....
BOOK .....
LAMP .....
RUG .....
CHAIR .....
BOYFRIEND .....
DARK .....
DEPRESSED .....
SPRING .....
BOWL .....
SUICIDE .....
MOUNTAIN .....
HOUSE .....
PAPER .....
HOMOSEXUAL .....
RADIATOR .....
GIRLFRIEND .....
SCREEN .....
FRAME .....
MAN .....
MOVIES .....
CUT .....
LAUGH .....
BITE .....
WOMAN .....
DANCE .....
DOG .....
DAUGHTER .....
ORGASM .....

APPENDIX 2

THE MULTIPLE CHOICE VOCABULARY SUBTESTS

Name : ..... Date : .....

Age : ..... Father's occupation: .....

Last grade completed in school : .....

INSTRUCTIONS

We want to ask you the meanings of some words. We want you to circle the word which is closest in meaning to the first word given. For example :

Huge - means the same as :

(a) small
(b) large
(c) red
(d) none of the above.

You are to circle the word which is closest in meaning to "huge". "Large" means the same as "huge" so you should circle the word "large".

Some of the words are easy and some are very hard. No one will know all of the words. Do not spend too much time on any one word, but be sure to answer all of them even if you have to guess.

1. Want means the same as
   a. lack
   b. slow
   c. read
   d. none of the above

2. Ship means the same as
   a. ocean
   b. transport
   c. den
   d. none of the above

3. Cast means the same as
   a. mold
   b. iron
   c. flow
   d. none of the above

4. Nurse means the same as
   a. chair
   b. suckle
   c. box
   d. none of the above

5. River means the same as
   a. celebration
   b. tie
   c. light
   d. none of the above

6. Pool means the same as
   a. puddle
   b. cold
   c. swim
   d. none of the above

7. Flat means the same as
   a. large
   b. surface
   c. apartment
   d. none of the above

8. Vagabond means the same as
   a. package
   b. thrust
   c. command
   d. none of the above

9. Note means the same as
   a. music
   b. observe
   c. simple
   d. none of the above

10. Patent means the same as
    a. cloudy
    b. river
    c. licence
    d. none of the above

11. Seed means the same as
    a. germ
    b. ape
    c. hat
    d. none of the above

12. Match means the same as
    a. light
    b. bout
    c. can
    d. none of the above

13. Open means the same as
    a. closed
    b. exposed
    c. top
    d. none of the above

14. Smart means the same as
    a. sting
    b. learn
    c. break
    d. none of the above

15. Horizon means the same as
    a. card
    b. silo
    c. mildew
    d. none of the above

16. Type means the same as
    a. path
    b. kind
    c. olive
    d. none of the above

17. Short means the same as
    a. hail
    b. rude
    c. long
    d. none of the above

18. Bar means the same as
    a. chair
    b. drink
    c. block
    d. none of the above

19. Scale means the same as
    a. pin
    b. yell
    c. climb
    d. none of the above

20. Rock means the same as
    a. sway
    b. run
    c. post
    d. none of the above

21. Flush means the same as
    a. coach
    b. smooth
    c. salt
    d. none of the above

22. Hand means the same as
    a. front
    b. roof
    c. give
    d. none of the above

23. Late means the same as
    a. deceased
    b. jumped
    c. stolen
    d. none of the above

24. Shoot means the same as
    a. rifle
    b. rug
    c. sprout
    d. none of the above

25. Run means the same as
    a. wail
    b. can
    c. flow
    d. none of the above

26. Catch means the same as
    a. paper
    b. penguin
    c. fastener
    d. none of the above

27. Pen means the same as
    a. enclosure
    b. glass
    c. hatch
    d. none of the above

28. List means the same as
    a. travel
    b. roll
    c. lamp
    d. none of the above

29. Act means the same as
    a. page
    b. actor
    c. behave
    d. none of the above

30. Budget means the same as
    a. ignore
    b. move
    c. call
    d. none of the above

31. Prune means the same as
    a. fathom
    b. grease
    c. trim
    d. none of the above

32. Nail means the same as
    a. attach
    b. dip
    c. map
    d. none of the above

33. Corral means the same as
    a. lamp
    b. pen
    c. horse
    d. none of the above

34. Bow means the same as
    a. bend
    b. arrow
    c. flake
    d. none of the above

35. Dial means the same as
    a. short
    b. number
    c. meter
    d. none of the above

36. Part means the same as
    a. play
    b. salt
    c. separate
    d. none of the above

37. Stumble means the same as
    a. blame
    b. rescue
    c. mention
    d. none of the above

38. Trunk means the same as
    a. plate
    b. car
    c. snout
    d. none of the above

39. Dip means the same as
    a. memo
    b. pool
    c. immerse
    d. none of the above

40. Stake means the same as
    a. sharp
    b. bet
    c. raisin
    d. none of the above

41. Graze means the same as
    a. turn
    b. scrape
    c. copy
