

FLATTENING OF AFFECT, THOUGHT DISORDER  
AND RETARDATION IN SCHIZOPHRENICS

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FLATTENING OF AFFECT, THOUGHT DISORDER AND  
RETARDATION IN SCHIZOPHRENICS

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## SUMMARY

The literature relating to the clinical features of, and experimental findings on, flattening of affect, thought disorder and retardation in schizophrenia was reviewed.

A group of 24 hospitalised ~~chronic~~ schizophrenics, including males and females, acutes and chronics and paranoid and non-paranoids, was given a battery of tests comprising: S.S.I., Mill Hill Synonyms Scale, Bannister-Fransella Grid Test, Dixon Flattening of Affect Test, Nufferno Speed and Level Tests, G.A.T.B. Motor Speed Test, Speed of Writing Sentences and Digit Symbol.

An attempt to replicate Buckley's (1969) finding that a poor performance on the Bannister-Fransella Test was associated with a poor performance on the Dixon Test and that both could be seen as the result of a faulty personal construct system, was only partly successful with acute schizophrenics: the finding was not replicated with chronic schizophrenics.

Performances on both the Bannister-Fransella Test and the Dixon Test were found to be unrelated to vocabulary level and general intelligence. The tests were, in the light of previous validity findings, used as operational definitions of thought disorder and flattening of affect respectively. Various relevant patient variables (sex, age, degree of illness) and subcategories of schizophrenia (paranoid-non-paranoid, acute-chronic) were thus related to flattening of affect and thought disorder. None of the patient variables was related to either

of the symptoms and neither was the paranoid-non-paranoid classification. It was found, however, that chronic schizophrenics were both more affectively flattened and more thought disordered than acutes.

The matrix of correlations between the speed tests clearly indicated that speed of functioning in a schizophrenic could best be represented by two relatively independent factors, which were called mental and psychomotor speed in the present thesis.

Mental and psychomotor speed were related to the patient variables and subcategories of schizophrenia listed above as well as vocabulary level and general intelligence. There were no significant differences between groups on the mental speed tests but on the psychomotor speed tests younger schizophrenics were slower, but, so were chronic schizophrenics. The most outstanding feature of the group's performance on these tests was the great variability within any subgroup.

Neither flattening of affect nor thought disorder were found to be related to mental or psychomotor speed.

GENERAL INTRODUCTION

Part I      FLATTENING OF AFFECT, THOUGHT DISORDER  
AND PSYCHOLOGICAL CONSTRUCTS

A. Flattening of Affect

1) Clinical Features

Flattening of affect is a clinical sign which Fish (1962) described as "a gross lack of emotional response to a given situation". Affective disorders may be disorders of mood and expression; disorders of mood include depression, anxiety and elation while flattening of affect is a disorder of expression. It should be distinguished from other disorders of expression such as incongruity of affect where the patient's expression of emotion is not in step with the flow of his ideas or of his talk (Mayer-Gross et al, 1960). Flattening of affect refers to an impaired capacity for emotional responses. Authors have frequently either explicitly (Herron and Kantor, 1968) or implicitly (Harris and Metcalfe, 1956) discussed the disorders of affect as a unit. It has also been suggested that flattening of affect should be distinguished from apparently similar affective disorders such as belle indifference in hysteria, lack of sustained emotional attitudes in psychopathy and loss of feeling states in depersonalisation (Harris and Metcalfe, 1956). Identification of a 'pane of glass' between the doctor and patient is said to be of diagnostic importance in schizophrenia.

Although Cohen (1961) suggested that expressive cues effected no improvement in the validity of assessments of schizophrenic pathology based on content alone, it is generally felt that the assessment of flattening of affect relies upon the clinical observation and interpretation of such cues as the patient's facial expression, tone of voice as well as content of talk.

The disorder is usually associated with a diagnosis of schizophrenia although Cameron and Magaret (1951) noted its appearance in depressive withdrawal and Bullock et al (1951) noted its presence in the organic psychoses.

Affective flattening has been described as a reversible phenomenon produced by oxygen lack and encephalitis lethargica (Harris and Metcalfe, 1956).

## 2) Reliability of Assessment

Although the cues utilised in the assessment of degree of flattening of affect are relatively subtle, it has been demonstrated that inter-rater reliability <sup>between</sup> ~~within~~ experienced clinicians is high. Harris and Metcalfe (1956) found complete agreement by three assessors in 17 cases out of 23 on a 3-point rating scale and Wing (1961) obtained a high reliability with a 5-point rating scale. These studies investigated 'inappropriateness' or 'incongruity' of affect, including flattening. Dixon (1968), specifically studying flattening, found a correlation of .37 (Kendall's tau,  $p < .001$ ) between the

ratings of a psychiatrist and a psychologist. McPherson et al (1970) found a correlation of .44 ( $p < .005$ ) between two psychiatrists' ratings. It therefore seems reasonable to assume that flattening of affect can be reliably rated by experienced clinicians.

### 3) Clinical Significance

There is difficulty in assessing the diagnostic and prognostic significance of flattening of affect per se as it is frequently included under the rubric of inappropriateness or incongruity of affect.

i) Diagnosis. Although Schneider (1959) suggested that the inadequacy of feeling responses cannot be seen as a primary symptom of schizophrenia (since the expressed feeling need not be out of proportion to the importance the patient himself attaches to what he says), the importance of emotional flattening has been emphasised by many authors. Many British psychiatrists view it as pathognomonic for schizophrenia.

That the feelings and emotions of lunatics were different from normals was noted as early as 1604 by Burton in his 'Anatomy of Melancholy'. Around the turn of the present century many authors were emphasising the importance of lack of affect or inappropriate affect. Stransky (1909) named the lack of co-ordination between the affective attributes and the rest of the psyche 'intrapsychic ataxia'. In his famous 1911 monograph, Bleuler described three primary symptoms of

schizophrenia: disturbance of affectivity, disturbance of association and autism. Bleuler observed that schizophrenics have not lost the capacity to react emotionally but that they react in an unusual or incomprehensible way:

"One can demonstrate the presence of affects in an individual who is apparently a mere vegetative organism".

Kraepelin (1919) described the "striking and profound damage" which occurs in the emotional life of schizophrenics and suggested that the most important of these was the "emotional dullness" which he described vividly:

"The singular indifference of the patients towards their former emotional relations, the extinction of affection for relatives and friends, of satisfaction in their work and vocation, in recreation and pleasures, is not seldom the first and most striking symptom of the onset of the disease".

More recently, Willis and Bannister (1966) sent out postal questionnaires to 346 senior English psychiatrists and found that incongruity of affect came second only to thought process disorder in assessed diagnostic importance of schizophrenia.

Foulds (1965), on the basis of his research while developing the Symptom Sign Inventory (Foulds and Hope, 1968) concluded:

" ..... loss of awareness of self as agent, incongruity of affect (including flattening) and thought-process disorder will each occur only in non-integrated psychosis and this diagnosis will not be made in the absence of all three signs".

As the non-integrated psychotic group comprises schizophrenics (although not all schizophrenics are non-integrated), this again suggests that flattening of affect is a sufficient condition for a diagnosis of schizophrenia.

ii) Prognosis. Another area of study for which flattening of affect is of clinical importance is prognosis. In 1838 Esquirol wrote:

"When the sensibility of lunatics is so weakened that they can look at the sun, that they have lost taste and smell and that they remain unmoved by all discomforts, they will not get well".

Bleuler (1950) also regarded lack of affect as a bad prognostic sign:

"It has been known since the early years of modern psychiatry that an acute curable psychosis became chronic when the affect began to disappear".

Strecker and Willey (1924), Malamud and Render (1939) and Gildea and Mann (1943) all agreed on the basis of prognostic studies that flattening of affect was a sign of an unfavourable course though Strecker and Willey (1927) reported that some of their patients did get well.

Harris and Norris (1954) made an analysis of the most prominent clinical features in a group of functional psychotics with a view to assessing their prognostic value. They found that flatness or incongruity of affect emerged as the most definite indicator of an unfavourable prognosis. Dixon (1968)

has criticised their investigation on two counts:-

- 1) they presented inter-rater reliabilities neither for emotional deterioration nor outcome.
- 2) the same psychiatrist assessed presenting symptoms and outcome which may have introduced a personal bias.

Nevertheless, the results are suggestive of the important role that affective flattening may have to play.

After a review of the relevant literature, Mayer-Gross et al (1960) concluded that early signs of emotional flattening are among the less favourable symptoms.

Thus, flattening of affect is generally said to be a poor prognostic indication although there have been reports of favourable outcomes; for example, Harris and Norris (1954) found 11% recovered on follow-up among their group of flattened and incongruous patients.

iii) Chronicity. Although Bleuler (1950) pointed out that reduced emotional responsiveness can occur in acute as well as chronic schizophrenics, Harris and Norris (1954) still found it necessary to emphasise that it is frequently found early in the illness. They stated that flat or inappropriate affect "has in the past frequently been regarded as a sign of long-standing illness and chronicity. However, this series shows that it may appear early in the disease and still be of grave import. This matter is still not clear."

Herron and Kantor (1968) suggest that 'loss of affect' (including inappropriate and flat affect) may be more typical

of process rather than reactive schizophrenics (Kantor and Winder, 1959). Their evidence was tangential, including studies on prognosis, chronicity, personality maturity and symptomatology within process schizophrenics. For example, they suggested that "the introverted, schizoid personality; poor premorbid life adjustment; silly giggling and senseless behaviour; and disturbances of symbolisation" of the process group in Stephens and Astrup's (1963) study all involved the loss of ability to use affect appropriately. This would appear to be rather a big assumption to make with no empirical support. They commented at the beginning of their paper that they could find no research studies directly concerned with loss of affect and so they provided no direct evidence for their hypothesis about the relationship between flattening and process-reactive continuum. It would appear that it is a hypothesis worthy of attention: if it is a defect typical of process schizophrenia then one would predict that it would be a feature of schizophrenics in their formal 'pre-illness' phase, as Heath et al (1964) found with intellectual deficit in process schizophrenics. The poor prognosis associated with flattening of affect could then be viewed as a result of the relationship between process schizophrenia and poor prognosis. On the other hand, Bleuler suggested that the point when the affect was lost was the point at which an acute illness became chronic, as if a quantitative change was occurring. A longitudinal study is obviously required to throw light on this problem.

Even if flattening of affect were typical of process schizophrenics who may have been gradually developing the illness and so in some sense could be considered to have been ill for a long time, or if the appearance of flattening of affect were to represent the change from an acute to a chronic illness, this would still not necessarily mean that all chronic schizophrenics were flattened as some authors assume (for example, Salzinger and Portnoy, 1964; Malmo et al, 1951). The 'chronic' patients in such studies are more probably 'burnt out', that is, manifesting a defect state resulting from institutionalisation rather than the illness process (Foulds et al, 1967). They would thus not be expected to show any positive signs of schizophrenia, including flattening of affect.