    d. none of the above

42. Glare means the same as
    a. pack
    b. sun
    c. scowl
    d. none of the above

43. Pardon means the same as
    a. divide
    b. mangle
    c. freshen
    d. none of the above

44. Flag means the same as
    a. bottle
    b. starch
    c. weaken
    d. none of the above

45. Spring means the same as
    a. coil
    b. leap
    c. eagle
    d. none of the above

46. Learned means the same as
    a. erudite
    b. packed
    c. sent
    d. none of the above

47. Mind means the same as
    a. think
    b. ring
    c. obey
    d. none of the above

48. Check means the same as
    a. fill
    b. cash
    c. inspect
    d. none of the above

49. Expand means the same as
    a. wear
    b. crouch
    c. whisper
    d. none of the above

50. Grave means the same as
    a. move
    b. serious
    c. dead
    d. none of the above

51. Tip means the same as
    a. hoe
    b. advice
    c. place
    d. none of the above

52. Twist means the same as
    a. manage
    b. lunge
    c. contort
    d. none of the above

53. Board means the same as
    a. meals
    b. smoke
    c. print
    d. none of the above

54. Mail means the same as
    a. horror
    b. armour
    c. evening
    d. none of the above

55. Class means the same as
    a. category
    b. rude
    c. teacher
    d. none of the above

56. Wallet means the same as
    a. carton
    b. tile
    c. handle
    d. none of the above

57. Wax means the same as
    a. please
    b. fixate
    c. increase
    d. none of the above

58. Singular means the same as
    a. unique
    b. plural
    c. blue
    d. none of the above

59. Bolt means the same as
    a. retrieve
    b. gobble
    c. descend
    d. none of the above

60. Save means the same as
    a. because
    b. except
    c. money
    d. none of the above

61. Fair means the same as
    a. tree
    b. weather
    c. equitable
    d. none of the above

62. Court means the same as
    a. plaza
    b. sorrow
    c. stop
    d. none of the above

63. Race means the same as
    a. breed
    b. horse
    c. hill
    d. none of the above

64. Post means the same as
    a. snag
    b. assignment
    c. mustache
    d. none of the above

65. Net means the same as
    a. maintain
    b. content
    c. remainder
    d. none of the above

66. Print means the same as
    a. news
    b. impression
    c. table
    d. none of the above

67. Corn means the same as
    a. preserve
    b. present
    c. prestige
    d. none of the above

68. Callous means the same as
    a. preventive
    b. insensitive
    c. ambiguous
    d. none of the above

69. Cross means the same as
    a. irreplacable
    b. irritable
    c. integument
    d. none of the above

70. Obvious means the same as
    a. damp
    b. worried
    c. kind
    d. none of the above

71. Piece means the same as
    a. join
    b. pie
    c. hill
    d. none of the above

72. Bay means the same as
    a. ruin
    b. leave
    c. howl
    d. none of the above

73. Press means the same as
    a. pants
    b. house
    c. hurry
    d. none of the above

74. Case means the same as
    a. investigation
    b. game
    c. mark
    d. none of the above

75. Range means the same as
    a. rifle
    b. roam
    c. milk
    d. none of the above

76. Tread means the same as
    a. remain
    b. step
    c. favour
    d. none of the above

77. Preference means the same as
    a. runner
    b. block
    c. method
    d. none of the above

78. Roll means the same as
    a. case
    b. tumble
    c. call
    d. none of the above

79. Service means the same as
    a. employ
    b. wind
    c. station
    d. none of the above

80. Show means the same as
    a. television
    b. indicate
    c. cloud
    d. none of the above

81. Turn means the same as
    a. remove
    b. around
    c. revolve
    d. none of the above

82. Saw means the same as
    a. parched
    b. yelled
    c. viewed
    d. none of the above

83. Clumsy means the same as
    a. red
    b. naked
    c. fine
    d. none of the above

84. Weak means the same as
    a. pent
    b. slight
    c. strong
    d. none of the above

85. Stamp means the same as
    a. imprint
    b. swing
    c. fence
    d. none of the above

86. Wing means the same as
    a. extension
    b. help
    c. bird
    d. none of the above

87. Stall means the same as
    a. oven
    b. compartment
    c. material
    d. none of the above

88. Hail means the same as
    a. scrape
    b. paste
    c. salute
    d. none of the above

89. Wear means the same as
    a. display
    b. purple
    c. clothes
    d. none of the above

90. Log means the same as
    a. record
    b. painting
    c. device
    d. none of the above

91. Sap means the same as
    a. law
    b. head
    c. kite
    d. none of the above