#### 4) Physiological Basis

Most of the studies on the physiological aspects of incongruity or flattening of affect have investigated arousal level. Malmo et al (1951) found that a group of 17 chronic schizophrenics had consistently higher levels of background physiological activity compared with normals but that they pressed a lever to indicate pain less often. Malmo et al concluded that this was "counter to the traditional view that affect is 'flat' in schizophrenics" since their data indicated that in chronic schizophrenics those aspects of responsiveness which are most associated with emotional arousal remain intact

while the "run-of-the-mine" chronic schizophrenic appears emotionally unresponsive to the observer. Malmö et al were making the assumption that all chronic schizophrenics are flattened which, as discussed above, p. 8, is an untested assumption.

Venables and Wing (1962) found a positive relationship between increasing arousal levels and increasing withdrawal in chronic schizophrenics. They also demonstrated a high association between flattening of affect and withdrawal, which is rather more direct evidence for the association between high arousal levels and affective flattening.

Herrington and Claridge (1965) found that psychotic groups classified in terms of the presence of high sedation thresholds and short spiral after-effects (that is, high levels of cortical arousal) or low thresholds and long spiral after-effects were not differentiated in terms of the degree of clinically rated flattening of affect.

In contrast, Herron and Kantor (1968) suggested that the evidence which they could muster was in support of diminished autonomic responsiveness in process patients compared with reactives and so, by implication, reduced responsiveness in flattened patients. However, their evidence was again very indirect: for example, King (1968) found that reactive schizophrenics exhibited a significantly greater fall in blood pressure after the administration of mecholyl than did process patients. From this evidence Herron and Kantor inferred that

process patients exhibit a greater "loss of affect" than reactive patients.

Lacey (1959) has pointed out that any single index of arousal may correlate poorly with other measures (see Part 1b Thought Disorder for further discussion).

Direct evidence on physiological correlates of flat affect was provided by Rice et al (1969). They studied nine 'flat' patients rated by two judges to be showing either 'moderate', 'marked' or 'extreme' flatness of affect. Only five of the nine were diagnosed schizophrenics, a further two were borderline schizophrenics and the other two were personality disorders. As many British psychiatrists regard flattening of affect as pathognomic for schizophrenia, perhaps the patients differed from British samples of 'flattened' patients in other respects. Rice et al matched the flat patients with controls on age, sex, education, diagnosis and drugs. There were no differences on GSR, measures of body movement, basal skin resistance or EMG. Heart rate was lower for the flattened patients and it was concluded that there was evidence of diminished physiological responsiveness in flat patients. The study further highlights the importance of which measure is used.

##### 5) Experimental Investigations

A disadvantage of research in this area is that very little experimental work has so far been carried out. Herron and

Kantor (1968) draw attention to the discrepancy between the familiarity to clinicians of 'loss of affect' and the paucity of research studies concerned with 'flattening of affect'.

Previous relevant studies have been of four main types - those which related affective flattening to i) verbal output; ii) retardation; iii) those which considered the relevance of 'content' to the performance of schizophrenics and iv) those which investigated the content of the personal construct systems of patients with flattening of affect.

i) Verbal Output. Salzinger and Portnoy (1964) described how in earlier experiments they had developed a verbal conditioning technique with acute schizophrenics so that they could increase the output of verbal material in a specific area in some experiments and increase the total speech output in other experiments. As the special class of material, they chose self-referred affect statements because it seemed important to discover how the interviewer influences what he measures when he tries to get estimates of such characteristics as 'flatness of affect' on the basis of verbal behaviour. They provided evidence (for example, Cohen, 1961) that the content of speech rather than non-verbal cues were important in such ratings and they felt that self-referred affect statements had a heavy weighting in flatness of affect ratings. It was commendable that they should have incorporated a feature of direct clinical relevance in an experiment on free-operant learning but, unfortunately, they omitted to test the

hypothesis that the number of self-referred affect statements had any relevance for flattening of affect. In the experiment reported in their 1964 paper, they found that it was not possible to reinforce chronic schizophrenics because the number of self-referred affect statements was initially too low. They suggested that a low rate of responding in general rather than a low rate specifically related to self-referred affect statements, was typical of chronic schizophrenics and they therefore concluded that 'flatness of affect' is an artefact of a low rate of responding. There would appear to be two untested assumptions in this conclusion:

- (1) that all the chronic schizophrenics were flat while none of the acutes were.
- (2) that the number of self-referred affect statements emitted spontaneously has relevance for flatness of affect.

Thus, although the results are suggestive, they are inconclusive as far as flatness of affect is concerned.

ii) Retardation. Harris and Metcalfe (1956) explicitly investigated inappropriate affect in schizophrenics which they regarded as an "impaired capacity for emotional responses" and included flattening and incongruity of affect. They documented the clinical items from a routinely administered item sheet and found that age, clinical signs and outcome differentiated patients with flattening of affect from patients without, while sex, psychiatric family history, early

life and childhood development, medical history and treatment given did not. They also administered a series of psychological tests:

- (1) Wechsler-Bellevue Test - short form with Vocabulary, Similarities and Block Design.
- (2) Rampton Hospital Sorting Test - an abstract reasoning task where the patient has to sort cardboard pieces according to colour, shape and decoration.
- (3) Nufferno Speed Tests - a test of reasoning, the items in which are sufficiently simple to allow 80% of normal subjects to complete them without difficulty. It is administered under timed and untimed conditions ('stressed' and 'unstressed') and only correct answers are included in the computation of speed. (For further details see Method p. 115 below).
- (4) Recognition of Absurdities Test - a test consisting of a text containing a certain number of absurdities which the subject is given to read. The subject is given increasingly more help until he recognises the absurdities. Schizophrenics had previously been shown to have difficulty with this test.

(5) Wegrocki's Test - a test originally conceived to measure generalising ability or the abstract attitude. The test comprises:

- i) a set of proverbs to be matched with explanations.
- ii) a list of analogies in which the final word has to be supplied.
- iii) lists of four words, one of which has to be selected as different in an essential way from the others.

The group was assessed on a 3 point scale: grossly flat, moderately flat and not flat. Harris and Metcalfe found that the Nufferno Speed Tests and the Wechsler-Bellevue Test (particularly Block Design) best differentiated between the groups, the flattened patients being slower than the non-flattened. They suggested that phenomenon of flattening of affect, which they say is the result of an observer-subject interaction, may arise from the subject being slower than the observer so that, for example, an emotional response may appear too late and therefore appear to be out of context. However, many authors, for example, Shapiro and Nelson (1955), Payne and Hewlett (1960), have demonstrated that other psychiatric groups are slower than schizophrenics so that even if flattened schizophrenics are markedly slower than non-flattened schizophrenics, there must be additional differentiating features.

iii) Relevance of 'Content' for the Performance of Schizophrenics. Many authors have dealt with the effect of content, frequently differentiating between 'affective' and 'not affective', on the performance of schizophrenics. Many of these studies do not deal directly with flattening of affect but will be discussed together with those that do in the present section.

Many authors followed up the work of Garnezy (1952) where he showed that schizophrenics had flatter generalisation gradients with censure than with praise whereas normals had steeper gradients. Much of this work was taken to indicate that threat of failure or punishment increased the performance deficits of schizophrenics in the areas of learning, discrimination and concept formation. Under conditions of reward, the performance of schizophrenics was comparable with that of normals. Bleke (1955) compared normal subjects with 'good' and 'poor premorbid' schizophrenics (Garnezy and Rodnick, 1959) on a memory task. Both praise and censure were used during learning. The poor premorbid schizophrenics showed better reminiscence and relearning than did good premorbid schizophrenics or normal subjects. This was interpreted in terms of an interference hypothesis, that threats of punishment in persons overly sensitive to signs of social censure and failure tend to create interfering sets which inhibit effective task performances - in Bleke's case, the original learning.

However, Smock and Vancini (1962), in a similar experiment, found that while there were no differences between schizophrenics and normals in the original learning, censured schizophrenics showed less reminiscence than both praised schizophrenics and normals. Buss (1966) suggested that this inconsistency characterised the evidence provided by Rodnick and Garmezy and their students and that while they interpreted their evidence as supporting the social censure hypothesis, a more balanced appraisal revealed the evidence to be equivocal. Similarly, Herron and Kantor (1968) discussed two recent studies which provided contradictory evidence with respect to the censure deficit hypothesis. Magara (1967) found that the degree of perceptual discrimination of scenes including people varied with stimulus content for the process-reactive continuum and supported the censure deficit hypothesis. Cicchetti (1967), using taped discussions by parents of ways to punish a disobedient son, failed to support the hypothesis. Buss and his co-workers conducted a programme of research on verbal reinforcement. For example, Buss and Buss (1956) investigated various combinations of verbal reinforcement on conceptual learning tasks in psychiatric patients and found that censure facilitated performance. Buss (1966) reviewed other studies on verbal reinforcement and concluded that generally the results were opposite from what would be predicted from the social censure hypothesis. Garmezy (1965) amended the original

censure theory and postulated that censure leads to psychological deficit when it is irrelevant to the task and cannot be avoided. Berkowitz (1964) investigated the effect of the experimenter-subject relationship on reaction time and found that for schizophrenics, if the experimenter was aloof and rebuffed attempts at a warm relationship, then performance was better than if he was warm and friendly: the censure hypothesis would predict that under such unavoidably punishing conditions his performance should deteriorate. Thus Buss (1966) concluded that even Garnezy's modified theory does not account for the facts without too many assumptions.

Lebow and Epstein (1963) looked at the responses of good premorbid schizophrenics (12 paranoids, 3 catatonics, 6 chronics unspecified) to pictures of mother, father and peer figures in nurturant, ambiguous and rejecting interactions with a boy hero. They concluded that:

"rather than a specific censure deficit, the schizophrenic exhibits a general deficit for cues associated with emotional involvement, whether of a positive or a negative nature".

Social censure can in this light be seen as one element in the class of 'affective stimuli'. It has been shown that schizophrenics are adversely affected by stimuli connoting affection, nurturance and approval. Culver (1961) found that both good and poor premorbid schizophrenics underestimated the size of a mother picture, while behaving as the normals did

with a neutral square (Buss and Lang, 1967). Raush (1956) found schizophrenics overestimated the size of symbolic sexual objects compared with normals. Arey (1960) investigated the prerecognition distortions of schizophrenics on sexual and neutral pictures and found they were more affected by the sexual stimuli than normals. Feffer (1961) tested the perception of affective and neutral words and found that schizophrenics who were pathologically concrete on such tests as the Wegrocki battery tended to avoid affective stimuli; on the other hand, schizophrenics who conceptualised adequately were especially vigilant about affective stimuli.

Having considered the above experiments, as well as many more in the general area of the effect of affective stimuli on the performance of schizophrenics, Buss and Lang (1967) make the point that it is difficult to maintain a clear referent for 'affective stimuli' in the face of such a diversity of experimental situations. As one solution, they suggest that affective stimuli may be seen as better able to elicit associations from subjects on the assumption that such classes of stimuli as human, symbolic, sexual and aggressive stimuli are more capable of setting off a train of personal and idiosyncratic emotions. Thus one way of accounting for the deleterious effect of affective stimuli is to assume that they trigger more associations than do neutral stimuli. In support of this, Deering (1963) had subjects associate to affective (pleasant and unpleasant) words and neutral words and found

that schizophrenics give more associations to the affective words but did not differ from normals on the neutral words. Deering's subjects were 140 first admission schizophrenics who had been hospitalised for less than 11 months. She gave no information on symptomatology and so it is not possible to tell whether these results would apply to flattened schizophrenics. If the group was comprised of both flattened and non-flattened schizophrenics (as was probably the case) then opposite results for flattened schizophrenics could have been swamped in the general trend (see, for example, Chassan, 1967). Despite urging from writers since Bleuler onwards (see, for example, Freyhan, 1958) to consider the heterogeneity of the schizophrenic group, many authors still operate as if it were homogeneous.

One sub-class of affective stimuli which has aroused especial interest is that of 'human' stimuli. Davis and Harrington (1957) found that schizophrenics (patients with a 'schizophrenic reaction') when matched with normal subjects on problems involving non-human elements were significantly worse than normals on problems involving human elements. Marx (1962) found that acute schizophrenics were more disrupted by human stimuli in a conceptual task than chronic schizophrenics. Whiteman (1954) found that schizophrenics (13 catatonic, 12 paranoid, 4 mixed, 1 hebephrenic and 1 simple, therefore likely to be heterogeneous with respect to flattening of affect) were worse than normals on a conceptual task involving

human elements when matched on performance on a task with formal elements. Brodsky (1961) compared schizophrenics with non-psychotic patients and found that the schizophrenics were poorer on conceptual tasks only when human stimuli were involved.

While none of this work was explicitly concerned with affectively flattened schizophrenics, it is suggestive of the role that the content of a task might have in the disruption of schizophrenic performance.

Rice et al (1968) conducted a more directly relevant experiment in that his patients, while not all diagnosed schizophrenic, were rated as being more than 'moderately' flattened on the Venables and Wing (1962) scale. Rice found that within the flattened patients there was a mean decrease in response level while telling an emotional story (to a TAT card) compared with the response level while reading a non-emotional passage. In contrast, the controls showed a mean increase in response level. Rice et al concluded that the diminished affective and physiological responses of 'flat' affect patients may be selective to emotional stimuli.

iv) Personal Constructs. Following an observation by Foulds that affectively flattened patients made less emotional responses to TAT cards than other patients, Dixon (1968) investigated this lack of responsiveness in terms of Kelly's construct theory (Kelly, 1955). This approach led to meaningful results when applied to thought process

disorder (Bannister, 1960, 1962). Dixon tested the hypothesis that while schizophrenics compared with normals have a low rate of verbal response to pictorial stimuli, they give proportionately fewer emotion- and personality-oriented verbal responses and, furthermore, that the proportion of verbal responses to pictorial stimuli is negatively correlated with the degree of flatness of affect, assessed clinically.

One of the methods Kelly suggested for eliciting constructs was asking for differences between people and Dixon adopted this approach giving 5 standard pairs of photographs of people to each patient, who was asked to list the differences between the people in the photographs. The replies of each patient were tape-recorded and independently classified by two judges according to 12 classes of construct. The two judges demonstrated a high degree of inter-rater reliability. The classification adopted by Dixon was as follows:

- |                  |                                                                                   |
|------------------|-----------------------------------------------------------------------------------|
| Activity (A):    | Reference to what the people in the pictures are doing.                           |
| Clothes (C):     | Reference to anything the people in the pictures are wearing.                     |
| Emotion (E):     | Reference to the feelings, emotions or personality of the people in the pictures. |
| Age (G):         | Explicit reference to the age of the people in the pictures.                      |
| Nationality (N): | Reference to the country of origin or race of the people in the pictures.         |

Occupation (O): Reference to the social, economic, occupational or religious status of the people in the pictures.

Physique (P): Reference to the physical characteristics of the people in the pictures.

Stance (S): Reference to the bodily pose of the people in the pictures.

Further categories dealing with the background and other details of the photographs were also noted.

Background (B): Reference to anything in the pictures other than the people or the clothes they are wearing.

Denial (D): Indication that no (further) differences can be seen.

Irrelevance (I): Intrusion of irrelevant material of a delusional or personal nature.

Photography (X): Comment on the photography or the stimulus materials rather than the content of the pictures.

Dixon used two groups one of which comprised 37 male schizophrenics drawn at random from acute and chronic wards. They were all less than 60 years old, had no signs of brain damage, were not receiving ECT and gained a score of at least 15 on the Mill Hill Synonyms Test. The other group comprised 28 normal males who were either convalescent (and so hospitalised) or non-medical hospital staff.

The schizophrenics were clinically assessed for flattening of affect by both a psychiatrist and a psychologist. The raters were given no operational definition of flatness of

affect but were asked to use the term 'affective flattening' as they usually did. Each rater recorded the degree of flattening present in each patient by placing a mark on a line labelled 'no flattening' at one end and 'very considerable flattening' at the other. The psychiatrist conducted a routine psychiatric interview, asking questions about the patient's illness, family and so on, while the psychologist worked mainly from the SSI. Thus both interviewers were asking the patients to discuss fairly emotional topics. Dixon was able to confirm all her predictions. There was a negative relationship between flatness of affect and rate of verbal response in the schizophrenic group; however, when this was controlled for, the flattened schizophrenics still made less use of emotional and affective type constructs than non-flattened schizophrenics or normals. The rank order correlation between the percentage use of the 'emotion' category and the mean rating was  $-0.39$  ( $p < .01$ ); that is, the more flattened patients made less use of the emotion category. She found that the only other three categories of response occurring less frequently in the flattened group were 'age', 'occupation' and 'physique' but that significantly greater use was made of the three non-human categories - 'background', 'denial' and 'irrelevance'.

McPherson et al (1970a) studied 9 male and 9 female schizophrenic patients of whom half were paranoid and half non-paranoid. They had each had an unchanged diagnosis of schizophrenia for at least two years, were still showing active

psychotic signs and were aged between 17 and 60 years. These schizophrenics were rated for degree of flattening by two psychiatrists. McPherson et al were able to confirm that affective flattening, as clinically assessed, is associated with a reduced tendency to use affective constructs, that is, those concerned with personality and emotional state; they found a rank order correlation between the percentage use of the 'emotion' category and the mean psychiatric rating of  $-0.47$  ( $p < .01$ ). The other significant findings of Dixon on other categories were not confirmed in this study (which incidentally highlights the importance of such replication studies).

McPherson et al (1970b) had two patient groups of 15 subjects and a normal group of 15 subjects; all matched on age, sex, social class and vocabulary score. The two patient groups were both schizophrenic groups, matched for chronicity, but differentiated in terms of degree of flattening of affect. McPherson et al showed that those schizophrenics rated as showing moderate or severe flattening of affect used significantly fewer 'psychological' constructs than either the schizophrenics rated as showing little or no flattening of affect, or the normals.

Rush (1970), in a Canadian study of 30 schizophrenics, confirmed the main findings of Dixon (1968) and McPherson et al (1970a,b).

## B. Thought Disorder

" .... thinking operates with ideas and concepts which have no, or a completely insufficient, connection with the main idea and should therefore be excluded from the thought process. The result is that thinking becomes confused, bizarre, incorrect, abrupt. Sometimes all the associative threads fail and the thought chain is totally interrupted; after such a "blocking" ideas may emerge which have no recognisable connection with the preceding ones".

E. Bleuler (1950)

### 1) Clinical Features

As disorders of emotional behaviour can be divided into disorders of mood and disorders of expression, so disorders of thought can be divided into disorder of the content of thought and disorder of the processes of thought. Persecutory and grandiose delusions are examples of disorders of the content of thought.

'Thought disorder' more commonly refers to the disorder of thought processes and is frequently called 'formal thought disorder' or 'thought process disorder'.

Bannister (1960) suggested that the primary features of thought process disorder as judged from the speech of a schizophrenic are:

- i) inconsequential following of side issues.
- ii) tendencies for the thought to be directed by alliterations, analogies, clang associations,

associations with accidents of the speaker's environment, symbolic meanings and the condensation of several (perhaps mutually contradictory) ideas into one.

- iii) words used out of context, e.g., concrete meanings taken where abstract meanings would be appropriate.
- iv) clinging to unimportant detail.
- v) the use of laconic answers, e.g., "I don't know", "maybe", "perhaps" - indicative of emptiness and vagueness of ideas.
- vi) thought is generally marked by gaps, poverty, indefiniteness and vagueness.
- vii) indications of thought blocking.
- viii) indications of pressure of thought.

Fish (1962) distinguished between disorders of the stream of thought under which, e.g., pressure of thought and thought blocking would fall, and disorders of the form of thought. He also distinguished between 'positive' (e.g., clang associations) and 'negative' (e.g., poverty of thought) formal thought disorder but this possibly important distinction has not been widely considered.

Clinically, thought process disorder is inferred from the observation of language disturbance. Cameron (1963) stated,

" .... it is hardly necessary to repeat that such language distortions involve the patient's thinking along with

his talking".

However, Williams (1963) has argued,

"It seems reasonable to suppose that if speech is to be ordered then thought must be ordered. It does not follow logically, however, that if speech is disordered then thought is disordered".

Kleist (Fish, 1962) differentiates between speech and thought disorder since he maintains that some schizophrenics act so reasonably that their thoughts could not possibly be as muddled as their speech.

Nevertheless, clinical evidence of thought disorder generally relies upon examples of written or spoken language disturbance and experimental attempts at demonstrating more clearly the nature of thought disorder very largely depend on performances such as word association, concept formation, reasoning and so on.

Thought disorder is probably best seen as varying along a continuum ranging from normality to abnormality. Mayer-Gross et al (1960) describe degrees ranging from a mild vagueness to a complete disorganisation of thought and speech. Foulds et al (1967a) used a rating scale whose extreme points were 'very considerable thought process disorder' and 'no thought process disorder'.

## 2) Reliability

The data on the reliability of the assessment of thought disorder is less encouraging than that for flattening of affect.

Kreitman et al (1961) found that if thought disorder was found in a patient by one psychiatrist and considered by him to constitute an important symptom for diagnosis and disposal, then 0% of his colleagues would be of the same opinion - this was taking no account of severity and contrasted with 87% agreement in the case of depression. The finding was based on only 7 patients thought by one psychiatrist to be manifesting thought disorder.

Mayer-Gross et al (1960) point out that thought disorder is often difficult to detect and may be entirely absent while the patient is interviewed by the psychiatrist in an interview. Such functional variability would reduce the apparent reliability of ratings if carried out at different times but any increase in reliability would be at the expense of validity. Mayer-Gross et al suggest that if the patient is allowed to express himself freely he is more likely to give evidence of thought disorder. It could also be that the patient is always disordered when dealing with certain classes of material.

Foulds et al (1967) suggested that clinicians may have particular difficulty in rating the degree of thought disorder in chronic patients because of the distracting influence of other factors such as social deterioration.