92. Light means the same as
    a. carve
    b. kindle
    c. cautious
    d. none of the above

93. Sling means the same as
    a. shot
    b. support
    c. relate
    d. none of the above

94. Suggest means the same as
    a. finalize
    b. control
    c. drip
    d. none of the above

95. Fine means the same as
    a. angry
    b. broad
    c. excellent
    d. none of the above

96. Ash means the same as
    a. before
    b. tray
    c. cinder
    d. none of the above

97. Racket means the same as
    a. swindle
    b. charm
    c. hide
    d. none of the above

98. Club means the same as
    a. fog
    b. Bludgeon
    c. trinket
    d. none of the above

99. Diamond means the same as
    a. ring
    b. grass
    c. gem
    d. none of the above

100. Box means the same as
    a. sliver
    b. stampede
    c. hit
    d. none of the above

101. Iron means the same as
    a. press
    b. ice
    c. pass
    d. none of the above

102. Cushion means the same as
    a. sofa
    b. soften
    c. rail
    d. none of the above

103. Ring means the same as
    a. cup
    b. bell
    c. sound
    d. none of the above

104. Eye means the same as
    a. glasses
    b. wood
    c. watch
    d. none of the above

105. Shade means the same as
    a. tree
    b. screen
    c. mart
    d. none of the above

106. Knot means the same as
    a. woman
    b. cover
    c. luck
    d. none of the above

107. Point means the same as
    a. burn
    b. aim
    c. sing
    d. none of the above

108. Pit means the same as
    a. plum
    b. note
    c. oppose
    d. none of the above

109. Rifle means the same as
a. ransack
b. shoot
c. jump
d. none of the above

110. Ball means the same as
a. throw
b. dance
c. ant
d. none of the above

111. Change means the same as
a. eat
b. mats
c. coins
d. none of the above

112. Staff means the same as
a. pole
b. cement
c. brake
d. none of the above

113. Pacify means the same as
a. prepare
b. extend
c. render
d. none of the above

114. Hatch means the same as
a. remain
b. effect
c. door
d. none of the above

115. Hawk means the same as
a. sell
b. border
c. group
d. none of the above

116. Score means the same as
a. encase
b. orchestrate
c. approach
d. none of the above

117. Advertize means the same as
a. collect
b. knit
c. mend
d. none of the above

118. Bear means the same as
a. carry
b. jump
c. fur
d. none of the above

119. Air means the same as
a. breathe
b. sun
c. song
d. none of the above

120. Halt means the same as
a. thief
b. cessation
c. stone
d. none of the above

121. Duck means the same as
a. jack
b. numb
c. avoid
d. none of the above

122. Bond means the same as
a. connection
b. ray
c. inspection
d. none of the above

123. Boil means the same as
a. tray
b. store
c. pipe
d. none of the above

124. Face means the same as
a. countenance
b. head
c. consist
d. none of the above

125. Go means the same as
a. depart
b. lasting
c. come
d. none of the above

126. Limp means the same as
a. buoyant
b. piquant
c. flexible
d. none of the above

127. Give means the same as
a. gift
b. supply
c. being
d. none of the above

128. Radiator means the same as
a. preface
b. cloth
c. need
d. none of the above

129. Spread means the same as
a. decide
b. write
c. engage
d. none of the above

130. Peak means the same as
a. summit
b. assist
c. foul
d. none of the above

131. Fall means the same as
a. book
b. spring
c. decline
d. none of the above

132. Back means the same as
a. reveal
b. cup
c. reinforce
d. none of the above

133. Bill means the same as
a. beak
b. mound
c. plaster
d. none of the above

134. Throne means the same as
a. king
b. ceiling
c. chair
d. none of the above.

135. Mean means the same as
a. ready
b. stingy
c. healthy
d. none of the above

136. Jar means the same as
a. jam
b. pen
c. shake
d. none of the above

137. Absurd means the same as
a. sad
b. dirty
c. missing
d. none of the above

138. Pass means the same as
a. key
b. throw
c. list
d. none of the above

139. Grate means the same as
a. unite
b. grid
c. nonsense
d. none of the above

140. Length meqns the same as
a. colour
b. humour
c. sound
d. none of the above

APPENDIX 3

THE LEXICAL AMBIGUITIES TEST

Name : ..... Date: .....

Age : ..... Last grade completed in school : .....

INSTRUCTIONS

We would like to ask you the meaning of some sentences. We want you to select the correct meaning from among the several choices presented. For example :

Mike woke up when his alarm went off.

This means :

A. He woke up when his bedclothes slipped to the floor.

B. He woke up when his clock sounded.

C. He woke up with a fright.

You are to circle the sentence which gives the correct meaning of the statement 'Mike woke up when his alarm went off'. Sentence B. 'He woke up when his clock sounded' gives the correct meaning so you should circle sentence B.