### 3) Clinical Significance

For many authors thought process disorder is pathognomic for schizophrenia. Bleuler in 1911 held 'disturbances of

association' to be a primary symptom of schizophrenia along with 'disturbances of affectivity' and 'autism'.

Kraepelin (1919) said that sooner or later the patient's train of thought suffers considerably and that,

" . . . . above all, . . . . the patients lose in a most striking way the faculty of logical ordering of their trains of thought".

Fish (1964) asserted that formal thought disorder is diagnostic of schizophrenia in the absence of coarse brain disease.

Mayer-Gross et al (1960) suggested that a useful sign for distinguishing hebephrenic from other schizophrenics was the presence of thought disorder:

"We think it preferable to place in this group all the cases of schizophrenia in which thought disorder is the leading symptom. This is a large group comprising the majority of schizophrenics whose illness starts before the age of thirty".

Foulds (1965) suggested that the non-integrated psychotic (mainly non-paranoid schizophrenics) begins very early in the illness to use words slightly incorrectly and later, increasingly bizarrely.

"This disorder of the thought processes should, therefore, only occur, but will not always occur, in non-integrated psychotics".

Willis and Bannister (1966) showed that, according to psychiatrists' assessment, thought disorder was the most

important of all the signs and symptoms for a diagnosis of schizophrenia.

Buss (1966) said that the most important and salient symptoms of schizophrenia were in the cognitive sphere. He suggested that there were five varieties: disturbances of the self, autism, disturbances of language and thought, hallucinations and delusions.

Thus it appears that although not all schizophrenics exhibit thought-process disorder, all thought disordered patients are schizophrenic.

A consideration of the importance of thought disorder for a diagnosis of schizophrenia, together with the low reliability of its clinical assessment, suggests that there should be continued efforts to elucidate what processes are disrupted so that both more accurate identification and rational management would be possible.

#### 4) Physiological Correlates

Some authors have concentrated on the physiological correlates of thought disorder. Claridge (1967), for example, has suggested that such an approach might aid the classification of the psychoses.

Meadow and Funkenstein (1952) demonstrated that the greatest impairment of abstract thinking occurred in schizophrenics who were more aroused on indices derived from responses to Mecholy1. However, tests of abstract thinking are now not felt to be relevant for thought disorder (see p. 35).

Venables (1963) demonstrated that the narrowing of attention which has been described by many authors in connection with thought process disorder (see p. 36) varies with arousal level in schizophrenics so that the more physiologically aroused patients perform worse.

Herrington and Claridge (1965) found that psychotics with high sedation thresholds and short spiral after-effects (that is, those with a high level of arousal) showed a significantly greater degree of clinically rated thought disorder and mood deviation than those with low thresholds and long spiral after-effects.

Claridge et al (1966) found that psychotics with high sedation thresholds produced many more non-A sorts on Payne's object sorting test (Payne and Friedlander, 1962); there was no relationship with spiral after-effect. The usefulness of Payne's test in connection with thought process disorder has been questioned (see p. 41). Claridge et al (1966) reclassified Payne's non-A sorts under three headings - overinclusive, abstract-bizarre and concrete-bizarre. They showed that patients with short spiral after-effects (and tending towards the profile of high sedation threshold, low spiral after-effect group) gave both more overinclusive sorts (i.e., sorts where the subject attempted to sort the objects but was unable to confine himself to one concept) than the rest and more abstract-bizarre sorts (i.e., sorts where the patient made no use at all of the required concepts but formed patterns and

explained them in terms of abstract ideas). Concrete-bizarre sorts (i.e., sorts where the patient formed patterns with the test pieces and explained them in terms of concrete objects) were common to all psychotics but were particularly prevalent among patients with low sedation thresholds and long spiral after-effects. Claridge (1967) presented confirmatory evidence for these findings, namely, that overinclusive and abstract-bizarre responses were more characteristic of patients with high initial levels of arousal.

Buss (1966) pointed out that there are some schools which hold that membership of the process group in a process-reactive dichotomy relies on the presence of formal thought disorders which is present in every process schizophrenic. Thus further indirect evidence of the physiological basis of thought disorder may be mustered by looking at data on the process-reactive continuum. Claridge (1967) reported that Wawman found that process schizophrenics had lower sedation thresholds and longer spiral after-effects than neurotic patients; Wawman relied on prognostic data rather than clinical features for his retrospective classification of his patients.

Herron and Kantor (1968) suggest that there is considerable evidence to support the concept of diminished autonomic responsiveness in process patients as compared to reactives. They caution, following Lacey (1950), that any single index of arousal may correlate poorly with others owing to 'response specificity'. Claridge (1967) countered this, pointing out

that although all subjects do not show equal changes in all autonomic systems, nevertheless, there is an overall, usually sympathetic, response to imposed stress, thus making some degree of interindividual correlation likely.

#### 5) Experimental Findings

There have been many experimental investigations of thought disorder and many different features, important among which are concreteness, attention defects, overinclusion and construct systems, have been considered.

i) Concreteness. Goldstein (1941) conducted the major part of his enquiries with organic patients but then extended his concept of 'concreteness' to schizophrenics. This suggested that schizophrenics were unable to adopt an 'abstract attitude' and therefore unable to follow any path of inductive reasoning. 'Abstraction' was usually operationally defined in terms of the subject's ability to group and categorise objects in sorting tasks (Bolles and Goldstein, 1938) or ability to give the meanings of proverbs in terms of acceptable generalizations.

However, Rapaport et al (1945) and Payne et al (1959) have provided evidence that schizophrenics tend to give unusual generalisations rather than fail to abstract.

The relevance of such studies for thought process disorder is further limited by the fact that most were concerned with differentiating between schizophrenics and non-schizophrenics rather than between thought-disordered and non-thought-disordered

schizophrenics.

ii) Attention Defect. The interest in an attention defect in schizophrenia has a long history. Bleuler (1911) clearly emphasised it:

"At the one extreme patients are easily distractible, seem to lack directives of their own and depend entirely upon outer impressions, ..... and at the other extreme, they are undistractible and even the strongest stimuli will fail to influence their train of thought or arouse their attention"

and Kraepelin (1919) also stressed the difficulty in this area,

"It is quite common for them to lose both inclination and ability on their own initiative to keep their attention fixed for any length of time. It is often difficult enough to make them attend at all".

McGhie and Chapman (1961) gave examples of schizophrenic speech which they suggested provided vivid descriptions of the form of schizophrenic thought disorder as well as demonstrating the importance of attention. For example, one patient said,

"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".

Chapman and McGhie (1962) have concentrated upon this distractibility of schizophrenics using, for example,

Fleishman's (1954) psychomotor battery for examining the effect of both auditory and visual distraction. They found that the deterioration of schizophrenics under distraction conditions was no greater than that of other psychotic patients except when they were processing unpredictable signals. Lawson, McGhie and Chapman (1967), in this and previous work, showed that schizophrenics were particularly affected by irrelevant information when this had to be ignored and relevant information dealt with, particularly if the task involved the integration of information from two sensory modalities. McGhie interpreted this in terms of a breakdown in the filter mechanism of the type postulated by Broadbent (1958) so that the schizophrenic is trying to cope with information overload with the result that he is particularly affected in tasks involving complex decision making.

It seems that McGhie and his co-workers have not distinguished between thought-disordered and non-thought disordered schizophrenics in these studies although they have suggested that the work has relevance for thought disorder (McGhie, 1961). McGhie, Chapman and Lawson (1965) noted a tendency for the effects of distraction to be more marked in the case of hebephrenic patients and also to increase with chronicity. This may be suggestive that thought disordered schizophrenics are the more susceptible.

Yates (1966) raised the point that poor performance on tasks used in investigating thought disorder could be because

of difficulty at i) the receptor level, ii) the data-processing level or iii) the cortical or mediational level. He reviewed evidence from a wide source and concluded that while some distortion may take place at the receptor level (e.g., as in constancy and size- and time-estimation experiments), there is evidence that cognitive processes in schizophrenics are quantitatively similar to those in normal subjects and may be unimpaired under certain conditions. He concedes that over a long period of time the higher thought processes themselves may be permanently affected, just as severe and prolonged migraine may produce brain damage. He held, however, that the fundamental deficit in schizophrenia is related to difficulties at the data-processing level and, in contrast to McGhie and Chapman who stress the importance of information overload, he maintains that the "primary deficit in schizophrenia consists in the abnormally slow rate at which information in the primary channel is processed" so that "the amount of stored information lost per unit of time will be much greater than in normals".

He suggested that as only part of the relevant information would be processed, higher cortical processes and response processes would all be affected, the result being the appearance of language disorder and other indices of thought disorder.

Yates (1966) provided evidence for his theory by drawing on evidence from other experiments but Hawks and Robinson (1970) conducted an experiment designed to evaluate McGhie's and Yates' theories. A group of chronic schizophrenics

(9 paranoid and 9 non-paranoid) and a group of normals were asked under one condition to reproduce digits presented dichotically at three different rates of presentation and, under another condition, to reproduce only those digits received through a designated channel. There were four different list lengths. Both 'group' and 'rate' were significant sources of variance but the interaction was not significant, which was contrary to the predictions from Yates' theory. The three groups were not differentially affected by variations in the rate of presentation under the interference condition but the non-paranoid schizophrenics were most affected by distraction from the irrelevant channel; this provided substantial support for McGhie and Chapman's theory.

From their work on reduced perceptual constancy in schizophrenics compared with other psychotics and normals, Weckowicz and his co-workers (Weckowicz and Blewett, 1959) talk of some change in the filtering of stimuli with the result that the cortex is flooded with irrelevant information so that the maintenance of a set becomes difficult. Again, he talks of 'schizophrenic' rather than 'thought disordered schizophrenic'.

Shakow (1962, 1963) also talks in terms of an inability to maintain a set in schizophrenia. Much of his work has been on reaction times under varied conditions, particularly those concerning preparatory intervals and the 'set index' (the latter refers to the degree to which the subject is able to

take advantage of regular preparatory intervals and the effect of preceding preparatory intervals) but the work carried out by his team has encompassed such diverse areas as habituation, association tests, aspiration levels and Rorschach responses. Shakow (1963) suggested that there is a distinct weakening of the control centre that serves to integrate and organise function, with the result that the schizophrenic is impaired by his inability to maintain major sets and so is controlled by segmented sets. Shakow (1962) defined the inability to maintain a major set as

"the difficulty in keeping up a state of readiness for response to incoming stimulation, the state which facilitates the optimal response called for by a given situation". He further suggested that the immense variety of schizophrenic symptoms, including preoccupation with bodily processes, sensory disturbances represented by hallucinations, peculiar thought patterns and delusions can, in one sense, be viewed as different expressions of this segmentalisation. This formulation would seem to be rather too broad for an understanding of thought disorder per se.

Silverman (1964) has proposed that there are two independent dimensions relevant to the attention process, namely, scanning behaviour and type of field articulation and he propounded a 'cognitive control' theory of attention. According to this theory there are differences in the perceptual orientations of process and reactive schizophrenics as a result

of perceptual development and so on. Further, in the chronic stage of the illness, as an ultimate defence, the schizophrenic actively monitors out stimulation to defend against a hostile environment. This contrasts with McGhie's theory in which the patient is seen as being overwhelmed by stimuli with which he cannot cope. Silverman's theory would predict that the schizophrenic would be inordinately affected by certain types of material.