1. Robert says he likes rare meat.
   This means :
   A. He likes a kind of meat that is exceedingly uncommon
   B. He likes a meat with bones in it
   C. He likes partially cooked meat

2. Joe was given a tip at the race track.
   This means :
   A. He was given a piece of private information
   B. He was given 25 cents
   C. He was given a new hairbrush

3. In his poker hand George received a pair of diamonds.
   This means :
   A. He received two precious stones
   B. He received two magazines
   C. He received two playing cards with red spots on them

4. There was a cross painted on the church wall.
   This means :
   A. There was an X mark on the wall
   B. There was a religious symbol on the wall
   C. There was a picture of a house on the wall

5. The little boy said he could have more fun playing ball if he had a yard.
   This means :
   A. He wanted 3 feet of something
   B. He wanted a telephone
   C. He wanted a grassy place to play

6. Every Friday Jim paid for his board at his rooming house.
   This means :
   A. He paid for his rollerskates
   B. He paid for his meals
   C. He paid for a flat piece of wood

7. Harry said "Ouch" when John stepped on his corn.
   This means :
   A. John had stepped on the little lump on Harry's foot
   B. John had stepped on Harry's new rug
   C. John had stepped on plants in Harry's field

8. There were bats in the attic of the old house.
   This means :
   A. There were wooden sticks in the old house
   B. There were some picture calendars in the old house
   C. There were flying animals in the old house

9. The captain said to clean the deck.
   This means :
   A. He was talking about a part of a ship
   B. He was talking about a shelf of books
   C. He was talking about a pack of playing cards

10. Jack asked Nancy for a date.
This means :
   A. He wanted a piece of fruit from a palm tree
   B. He wanted a piece of cinnamon toast
   C. He wanted to take her out

11. The neighbours complained because of the racket at the party.
This means :
   A. They complained about some dishonest business
   B. They complained about some noise making
   C. They complained about an art dealer's meeting

12. After the noise ceased, Janet said, "The bark is bad, but it won't hurt you".
This means :
   A. She was talking about the sound made by a dog
   B. She was talking about the outer covering on a tree
   C. She was talking about the colour of a house

13. Gerald was afraid of robbers so he left his money at the bank.
This means :
   A. He buried it at the side of the river
   B. He left it at a financial establishment
   C. He shoved it under his mattress

14. When he was unable to sell his harvest at a profit, the farmer said, "I've had a bad fall".
This means :
   A. He meant that he lost money during that season of the year
   B. He meant that he had grown petunias near his front door
   C. He meant that he had tripped and hurt himself

15. When the farmer bought a herd of cattle, he needed a new pen.
This means :
   A. He needed a new writing implement
   B. He needed a new fenced enclosure
   C. He needed a new Pick-up truck

16. Mary's palms were moist because it was a hot day.
This means :
   A. Her hands were moist
   B. The windows were moist
   C. Some plants or trees were moist

17. Junior hammered so hard on the wall that he made a crack.
This means :
   A. He polished his shoes with a rag
   B. He broke a hole or crevice in the wall
   C. He made a sarcastic remark

18. Because he didn't watch where he was walking, he didn't see the pit in front of him.
This means :
   A. He didn't see a dog on the front lawn
   B. He didn't see a hard stone of a fruit
   C. He didn't see a hole in the ground

19. The police came and broke up the bookie's racket.
This means :
   A. They broke up a dishonest business
   B. They broke up some noise making
   C. They broke up an art dealer's meeting

20. At the banquet the president got up to make the toast.
This means :
   A. He proposed a drink in honour of someone
   B. He heated and browned the bread
   C. He went out for a walk

21. The pirate drew a cross on the map where the treasure was hidden.
This means :
   A. He put a picture of a house on the map
   B. He put an X mark on the map
   C. He put a religious symbol on the map

22. Mrs. Jones said she could make a blouse out of the material, if she had a yard.
This means :
   A. She wanted a grassy place
   B. She wanted a telephone
   C. She wanted 3 feet of something

23. He couldn't find bear meat because it was rare.
This means :
   A. It was a meat with bones in it
   B. It was an exceedingly uncommon meat
   C. It was partially cooked meat

24. When he wanted to build a bookshelf, Kenneth bought his board at the lumber yard.
This means :
   A. He bought his meals
   B. He bought a pair of rollerskates
   C. He bought a flat piece of wood

25. The athlete has a bat in his locker.
This means :
   A. He has an old calendar in his locker
   B. He has a flying animal in his locker
   C. He has a wooden stick in his locker

26. The waiter received a tip for his good work.
This means :
   A. He was given a new hairbrush
   B. He was given a piece of private information
   C. He was given 25 cents

27. The farmer was proud of his corn.
This means :
   A. He was proud of the plants in his field
   B. He was proud of the rug in his living room
   C. He was proud of the little lump on his foot

28. When Bill and Mary got engaged, he gave her a diamond.
This means :
   A. He gave her a precious stone
   B. He gave her a playing card with red spots on it
   C. He gave her a magazine

29. Roger went to the grocery store because he wanted some dates.
This means :
   A. He wanted to take out some girls
   B. He wanted a piece of cinnamon toast
   C. He wanted some fruit that grows on a kind of palm tree

30. The gambler marked the deck.
This means :
   A. He made marks in a book
   B. He made marks on a pack of playing cards
   C. He made marks on part of a ship

31. The palms in the church were dry.
This means :
   A. Some windows were dry
   B. Some plants or trees were dry
   C. Some hands were dry

32. The professor loaned his pen to Barbara.
This means :
   A. He loaned her a pick-up truck
   B. He loaned her a writing implement
   C. He loaned her a fenced enclosure

33. The fisherman yelled to his friend on shore, "I'll row over to the bank to meet you".
This means :
   A. He meant he'd meet him at the grocery store
   B. He meant he'd meet him at the financial establishment
   C. He meant he'd meet him at the edge of the water

34. The gardener said, "Here is an unusual bark".
This means :
   A. He was talking about the sound made by a dog
   B. He was talking about the outer covering of a tree
   C. He was talking about the colour of a house

35. Because Mrs Smith got out of bed before the rest of her family, she usually made the toast.
This means :
   A. She heated and browned the bread
   B. She went out for a walk
   C. She proposed a drink in honour of someone

36. He was eating the peach so fast that he didn't see the pit.
This means :
   A. He didn't see the dog on the front lawn
   B. He didn't see the hole in the ground
   C. He didn't see the hard stone in the middle of the fruit

37. When asked to get to work washing the wall, Larry just made a crack.
This means :
   A. He broke a hole or crevice in the wall
   B. He made a sarcastic remark
   C. He polished his shoes with a rag

38. When Johnny came in bleeding he said, "I've had a bad fall".
This means :
   A. He meant that he had tripped and hurt himself
   B. He meant that the autumn was a bad time of the year for him
   C. He meant that he had grown some petunias near his front door

APPENDIX 4

THE GENERAL INFORMATION QUESTIONNAIRE

Name : ..... Date : .....

INSTRUCTIONS FOR FILLING OUT THE GENERAL INFORMATION QUESTIONNAIRE

FOR MOST OF THE QUESTIONS, ALL YOU WILL HAVE TO DO IS PUT A CHECK BESIDE THE STATEMENT OR STATEMENTS WHICH APPLY TO YOU. SOMETIMES MORE THAN ONE STATEMENT WILL BE TRUE OF YOU. PLEASE BE SURE TO CHECK ALL THE STATEMENTS THAT APPLY TO YOU AND PLEASE BE VERY CAREFUL TO ANSWER EVERY QUESTION. SOMETIMES YOU WILL NOT BE COMPLETELY SURE OF THE ANSWER TO A QUESTION. WHEN YOU ARE NOT COMPLETELY SURE OF THE ANSWER, GO AHEAD AND ANSWER THE QUESTION AND BE AS ACCURATE AS YOU CAN. IF YOU HAVE ANY QUESTIONS, EITHER NOW OR AT ANY TIME WHILE YOU ARE FILLING OUT THE QUESTIONNAIRE, JUST RAISE YOUR HAND AND SOMEONE WILL COME TO YOUR SEAT TO ANSWER IT.

REMEMBER, PLEASE ANSWER EVERY QUESTION AS ACCURATELY AS YOU CAN AND CHECK ALL THE STATEMENTS THAT APPLY TO YOU ON EACH QUESTION.

GENERAL INFORMATION QUESTIONNAIRE

1) WHAT IS YOUR AGE ?

..... under 20
..... 20-24
..... 25-29
..... 30-34
..... 35-39
..... 40-44
..... 45-49
..... 50-54
..... 55-59
..... 60-64
..... 65-69
..... 70 or over

2) WHAT WAS YOUR LAST JOB ?

.....

.....

3) ARE THERE OTHER MEMBERS OF THE HOUSEHOLD WHO WORK ?

..... No other members work and I have been out of work.
..... At present, I am the only member who works.
..... 1 or more parents I live with work.
..... Wife and/or children work.
..... Relatives I live with work.

4) BEFORE ENTERING THE HOSPITAL, DID YOU :

..... Own your own home
..... Rent your own home
..... Own an apartment
..... Rent a room
..... Live with parents or relatives
..... Have some other living arrangements

5) IF YOU ARE SINGLE, BEFORE ENTERING THE HOSPITAL, DID YOU :

..... Live alone
..... Live with parents
..... Live with relatives
..... Live with friends
..... I am married

6) BY WHOM WERE YOU RAISED ?