He ties in the minimal scanning and/or minimal field articulation of the process schizophrenic with the work of Singer and Wynne (1965), proposing a link between his process schizophrenics and their schizophrenics with amorphous thought disorder.

iii) Overinclusive Thinking. Cameron (1939) was one of the first authors to maintain that schizophrenics demonstrated a peculiar inability in dealing with concepts so that their thinking was overinclusive. He defined overinclusive thinking as

"the inability to preserve conceptual boundaries as a result of which distantly associated and even irrelevant ideas come to be regarded as essential parts of a concept".

He first used this theory to explain the difficulty of chronic schizophrenics with the Vigotsky test and a sentence completion task.

Payne gave a strong impetus to the investigation of this area after studies had spasmodically appeared during the twenty

years following Cameron's original formulation.

Payne, Matussek and George (1959) investigated 18 schizophrenics and 16 neurotics using a large battery of tests and concluded that, while poor intellectual and motor speed and concreteness were not features of the schizophrenic group, overinclusiveness was a very prominent feature.

Payne and Hewlett (1960) conducted a large study with 20 normals, neurotics, endogenous depressives and schizophrenics. They investigated three aspects of thought disorder in psychotic patients - retardation, overinclusion and concreteness - by administering 61 tests to the 80 patients. The latter two aspects of thought disorder were discussed in Payne and Hewlett's introduction in connection with formal thought disorder in schizophrenia and so it appeared that this was what Payne was investigating at this stage. It was, however, never made clear. They carried out a canonical variate analysis on the data and obtained two independent factors: a retardation factor which differentiated between the psychotics and the other groups but not within the psychotic groups; and an overinclusion factor which differentiated between the schizophrenics and depressives. Half of the schizophrenics were within the normal range and Payne and Hewlett suggested that there might be two groups of schizophrenics - those with ideas of reference and paranoid delusions who overinclude; and the other schizophrenics who are retarded.

In 1962 Payne and Friedlander published a short battery of tests for measuring overinclusive thinking, comprising the three measures from Payne and Hewlett's (1960) battery which had had the highest saturation on the factor of overinclusion. These were the 'Non-A' sort on the object classification test, the average number of words used in explaining the Benjamin proverbs and the average number of objects per group selected during 'handing over' in the Goldstein-Scheerer Object Sorting Test. Payne and Friedlander suggested that these three measures be combined into a single score and that on the basis of this score schizophrenics were more overinclusive than all other groups.

Payne, Ancevich and Laverty (1964) suggested that overinclusive thinking was not a permanent characteristic but rather symptomatic of the illness and that patients during remission were not abnormally overinclusive. Payne (1962) suggested that overinclusiveness is a disorder of acute schizophrenics exclusively, although Cameron invoked the concept to explain a deficit in chronics.

Payne (1968) has extended the theory of overinclusion into an attention defect, suggesting that whatever filtering mechanism ensures that only the stimuli that are relevant to the task enter consciousness and are processed, seems no longer able to exclude the irrelevant.

Payne and Caird (1967) demonstrated the relationship between distractibility and overinclusion using a simple and

multiple-choice reaction time paradigm, with and without distraction, plus the overinclusion measure based on Benjamin's proverbs. They found that the relationship was particularly notable with paranoid schizophrenics.

A great number of different experimental situations have been used in these investigations; examples are Zaslów's test (1950) (which involves classifying designs as either a triangle, a circle or neither), Chapman's card-sorting task, Epstein's sentences, the number of words used on the Benjamin proverbs and the 'handing-over' score on the Object Classification test. Price (1970) has criticised the breadth of this concept, saying that although so many different paradigms imply generalisability, there is in fact no precise description of the concept. It is not obvious how far all these experiments are investigating the same processes except in that all the deficits are labelled 'overinclusiveness' with little regard to what the tests are likely to be measuring. For example, Gathercole (1965) suggested that Epstein's test was probably a measure of intelligence and that the tests in Payne and Friedlander's battery (handing-over score, number of used on the Benjamin proverbs and 'non-A' sorts) are probably measures of fluency of association. Claridge et al (1966) showed that non-A sorts were not of a unity and that some schizophrenics probably answered randomly as they did not understand the instructions. Hawks (1964) found low correlations between the measures of overinclusion and said that they should not be combined; this was confirmed

by Watson (1966) and Foulds et al (1967a). Thus the measures of, and indeed the concept of overinclusion, have been put in doubt.

Its relevance to thought process disorder has also been questioned. As stated above, Payne's position on whether the tests were relevant to thought process disorder, thought content disorder or both, was never made clear. Payne and Hewlett (1960) state that less than half of their schizophrenic group were "clinically judged to be suffering from thought process disorder" but they did not indicate which half, if either, was predominantly overinclusive.

Payne and Hewlett (1960) suggested that there might be a relationship between paranoid delusions, ideas of reference and overinclusion. Payne, Caird and Laverty (1964) found a relationship between paranoid delusions and abnormal performance on the modified Benjamin proverbs test; Lloyd (1967), however, pointed out an error in their statistical design which meant that their conclusions were not supported by their data. Hawks (1964), in a validation study, found no relationship between delusions and ideas of self reference and high scores on Payne's battery. Foulds et al (1967a), although they could not support Payne's contention that high scores on his battery were exclusive to acute schizophrenics, found that paranoid schizophrenics scored more abnormally on Benjamin's proverbs, with the results tending in the same direction for the Object Classification test. Foulds et al (1967a) were unable to find

any relationship between the measures of overinclusiveness and clinically rated thought process disorder.

Thus it appears that whatever the tests of overinclusion are measuring, it seems that they are more probably related to thought content disorder than thought process disorder.

A recent extension of Payne's theory, which is yet to be tested directly, has been proposed by Hawks and Marshall (1970): that acute schizophrenics who are overinclusive learn to cope with their attention defect by slowing the rate at which they respond to stimuli (see p. 83).

iv) Repertory Grids and Thought Disorder. Bannister (1960) criticised previous theories of thought disorder in that they were seemingly based on the assumption that all schizophrenics are thought-disordered; they are not. Thought disorder is a sufficient but not necessary condition. He also criticised that they did not try to describe normal thought but rather appeared to look upon thought disorder as a condition rather than a process.

He formulated his ideas on the basis of Kelly's construct theory (Kelly, 1955) in which the Fundamental Postulate was that:

'a person's processes are psychologically channelised by the ways in which he anticipates events'

thus stressing that the person is the area of interest, that it is a psychological theory, that a person's processes are structured and organised and that the aim of the person is

successful anticipation rather than response. As Kelly put it,

"Like the prototype of the scientist that he is, man seeks prediction. His structured network of pathways leads towards the future so that he may anticipate it. This is the function it serves. Anticipation is both the push and pull of the psychology of personal constructs".

A person is seen to develop a system of constructs in order to categorise the situations he encounters during his life experience. A construct is not simply a label for categorisation, however; constructs have the features of being bipolar, personal, predictive and hierarchically related and systematised.

Bannister (1960) used this theoretical framework to investigate the conceptual structure in thought disorder. He used a Kelly Repertory Grid technique which has as its basic assumption that conceptual relationships can be usefully inferred from statistical associations in their usage with more than one person. For example, if an individual uses the words "sincere" and "trustworthy" about another person, nothing can be inferred about his conceptual structure. But if he uses "trustworthy" about ten people he also describes as "sincere" and fails to use "trustworthy" about ten people he also fails to describe as "sincere", then it is assumed that a strong positive relationship between these two concepts can be inferred.

Bannister (1960) investigated conceptual relationships in this manner for a group of thought-disordered schizophrenics

as well as non-thought-disordered schizophrenics, normals, neurotics and depressives, using 36 people known to the subjects as elements and ten constructs. He found that measures of stability (in terms of the consistency of the relationships between constructs in two grids using different elements, one immediately following the other) and strength of relationships (in terms of deviations of the relationships from chance) differentiated successfully between thought-disordered schizophrenics and the other groups, including non-thought-disordered schizophrenics. For inclusion in the thought-disordered or the non-thought-disordered groups, three psychiatrists had to agree on the presence or absence of thought disorder and, in view of Kreitman's (1961) data on the reliability of its assessment, Bannister's were probably extreme groups.

Bannister (1962) repeated the experiment with larger groups, this time using twenty photographs of people unknown to the subjects as elements rather than 36 people known to them. Bannister explained this departure from the 'personalness' of grids inherent in Kelly's theory by saying that he was controlling for the patients remembering how they used to construe their acquaintances before they became psychotic. It could be argued that, if the patients were able to remember their construing, then they would not appear thought-disordered in familiar situations, which is not so. However, the change to photographs increases the standardisation of the test situation, particularly as some schizophrenics may have great difficulty

in naming 36 people known well to them. Certainly, the differentiation between the groups was improved and Bannister confirmed that measures of stability (hereafter called Consistency) and strength (hereafter called Intensity) of relationships between constructs successfully differentiated between the groups.

Bannister explained these results in Construct Theory terms, that if constructs lead to anticipations which are subsequently invalidated, then the person tends to modify his construct system accordingly. If invalidation occurs repeatedly so that the system has to be repeatedly modified, Bannister suggested that the person may react by modifying the construct itself and loosen the relationship between the poles of the construct and other constructs which normally cluster around it so that the construct may now be used for varying predictions; for example, to construe someone loosely as 'loving' does not necessarily imply that one expects 'warm' or 'kind' behaviour from him. Thus it is hypothesised that thought disorder is a result of such a sequence of invalidating experiences. The advantage of such a strategy is that the person can no longer be invalidated (which in Kelly's terms is anxiety reducing) but the disadvantage is that reality testing is no longer possible.

Bannister (1962) proposed that a suitable operational definition for thought disorder was:

"a condition in which subjects on any sorting task produce weak sorting relationships. These sorting relationships show little stability when the subject moves from one group of elements (stimuli) to another and the pattern of sorting relationships is private and idiosyncratic with the subject manifesting little conscious awareness of the nature of such patterning as does remain".

Against the background of such a definition, Bannister and Fransella (1966) published a test with norms and suggested cutoff points for detecting thought process disorder. In their sample, performance was not affected by intelligence or age except in organic brain damaged subjects for whom different cutoffs were suggested.

The task involves ranking eight photographs in terms of specific constructs of which one polar end is given, namely, kind, selfish, stupid, sincere, mean and honest. The subject repeats the six rankings immediately after the first trial. Measures of Intensity and Consistency are derived and thought disordered subjects obtained low scores on both of these - non-thought-disordered subjects high scores.