..... Real parents
..... Adoptive parents
..... Foster parents
..... Relatives
..... Orphanage
..... (List other)
.....

7) HOW MANY BROTHERS AND SISTERS DID YOU LIVE WITH ?

..... None
..... One
..... Two
..... Three or four
..... More than four

8) WHAT IS YOUR NATIONALITY BACKGROUND ?

..... South African
..... British
..... Irish
..... French
..... German
..... Italian
..... Greek
..... Portuguese
..... Other, list here
.....

9) WOULD YOU SAY YOUR CHILDHOOD WAS :

..... Unhappy
..... Sometimes unhappy
..... Somewhat happy, sometimes unhappy

10) HOW MUCH EDUCATION HAVE YOU HAD ? (Number of years completed)

..... University graduate or more
..... Some university education
..... High school graduate
..... Completed primary school
..... Some primary school
..... No formal education

11) HOW MANY FRIENDS DID YOU HAVE BETWEEN THE AGES OF 6 AND 12? (REAL FRIENDS, NOT JUST PEOPLE WHOM YOU KNEW BY NAME)

..... No real friends, then
..... 1
..... 2
..... 3
..... 4 or 5
..... 6 or 7
..... 8 to 10
..... more than 10

12) HOW CLOSE WERE YOUR FRIENDS WHEN YOU WERE BETWEEN THE AGES OF 6 AND 12 ?

..... No friends, then
..... Mainly casual friendships
..... Mainly close friends

13) HOW MANY REAL FRIENDS DID YOU HAVE BETWEEN THE AGES OF 12 AND 18 ?

..... No real friends
..... 1 or 2
..... 3 to 5
..... 6 to 10
..... over 10

14) HOW CLOSE WERE THESE FRIENDS?

..... No friends then
..... A few casual friends,only
..... A few close friends, only
..... A number of close and casual friends

15) HOW WELL DID YOU GET ALONG IN ELEMENTARY AND HIGH SCHOOL?

..... Never went to school
..... Never seemed to have any trouble
..... Disciplined by teachers a few times
..... Often disciplined by teachers or by principal
..... Expelled from school

16) HOW MANY OF YOUR REAL FRIENDS (BEFORE YOU WERE EIGHTEEN) WERE GIRLS ?

..... Not really friendly with any girls
..... One or two
..... A few
..... Quite a few
..... Mainly girls for friends

17) HOW MANY GIRLS DID YOU DATE BEFORE YOU WERE EIGHTEEN ?

..... None
..... 1 to 5
..... 6 to 10
..... 11 to 20
..... over 20

18) HOW MANY GIRLS DID YOU DATE MORE THAN FIVE TIMES BEFORE YOU WERE EIGHTEEN ?

..... None
..... 1 or 2
..... 3 to 5
..... 6 to 10
..... over 10

19) HAVE YOU EVER DATED FREQUENTLY AND REGULARLY? IF SO, HOW OLD WERE YOU WHEN YOU STARTED ?

..... Never did
..... Over 18
..... 16 to 18
..... 14 to 16
..... 13 or younger

20) DID YOU HAVE A "STEADY GIRL" BEFORE YOU WERE EIGHTEEN ?

..... No
..... Yes

21) WHAT ACTIVITIES DID YOU TAKE PART IN IN ELEMENTARY AND HIGH SCHOOL ?
(check as many as apply to you)

..... Language or Hobby Clubs
..... Student government
..... "Major"sports: Rugby, Soccer,Swimming, Athletics, Tennis, Hockey.
..... Other high school sport teams
..... Musical or Dramatic groups
..... Social Clubs
..... Debate or Academic (Science or literary, etc.) Clubs
..... Ran around with a group, clique or gang.
..... Was not interested in group activities

22) ARE YOUR PARENTS LIVING ?

..... Yes, both living
..... Mother deceased
..... Father deceased
..... Both deceased

23) ARE YOUR PARENTS PRESENTLY LIVING TOGETHER ?

..... One or both deceased
..... Yes
..... No

24) HOW OLD WAS YOUR FATHER WHEN YOU WERE BORN ?

..... Under 20
..... 20-24
..... 25-29
..... 30-39
..... Over 40

25) HOW OLD WAS YOUR MOTHER WHEN YOU WERE BORN ?

..... Under 20
..... 20-24
..... 25-29
..... 30-39
..... Over 40

26) HOW OLD WERE YOU WHEN YOUR FATHER DIED ?

..... Father still living
..... Under 5
..... 5-9
..... 10-14
..... 15-19
..... 20 or over

27) HOW OLD WERE YOU WHEN YOUR MOTHER DIED ?

..... Mother still living
..... Under 5
..... 5-9
..... 10-14
..... 15-19
..... 20 or over

28) HOW MUCH EDUCATION DID YOUR MOTHER HAVE ?

..... University graduate or more
..... Some university education
..... High school graduate
..... Some high school
..... Completed primary school
..... Some primary school education
..... No formal education

29) HOW MUCH EDUCATION DID YOUR FATHER HAVE ?

..... University graduate or higher
..... Some university education
..... High school graduate
..... Some high school education
..... Completed primary school
..... Some primary school education
..... No formal education

30) WHERE IS YOUR PRESENT SOCIAL POSITION IN RELATION TO THAT OF YOUR PARENTS ?

..... I am better of socially
..... I am at about the same level
..... I am slightly worse off socially
..... Can't tell

31) WHAT IS YOUR CURRENT MARITAL STATUS ?

..... Single
..... First marriage
..... Widowed
..... Divorced
..... Separated
..... Second marriage
..... Third or more marriage

32) HOW WELL DO YOU GET ALONG WITH YOUR WIFE OR GIRL FRIEND ?

..... Very well; never quarrel or disagree; almost perfect
..... Fairly well; a few quarrels or disagreements, but enjoy being together most of the time
..... Alright; some ups and some downs
..... Not too well; mostly bickering and tension but occasional peace and contentment together
..... Poorly;constantly quarreling with disagreements and tension
..... No wife or girl friend at present

33) If your answer to item 32 HAS NOT ALWAYS BEEN TRUE, HOW LONG HAS IT BEEN TRUE?

..... Always been this way
..... Been this way a long time
..... Only a short time
..... No wife or girl friend at present

34) WHAT IS YOUR LENGTH OF MARRIAGE? (If more than one, length of longest)

..... Never married
..... Under 1 year
..... 1 to 5 years
..... 6 to 10 years
..... 11 to 20 years
..... Over 20 years

35) HOW MANY CHILDREN DO YOU HAVE?

..... Never married
..... No children
..... 1 child
..... 2 to 4 children
..... over 4 children

36) HOW OLD WERE YOU WHEN YOU WERE FIRST MARRIED ?

..... Never married
..... Under 20
..... 20-24
..... 25-29
..... 30-34
..... 35 or over

37) WHAT IS YOUR WIFE'S AGE COMPARISON WITH YOURS?

..... Never married
..... More than 5 years younger than I
..... Less than 5 years younger than I
..... Less than 5 years older than I
..... More than 5 years older than I
..... same age as I am

38) HOW MANY WOMEN HAVE YOU DATED IN THE PAST YEAR?

..... Only my wife
..... None
..... 1 or 2
..... 3 to 5
..... 6 to 10
..... Over 10

39) IF SINGLE,HAVE YOU DATED ANY WOMEN MORE THAN 10 TIMES IN THE PAST YEAR ?

..... Married
..... Yes
..... No

40) ARE YOU NOW OR HAVE YOU EVER BEEN ENGAGED TO BE MARRIED?

..... Married before
..... Married now
..... Engaged now
..... Engaged before
..... Never engaged

41) DO YOU NOW HAVE DEFINITE PLANS TO BE MARRIED WITHIN ONE YEAR?

..... Married now
..... Yes
..... No

42) HOW MANY BOOKS HAVE YOU READ IN THE LAST YEAR ?

..... None
..... 1 or 2
..... 3 to 5
..... 6 to 10
..... Over 10

43) WHAT KIND OF BOOKS DO YOU READ ?

..... Fiction
..... Non-fiction
..... Both
..... Neither

44) WHAT MAGAZINES DO YOU FREQUENTLY READ ?

.....
.....
.....

45) WHAT ARE YOUR HOBBIES ?

.....
.....

46) WHAT GROUPS OR ORGANIZATIONS DO YOU BELONG TO ?

.....
.....

47) WHEN YOU ARE IN A GROUP, HOW DO THE OTHERS USUALLY THINK OF YOU ?

..... A "go getter"
..... Just one of the group
..... One of the quieter ones
..... Others never notice me
..... I usually try to stay out of groups as much as possible.

48) HOW MANY REAL FRIENDS DO YOU HAVE NOW ?

..... None at present
..... A few
..... Some
..... Many

49) DO YOU NOW HAVE ANY CLOSE FRIENDS THAT YOU CAN SHARE YOUR FEELINGS AND THOUGHTS WITH ?

..... No
..... Yes

50) DO YOU NOW KNOW ANY WOMEN THAT YOU CAN SHARE YOUR FEELINGS AND THOUGHTS WITH? (Include your wife if married)

..... No
..... Yes

51) HAVE YOU BEEN FEELING TENSE AND UNDER STRAIN IN THE RECENT PAST ?

..... Very much so
..... Somewhat so
..... I have been feeling fairly calm
..... I have been feeling very very calm

52) IS YOUR APPETITE PRESENTLY GOOD ?