Foulds et al (1967) conducted a validation study using 48 schizophrenic patients. They criticised Bannister and Fransella's standardisation in that they had classified schizophrenics as either thought disordered or not and had demanded agreement between three psychiatrists on this matter. Foulds et al proposed that thought disorder would be better

seen as a continuum and, in their study, they asked a psychiatrist to rate the degree of thought disorder by marking the position on a line from "no thought process disorder" to "very considerable thought process disorder". Probably as a result of including patients who were only slightly or moderately thought-disordered as well as the extreme groups, Foulds et al found that their schizophrenics were less abnormal than Bannister and Fransella's thought-disordered group but more abnormal than their non-thought-disordered group.

Foulds et al found that within the acute schizophrenics the Bannister-Fransella Grid Test was valid for the Consistency measure and in the right direction for the Intensity measure; within the chronic schizophrenics the pattern was less satisfactory and Foulds et al suggested that this may have been due to the psychiatrists' difficulty in rating thought disorder in chronic patients.

C. Personal Construct Theory, Flattening of Affect and Thought Disorder

Bannister (1962) hypothesized that thought process disorder is the result of a repeated series of invalidating experiences. He described it as follows:-

"Schizophrenic thought disorder is experienced as living in a fluid, unfocussed and undifferentiated world in which anxiety is not felt to any marked degree since only the vaguest and least destructible anticipations arise in the mind of the



subject. To the observer it presents as a condition in which the individual's behaviour is relatively random, purposeless and unpredictable. His talking has low communication value since it consists of constructs linked loosely by what appear to be vague associations and assonantal 'echo' effects in which sound has almost as much relevance as meaning".

Recognising that thought disorder is a disjunctive concept, he applied the theory to the individual features of thought disorder which he had noted previously (Bannister, 1960):

i) Inconsequential following of side issues - if the construct system has been loosened then its focussing and restricting effects are lost and chance features occurring may lead the person off on a completely alien sidetrack.

ii) Alliterations, analogies, clang associations, condensation of several ideas into one - it can be generally argued that construct relationships are what we usually refer to as meaning and if, therefore, construct relationships are weakened there is, ipso facto, a weakening in meaning.

iii) Clinging to unimportant detail - if a person's construct system has loosened then subordinate/superordinate relationships between constructs may have altered in direction or have been proportionately minimised. Thus, to the schizophrenic, he may be persevering with the consideration of some aspect which, within his loosened frame of reference, now occupies a relatively superordinate position.

iv) Vagueness and poverty of ideas - if loosening is taken to mean loss of meaning then the significance of the structure of constructs will be replaced by something more nearly approaching noise.

v) Thought blocking and pressure of thought - if thinking is considered to be a process of serial construing with a choice of constructs at the end of each 'unit of construction' owing to the organisation of the construct system, then the existence of this related network of constructs regulates the speed of thinking. Once construing is loosened, the optimal and minimal speeds of construing are widened and greater availability can be anticipated. At one level, the number of possibilities at each choice point is reduced, thereby increasing the rate of thought; and at a further level the number of possibilities is reduced to zero, thereby producing thought blocking.

Bannister suggested that this kind of explanation may be a useful starting point for an attack on the clinically observed phenomenon of schizophrenic thought disorder.

Bannister (1963, 1965) conducted two experiments to investigate the relationship between the invalidation hypothesis and thought disorder. He used normal subjects in an attempt to produce the loosening in construct relationships typical of the schizophrenic by subjecting them to either validating or invalidating experiences in their sortings of photographs in terms of supplied constructs. The correlations between

validated constructs increased over the trials but the invalidated constructs proved more difficult to deal with. He was able to show that there were more changes of pattern within the invalidated constructs (in terms of the number of reversals in the sign of significant correlations) but, overall, the correlations between the invalidated constructs did not fall. He suggested that the degree of weakening in the conceptual structure is probably a function of both the initial strength of the relationships and the presence of subsystems within the total structure. In the later experiment he divided the constructs into what appeared to be reasonable subsystems and then validated subjects on the whole of one subsystem and invalidated them on the whole of the other. In this way he was able to produce a decrease in intensity between the first and last trials in a series of twenty trials although the inter-correlations fluctuated considerably during the experiment. He suggested that the constructs of thought disordered schizophrenics might be the result of the progressive loosening of one group of constructs after another until the total network ceased to function.

Bannister and Salmon (1966) investigated the question of whether schizophrenic thought disorder is specific to certain areas within the system or is generalised throughout the system. Specifically, they looked at schizophrenics' sorting of objects as well as people by administering the standard grid with photographs of people and personality constructs and

also an object grid with photographs of objects and object constructs. They used 11 thought disordered schizophrenics and 12 normals and showed that although the schizophrenic group showed thought disorder in both 'object' and 'person' grids, the degree of thought disorder was greater in the latter. Bannister and Salmon concluded that content plays an important role in determining the degree of thought disorder manifested.

Buckley (1969) raised the objection that, as both elements and constructs had been varied, Bannister and Salmon could not validly conclude anything about the constructs alone. She therefore conducted an experiment with 8 thought-disordered, 12 non-thought-disordered schizophrenics and 12 normals in which the same elements were used in each of two grids, one with personality type constructs and one with physical constructs. She was able to show that the schizophrenics who were thought disordered on the psychological construct grid showed significantly greater improvement in their use of physical constructs than did the non-thought-disordered and normal groups. Thus, even when dealing with the same group of elements, disordered schizophrenics encounter particular difficulty in the use of personality constructs.

This conclusion echoes the work reviewed in Section 1A emphasising the particular difficulty schizophrenics have in dealing with 'affective' and 'human' stimuli. The work of Dixon (1968) is particularly relevant as her classification system can be viewed in terms of Kelly's Construct Theory.

It will be recalled that Dixon (1968) and McPherson et al (1969) demonstrated that schizophrenics described as exhibiting flattening of affect made significantly less use of personality and emotional constructs when describing differences between the people in pairs of photographs compared with non-flattened schizophrenics and normals; the flattened schizophrenics did not differ in their use of other categories of construct.

Buckley (1969) demonstrated that patients classified as 'flattened' by the Dixon test had more thought disordered scores on the Bannister-Fransella test than did non-flattened patients. On the physical version of the Bannister-Fransella test, however, the two groups did not differ.

McPherson and Buckley (1969) discussed these findings in terms of either an avoidance of the use of personality constructs (because of poor performance when using them) or a lack of a psychological construct system, leading to the abnormal performances of some schizophrenics on these two tasks.

Part II. Flattening of Affect and Thought Disorder and their Relationship to Patient Variables and the Subcategories of Schizophrenia.

A. Flattening of Affect

1) Dixon's Test as an Operational Definition of Affective Flattening

Among schizophrenics Dixon (1968) demonstrated a very highly significant correlation between flattening of affect, as rated clinically, and the use made of 'emotional' constructs when describing photographs of people. McPherson et al (1970) confirmed this finding, showing that the relative use made of these constructs correlated as highly with the ratings of each of two experienced clinicians as did the clinicians with one another. Relatively infrequent use made of 'emotional' constructs in the task described by Dixon and McPherson et al can therefore be used as an operational definition of affective flattening in schizophrenic patients.

2) Vocabulary, General Intelligence and the Use of Personal Constructs

Even if the Dixon test does correlate positively with clinically rated flattening of affect, this could be an artefact due to a) the Dixon test correlating positively with vocabulary and/or general intelligence and b) clinical flattening also being positively related to vocabulary and/or general intelligence.

a) Vocabulary. It could be argued that emotional constructs are more difficult than physical/non-emotional constructs in

that they are more abstract. Whether the Dixon test correlates with vocabulary is unclear. Dixon (1968) found a positive relationship between the proportion of emotional constructs used and score on the Mill Hill Vocabulary Scale. She therefore suggested that a vocabulary test should be used in conjunction with the Flattening of Affect Test and that patients scoring below a certain minimum should be considered unable to participate. Buckley (1969), on the other hand, found a non-significant correlation between Mill Hill Synonyms score and proportion of emotional constructs used on the Flattening of Affect Test. One of her selection conditions was that patients scored more than 6 on the Mill Hill Synonyms scale and so, although this leaves the question of the relationship of vocabulary level to score on the Dixon Test unanswered for the very low levels of vocabulary, for the greater part of the range, her results indicate no relationship.

The clinical evidence on the relationship between flattening of affect and vocabulary level is also not clear. There is some evidence of a vocabulary deficit in schizophrenics but Harris and Metcalfe (1956) found no differences on the Wechsler Vocabulary scale between grossly, moderately and not flattened schizophrenics.

b) General Intelligence. The Nufferno Level Test is a test of general intelligence which rewards persistent effort. There is no evidence about whether this, or any other general intelligence test, is correlated with performance on the

### Dixon Test.

There is very little evidence concerning the relationship between clinically assessed flattening of affect and general intelligence. Harris and Metcalfe (1956) found that a shortened form of the Wechsler-Bellevue test, comprising Vocabulary, Similarities and Block Design, differentiated significantly between grossly, moderately and flat schizophrenics. However, they claimed that further analysis of the data revealed that the difference was due mainly to a poor performance on the Block Design subtest and that speed of performance rather than accuracy on this test was the important parameter. Thus, general intelligence level appears not to be related to flattening of affect.

There is, however, evidence of deficit in schizophrenia as a whole although the picture is confused by contradictory findings. There is little direct evidence on the differences between process and reactive schizophrenics (the sub-groups which Herron and Kantor (1968) see as relevant to loss of affect). Heath, Albee and Lane (1964) found that process schizophrenics were significantly below their sibs in intellectual level even during childhood.

The paranoid/non-paranoid dichotomy may have relevance for flattening of affect. Foulds and Dixon (1962) showed that on the Mill Hill Vocabulary Scale (the one used by Dixon, 1968), a small difference existed between schizophrenic and neurotic patients but that this was significant only for females.

Foulds and Dixon found that hebephrenics obtained lower scores than did paranoids or catatonics. Smith (1964) found that paranoids achieved higher I.Q.'s, both initially and at follow-up, than did hebephrenics. Mason (1956) found that paranoids and catatonics had higher pre-illness AGCT scores than other schizophrenics. Although most of the results then show that paranoid schizophrenics do not show the degree of intellectual deterioration shown by non-paranoids, some work, for example, Lubin et al (1962), has suggested that paranoids show greater deficit.

With respect to the acute/chronic dichotomy which may also have relevance for flattening of affect, Kinsley and Streuning (1966) found that chronics were lower on the GATB than acutes, who were lower than controls. Schwartzmann and Douglas (1962) found that chronics were worse than acutes, who were worse than ex-patients, who were worse than normals on the Canadian Revised M tests. Schwartzman et al (1962) found that patients who were still in hospital after 17 years were still deteriorating. Albee et al (1963), however, found that there was no difference between the level during the chronic phase of the illness and the level during childhood.

There has been some work with Nufferno level in schizophrenics. Nelson (1953) found no difference between acute schizophrenics and normals although chronic schizophrenics differed significantly from normal. Ogilvie (1954) found that schizophrenics were lower on the Nufferno level than normals.

Payne and Hewlett (1960), however, reported that while schizophrenics differed from normals on mental speed, they were not differentiated in terms of the Nufferno level test. Eysenck et al (1957) obtained similar results.