..... Very good
..... Fairly good
..... Fairly poor
..... Very poor

53) AT PRESENT DO YOU SLEEP WELL?

..... Very well
..... Fairly well
..... Fairly poor
..... Toss and turn all night

54) OVER THE PAST FEW MONTHS BEFORE ENTERING THE HOSPITAL WAS YOUR SEX LIFE REASONABLY SATISFACTORY ?

..... No sex life
..... Unsatisfactory
..... Satisfactory

55) IS YOUR MEMORY AS GOOD NOW AS IT ALWAYS HAS BEEN ?

..... Yes
..... No

56) HAVE YOU EVER RECEIVED PSYCHIATRIC TREATMENT BEFORE, AND IF SO, HOW LONG AGO WAS THE LAST TIME ?

..... Never received psychiatric treatment before
..... Within the last 6 months
..... Between 6 months and 1 year ago
..... Between 1 year and 5 years ago.

57) WHAT ARE YOUR PRESENT PHYSICAL AILMENTS ?

.....
.....
.....
.....

58) WHAT IS YOUR BIRTHDATE ?

.....

59) WHAT IS YOUR AGE AS OF YOUR LAST BIRTHDAY ?

..... years

60) HOW LONG HAVE YOU BEEN IN THIS HOSPITAL ?

..... 0-6 months
..... 6-12 months
..... 1-2 years
..... 2-3 years
..... 3-5 years
..... 5-10 years
..... over 10 years

61) IF YOU WERE IN A PSYCHIATRIC HOSPITAL BEFORE,HOW LONG AGO WAS THAT ?

..... 0-1 year ago
..... 1-3 years ago
..... 3-5 years ago
..... 5-10 years ago
..... over 10 years ago

62) IN YOUR LIFE, HOW MUCH TIME HAVE YOU BEEN HOSPITALIZED IN PSYCHIATRIC HOSPITALS ?

..... 0-1 year
..... 1-2 years
..... 2-3 years
..... 3-5 years
..... 5-10 years
..... Over 10 years

63) WHEN YOU WERE BETWEEN 18 AND 25 YEARS OLD, HOW MANY MALE FRIENDS DID YOU HAVE ?

..... None
..... A few
..... Some
..... Many

64) HOW CLOSE WERE THESE FRIENDS?

..... Close friends
..... Casual friends

65) WHEN YOU WERE BETWEEN 18 AND 25 YEARS OLD, HOW MANY FEMALE FRIENDS DID YOU HAVE?

..... None
..... A few
..... Some
..... Many

66) HOW CLOSE WERE THESE FRIENDS?

..... Close friends
..... Casual friends

67) WHEN YOU WERE BETWEEN 26 AND 35 YEARS OLD, HOW MANY MALE FRIENDS DID YOU HAVE ?

..... None
..... A few
..... Some
..... Many

68) HOW CLOSE WERE THESE FRIENDS?

..... Close friends
..... Casual friends

69) WHEN YOU WERE BETWEEN 26 AND 35 YEARS OLD, HOW MANY FEMALE FRIENDS DID YOU HAVE ?

..... None
..... A few
..... Some
..... Many

70) HOW CLOSE WERE THESE FRIENDS?

..... Close friends
..... Casual friends

71)WHEN YOU WERE BETWEEN 36 AND 50 YEARS OLD, HOW MANY MALE FRIENDS DID YOU HAVE ?

..... None
..... A few
..... Some
..... Many

72) HOW CLOSE WERE THESE FRIENDS?

..... Close friends
..... Casual friends

73) WHEN YOU WERE BETWEEN 36 AND 50 YEARS OLD, HOW MANY FEMALE FRIENDS DID YOU HAVE?

..... None
..... A few
..... Some
..... Many

74) HOW CLOSE WERE THESE FRIENDS ?

..... Close friends
..... Casual friends

75) IF YOU ARE DIVORCED, HOW LONG HAS IT BEEN ?

..... 0-1 year
..... 1-2 years
..... 2-3 years
..... 3-5 years
..... 5-10 years
..... Over 10 years

76) IF YOU ARE SEPARATED, HOW LONG HAS IT BEEN ?

..... 0-1 year
..... 1-2 years
..... 2-3 years
..... 3-5 years
..... 5-10 years
..... Over 10 years

77) CONCERNING YOUR SEX LIFE DURING THE YEAR BEFORE ENTERING THE HOSPITAL, WHAT WAS THE FREQUENCY OF YOUR SEX RELATIONS ?

..... None
..... Little
..... Moderate
..... Much

78) DURING THE YEAR BEFORE ENTERING THE HOSPITAL, WHO WERE YOUR SEX RELATIONS WITH ?

..... None
..... Spouse
..... Steady friend of the opposite sex
..... Casual friend of the opposite sex
..... Stranger