### 3) Flattening of Affect and Patient Variables

If the Dixon test is shown not to be unduly influenced by vocabulary level or general intelligence, in view of the validity findings of Dixon (1968), McPherson et al (1970a), it can be as an operational measure of flattening of affect to investigate the effect of various patient variables.

i) Sex. There is no evidence on the prevalence of flattening of affect between the sexes. Previous workers, for example, Harris and Metcalfe (1956), Rice et al (1969), have combined the sexes for analysis. In view of such findings as Foulds and Dixon (1962) with regard to differences between the sexes in terms of intellectual deficit, it would seem necessary to investigate differences between the sexes with regard to symptoms.

ii) Age. Harris and Metcalfe (1956) examined a wide range of patient variables in relation to affective flattening or incongruity and one of the three significant differences which they found was that the flattened group had a higher proportion of teenagers than the non-flattened group. The relationship with age did not appear to extend beyond this.

The suggestion of Herron and Kantor (1968) that process schizophrenics are more likely than reactive schizophrenics to

be flattened would also suggest that flattening of affect would be more frequent in the lower age range.

iii) Subcategories of Schizophrenia. Two important sub-classifications of schizophrenia emphasised by many authors are the paranoid-non-paranoid and acute-chronic dichotomies (Shakow, 1963; Foulds et al, 1967b).

a) Paranoid-non-paranoid. Many authors (for example, Foulds et al, 1967b and Payne and Hewlett, 1960) have made the distinction between paranoid and non-paranoid schizophrenics, that is, those exhibiting delusions and hallucinations and those not (Fish, 1962). Shakow (1963) reported that in 58 measurements which were made on groups of normal, paranoid and hebephrenic subjects, the paranoid were nearer the normal in 31 instances and the hebephrenic nearer the normal in only 7 cases. In a further 20 instances the paranoid and hebephrenic groups fell on either side of the normals. Shakow concluded that this was strong evidence that the two groups deal with situations in contrasting ways and "should lead to caution against any tendency to disregard the subtype classifications as they have evolved over time".

Foulds and Owen (1963) discussed the question of whether or not paranoids are schizophrenic. Paranoid schizophrenia is more typical of older age groups, i.e., those over 25 years, and gross deterioration of the personality is not common. The non-paranoid group contains the other three Kraepelinian categories, the hebephrenic, catatonic and simple schizophrenics.

Greater disorganisation of the personality, with thought disorder and flattening of affect, is said to occur more frequently in this group (Mayer-Gross et al, 1960).

Harris and Metcalfe (1956) predicted that inappropriate affect would be more prevalent in the hebephrenic rather than the paranoid group.

Slater (1947) suggested that although a dementing course was rare in paranoid schizophrenia, the illness was highly likely to become chronic. If there is a relationship between flattening and chronicity many paranoids would therefore be expected to be flattened.

Buckley (1969) found that paranoids assessed clinically were less likely to be affectively flattened, as assessed by the Dixon test. However, when the SSI diagnosis was used, then the paranoids and non-paranoids were not differentiated in terms of flattening. Buckley suggested that the latter finding may have been due to paranoid patients denying symptoms during the SSI as this would be the first meeting with the interviewer.

b) Acute-Chronic. The chronic category, which is normally limited in terms of length of illness rather than symptomatology, should be clearly distinguished from the 'burnt-out' category where, as discussed above, there are no longer any active signs or symptoms of the illness (Foulds et al, 1967a).

Bleuler (1950) stated that flattening of affect may equally well appear early or late in the illness and Harris and Norris (1953) experimentally supported this.

Sommer and Witney (1961), however, described the path to chronicity, involving progressive affective loss demonstrable in apathy, withdrawal and the erosion of affective expression and response. Buss (1966) described chronic schizophrenics as showing little affect, confusion or anxiety.

There appear to be two issues involved: firstly, whether degree of flattening of affect increases with chronicity and, secondly, whether a higher proportion of chronics are flattened. The former does not necessarily imply the latter.

Many authors equate 'flatness of affect' with 'chronicity'. The work of Malmo et al (1951) and Salzinger and Portnoy (1963) are examples of this.

Buckley (1969) found no relationship between flattening of affect as measured by the Dixon test and chronicity.

iv) Degree of Illness. Harris and Metcalfe (1956) found that schizophrenics exhibiting inappropriate affect also had a higher incidence of other serious symptoms.

Foulds (1965) has suggested that there is reason for regarding the major classes of personal illness as lying along a continuum. He argued that:

" .... the loss of ability to maintain or to establish mutual personal relationships increases from neurosis, to integrated psychosis (in the main, melancholics, paranoiacs and probably most manics), to non-integrated psychosis (in the main, the schizophrenics)".

He derived the system logically and then presented empirical data to validate the proposed classification. The sufficient condition for a diagnosis of non-integrated psychosis was seen to be either i) loss of awareness of self or ii) thought process disorder or iii) affective disorder, including flattening. Thus, within Foulds' framework, those patients showing flattening of affect are those at the extreme of the continuum of failure in personal relationships and in this sense are those with the most severe degree of illness.

#### B. Thought Process Disorder

##### 1) Bannister-Fransella's Grid Test as an Operational Definition of Thought Disorder

Bannister and Fransella (1966) demonstrated that schizophrenics whom three psychiatrists agreed were manifesting a thought disorder would score below 1000 on Intensity and .49 on Consistency and that similarly assessed non-thought-disordered schizophrenics would score above this level. This was confirmed by Foulds et al (1967a) for acute schizophrenics, though less satisfactorily for chronics.

It can therefore be assumed that patients scoring below such a cut-off point on the Bannister-Fransella test would be clinically diagnosed as thought disordered.

##### 2) Vocabulary, General Intelligence and the Use of Personal Constructs

As with the Dixon test, even if the Bannister-Fransella test correlates positively with clinically rated thought disorder,

it could be an artefact due to a) the Bannister-Fransella test correlating positively with vocabulary and/or general intelligence and b) clinical thought disorder being positively related to vocabulary and/or general intelligence.

a) Vocabulary. Although there is evidence that the vocabulary scores of schizophrenics are below that of non-schizophrenics (Foulds and Dixon, 1962, for females only; Lubin et al, 1962; Payne, Matussek and George, 1959), there is no evidence that thought-disordered schizophrenics have lower vocabulary scores than non-thought-disordered schizophrenics.

In relation to the Bannister-Fransella test, it could be argued that labels such as 'kind', 'sincere', are more meaningful to individuals with greater verbal facility, so that such people would perform better on a ranking task involving such labels. Bannister (1960, 1962) found no relation between performance on such a task and verbal intelligence. Bannister and Fransella (1966) found no relationship between scores on their test and verbal intelligence in patients with an I.Q. over 80. McPherson (1969) found no difference in verbal intelligence between groups classed as thought-disordered and non-thought-disordered by the Bannister-Fransella test.

b) General Intelligence. There is evidence that schizophrenics are impaired on non-verbal reasoning tasks (Goldstein and Salzman, 1967), including the Nufferno Level Test (Shapiro and Nelson, 1955). There are inconsistent findings, however; Payne, Matussek and George (1959) found that

their group of schizophrenics were slightly above their neurotics on Nufferno Level scores. There is no direct evidence on the role of present intellectual level and thought disorder.

Lack of motivation or volition have frequently been cited as among the more permanent signs of schizophrenia (e.g., Bleuler, 1911), especially in non-paranoid varieties (e.g., Fish, 1962). The Nufferno level test can be considered as an intelligence test which rewards continuance - that is, the tendency to continue working at a problem of which the answer is not readily apparent. A personality factor underlying continuance is presumably persistence (Furneau, 1960). Similarly, performance on the Bannister Fransella test requires from the patient a considerable degree of co-operation and persistence in carrying out what is a rather dull, difficult and meaningless task. It is possible that "thought disordered" scores in this test are, partly at least, due to the patient being impatient at the task and sorting the photographs randomly.

Thus, it could be predicted that there would be a positive correlation between performances on the Level test and the Bannister-Fransella test because of the importance of persistent application and co-operation in both situations.

### 3) Thought Disorder and Patient Variables

If the Bannister-Fransella test is shown not to be influenced to any extent by vocabulary level or the lack of motivation described above, in view of the validity findings of

Bannister and Fransella (1966) and Foulds et al (1967a), it can be used as an operational measure of thought disorder to investigate the effect of various patient variables.

i) Sex. There is nothing in the literature to indicate that there may be differences in the cognitive disorders between males and females. Lidz et al (1960) suggested that the effects of being brought up in a schizophrenic family would be different for males and females.

Bannister (1960, 1962) and Bannister and Fransella (1966) reported that there were no sex differences in their groups of schizophrenics with respect to thought disorder as assessed by the Bannister-Fransella grid test.

Foulds et al (1967a) found essentially no differences between the sexes in thought disorder as assessed by the grid test.

ii) Age. It has been suggested that thought disorder is a feature of non-paranoid rather than paranoid schizophrenia and also that non-paranoid illnesses are more common in younger patients. This might suggest a slight relationship between age and thought disorder. There is, however, no emphasis on this in the clinical literature. Bannister (1960, 1962) found no relationship between age and thought disorder as assessed by a grid test and Bannister and Fransella (1966) found age only to be a significant factor in organically brain damaged patients.

iii) Subcategories of schizophrenia. Several authors have suggested that there are differences between subgroups in schizophrenia with respect to cognitive functioning. The paranoid non-paranoid and acute-chronic dimensions have been frequently discussed (e.g., Silverman, 1964; Shakow, 1964; and Venables, 1964).

a) Paranoid-non-paranoid. It is frequently implied that thought disorder is a feature of non-paranoid schizophrenia. For example, both McGhie and Chapman (1961) and Yates (1966) applied their theories of malfunction to non-paranoids. Much of the distractibility and attention defect work has demonstrated that non-paranoids are particularly prone to such disorders (McGhie, Chapman and Lawson, 1965) and that paranoids and non-paranoids show different defects (Silverman, 1964; Ravsh, 1952 and Shakow, 1963).

Payne and Hewlett (1960) and Payne, Caird and Laverty (1964) provided evidence that overinclusion was more a feature of paranoid schizophrenia but, as discussed above, overinclusion is probably not relevant for thought process disorder.

Mayer-Gross et al (1960) suggested that placement in the hebephrenic group should be confined to cases demonstrating thought disorder; but they also attest that only in a few cases of paranoid schizophrenia is thought disorder entirely absent.

Foulds et al (1967) expressed the view that thought disorder,

... "seems to be more typical of non-paranoid than of paranoid schizophrenia although it is a feature of some at least of the latter group".

They found that non-paranoids were more abnormal on Bannister-Fransella's Intensity measure but, owing to a chronicity and diagnosis interaction, the picture was confused for Consistency.

Clearer evidence was supplied by McPherson (1969). He argued that non-integrated psychotics, who are frequently thought disordered (Foulds, 1965), would be unlikely to have many persecutory delusions, as these require the patient to have a reasonably well-defined and stable set of concepts relating to himself and his environment, but would rather have delusions of 'non-integration'. Although the groups of thought-disordered and non-thought-disordered schizophrenics did not differ in the proportion of paranoid and non-paranoid patients, he showed that the thought-disordered paranoids did differ in the type of delusion which they held, both confirming that some paranoids are thought-disordered and also elucidating how they differ from non-paranoid thought-disordered patients.

b) Acute-chronic. Silverman (1964) stressed the different strategies adopted by acute and chronic patients and Shakow (1963) works mainly with chronic patients because he alleges they have greater symptom stability. However, psychiatric writers do not stress any great difference in the amount of thought disorder shown by acute and (active) chronic schizophrenics. Mayer-Gross et al (1960) suggest that simple

schizophrenics may be diagnosed initially on the basis of affective signs or social incompetence and only later develop thought disorder. But generally it appears to be a feature of both the acute and the chronic stages of the illness.

Foulds et al (1967) found no differences between acutes and chronics on Bannister and Fransella's measures of thought disorder.

McPherson (1969) found no differences in the proportion of acutes and chronics in his group of thought-disordered and non-thought-disordered schizophrenics, as measured by the Bannister-Fransella test.

iv) Degree of illness. According to Fould's classification of personal illness, patients exhibiting thought disorder would fall within the non-integrated psychotic group which is the most severely disturbed group on his continuum.

Part III.            Speed of Function in Schizophrenia

A. Speed in Schizophrenia as a Non-Unitary Phenomenon

Babcock (1933) was the first psychologist to emphasise the role of retardation in the deficits typical of schizophrenia. At times she spoke of slowness as one of three symptoms of inefficiency in schizophrenia and, indeed, mental disorder as a whole; the other two symptoms were a learning deficit and impairment of intellect. At other times, she ascribed a causative role to retardation, suggesting that it affected perception and learning, with the antisociability and withdrawal from reality typical of schizophrenia resulting from this:

"There is evidence that mental processes are generally retarded. This is probably the cause of the defective learning and constitutes the defect which is elementary to the condition in general".

Clinicians before Babcock had, of course, noted that schizophrenics were not infrequently slowed up. For example, Bleuler (1911) described retardation of the thought processes as a symptom of schizophrenia.

Certainly, there is ample evidence that schizophrenics differ from normal in speed, with tasks at all levels of complexity. On simple motor tasks Boring (1913) and Gatewood (1909) found that speed of tapping was markedly reduced in schizophrenics compared with normals. Shakow and Huston (1936) confirmed this finding but showed that the difference was

reduced markedly if only co-operative patients were considered. Huston, Shakow and Riggs (1937) demonstrated that schizophrenics were slower on simple visual, simple auditory and discrimination reaction times. Court and Garwoli (1969) found that while the increases in reaction time of schizophrenics as they dealt with increasing amounts of information obey Hick's law (Hick, 1952), the slope of the graph was flatter for schizophrenics, that is, they took increasingly longer to process increasing amounts of information, compared with normals.

Payne, Hochberg and Hawks (1969) found that the rate of presentation of a message to be shadowed had to be markedly reduced from the normal rate if schizophrenics were to be able to shadow it at all. Hausmann (1933) found that psychotics were slow on the Substitution test in the Army  $\alpha$  Classification Test. Senf, Huston and Shakow (1955) found that there were no differences between psychotics and neurotics when the Army  $\alpha$  Substitution Test was untimed but that there were significant differences when a time limit was imposed. Chapman and McGhie (1963) noted that reducing the rate of input of information to schizophrenics minimised the manifest thought disorder.

Slowness appears to be a feature of all the psychoses, both functional and organic. Profound motor retardation is often said to be pathognomic for depressive illnesses and tests of psychomotor speed are included in diagnostic tests of

diffuse brain damage (e.g., Kendrick, 1965). Senf, Huston and Shakow (1955), in the study noted above, found that while the timed substitution test differentiated between psychotics and neurotics, it did not differentiate within the psychotics and this is a common finding. Kessel (1955) and Campbell (1957) showed that, while schizophrenics and depressives were slower than normals on tracing the Porteus mazes, they did not differ between themselves.

Nelson (1953) carried out an extensive investigation of speed in psychiatric patients. She used 80 female patients, equally ~~represented~~<sup>contributed</sup> by neurotics, manic depressives, schizophrenics and organics, as well as 20 female normals. Included in a large battery of tests were the Babcock Mental Efficiency test, including subtests of motor speed, learning, immediate repetition, retention; a vocabulary test; and the Nufferno Speed and Power tests; there were also tests of persistence, verbal fluency and a new-learning test. She found, using a variety of statistical techniques, that the tests which best differentiated normals and abnormal were simple speed tests (specifically Digit Symbol, Writing U.S.A. and Writing Sentence) and that problem solving speed, measured by the Nufferno Speed Tests, differentiated less well. Acute schizophrenics were differentiated from normals on the simple speed tests as well as being differentiated from other psychotic and brain damaged patients; they also differed significantly from chronic schizophrenics who behaved more

like the organic patients, with poor performances.

Rimoldi (1951) factor analysed a number of tests of 'personal tempo' for normal subjects and suggested that speed of cognition, motor speed and perceptual speed are relatively independent. Nelson (1953) factor analysed her data for each diagnostic group separately which rendered the numbers rather small. In all the groups except the normals, she found evidence of a general factor of retardation but she felt that in the case of the schizophrenics this was probably an artefact which could have been remedied by looking at oblique factors (she used Thurstone's centroid method). This suggested one way in which speed of functioning in schizophrenics differed from that of other psychiatric patients. Shapiro and Nelson (1955) summarised the evidence as follows:

"On the whole, the data are consistent with the possibility of a generalised speed factor amongst psychiatric patients, with a possibility of limitations to the influence of the factor amongst schizophrenics".

There have been contradictory findings since Nelson's thesis. Ogilvie (1954) found that schizophrenics and normals were differentiated on the Nufferno speed tests with the schizophrenics slower, whereas Nelson (1953) found that acute schizophrenics were faster than normals on the unstressed Nufferno Speed Test. A similar pattern of scores to Ogilvie's in Nelson's group would presumably have increased the correlations between the motor and mental speed tests. She

pointed out that Ogilvie's schizophrenics were of above average intelligence, young and early schizophrenics and thus not a representative sample of schizophrenics in general.

Payne and Hewlett (1960) factor analysed a large battery of tests which included Babcock's battery of mental and motor speed tests, the Nufferno speed tests and tests of perceptual speed as well as tests of overinclusion and concreteness. The tests were analysed for the combined group of subjects and a 'retardation' factor emerged on which nearly all the speed tests had high loadings. This factor differentiated between normals and neurotics and psychotics but it did not differentiate between the psychotic groups, that is, between the schizophrenics and depressives. There was no tendency for the motor and mental speed tests to be uncorrelated, as in Nelson's study. Payne and Hewlett found that motor, mental and perceptual speed tests had roughly equal loadings on the retardation factor. However, Nelson found a general retardation factor within the non-schizophrenic psychotics and, only in the schizophrenic group did she consider that the evidence pointed more strongly to independent factors. Payne and Hewlett's analysis of the combined groups may have submerged the schizophrenic peculiarity in this respect.

Foulds et al (1969) supported Nelson's findings in a study of 48 schizophrenics with a test battery including the Babcock-Levy battery, and the Digit Symbol Test. They suggested that two different aspects of speed appeared to be

covered by the tests although they added that they may, in fact, represent different aspects of a general retardation factor.

It appears, therefore, that the evidence regarding a general speed factor in schizophrenia is equivocal.

B. Speed of Function, Personal Variables and Subcategories of Schizophrenia

It has been shown, as discussed above, by a variety of techniques, that schizophrenics as a group are retarded but that they are not differentiated in this respect from other psychiatric groups. It appears that within the schizophrenic group speed may be better considered in terms of two or more relatively independent factors rather than in terms of a general factor typical of other psychiatric groups.

A further obvious step in the description of speed of function in schizophrenics is to investigate its relationship with personal variables of schizophrenics and the subcategories of schizophrenia. Foulds et al (1968) point out that even if measures are developed to discriminate successfully between schizophrenic and non-schizophrenic groups, performance on these measures should be related to the presence of specific psychotic symptoms.

1) Sex. The studies of retardation mentioned above do not deal with sex differences; whether such differences were not present or not considered is unclear. Sex differences should be considered; for example, in their study of intellectual

deficit in schizophrenia, Foulds and Dixon (1962) demonstrated that the pattern of scores between diagnostic groups and sub-groups of schizophrenia was vastly different for the sexes.

2) Age. This factor is usually controlled by matching groups (e.g., Nelson, 1953; Payne, Matussek and George, 1959). The relationship between age and speed should be investigated more directly in view of the relationship between age and slowing down in normal persons (Bromley, 1967), as well as the confounding effect age could have in the relationship between retardation and chronicity or retardation and the paranoid-non-paranoid classification (if paranoid patients are indeed older than non-paranoids as clinical accounts, e.g. Fish, 1962, suggest).

3) Intellectual level. Furneaux (1960) gave a detailed analysis of problem solving behaviour and proposed that there are three main parameters - mental speed, persistence and an error checking capacity. Eysenck (1967) suggested that mental speed and power are fundamental aspects of all mental activity and that, although it may be modified to some extent by processes and materials involved, the major source of variation is speed.

There is a mass of evidence regarding intellectual deficit in schizophrenia, much of it hampered by poor design and sampling. Many studies have used pre- and post-illness levels of general intelligence to investigate whether there is a deficit (Mason, 1956; Lubin et al, 1962), illness and post-illness

levels to investigate whether it is reversible, progressive and so on (Schwartzmann et al, 1962, Hamlin, 1968). Only a few studies (for example, Schwartzmann and Douglas, 1962) managed to test the subjects with the same test on more than one occasion which has resulted in frequent difficulties with the comparability of scores.

Other workers administered tests involving different types of cognitive content (i.e. verbal, numerical, spatial, etc.) and analysed the results in terms of this. Payne (1960) reviewed these studies and concluded that, while the studies were inconclusive since content was only one of the variables which could have produced the differences between the tests, there was no evidence that any psychiatric groups, including schizophrenics, found any sort of test content particularly difficult.

Some authors used different tests on a cross-sectional basis, working on the assumption that some test scores could be seen as more stable than others, thus giving an indication of initial level. For example, Foulds and Dixon (1962) used the Mill Hill vocabulary scale and Progressive Matrices in this manner, which tests have the advantage of having correlational data available.

These studies have the advantage of describing where the defect lies and of describing its nature. They cannot offer any information about its cause or modification, however, as this would require an analysis of the processes involved. The

investigation of Nelson (1953) is a useful beginning for such an approach. She looked at the speed and cognitive level of psychiatric groups using the Nufferno Speed and Level tests, Terman-Merill Vocabulary Scale and a fluency test. There were no significant differences between acute schizophrenics and normals on any of the level tests although chronic schizophrenics were below normals on the Nufferno level and vocabulary tests and below acute schizophrenics on vocabulary. As noted above, the groups all differed significantly on simple psychomotor speed tests and, if the results of these tests were held constant, then the differences between the groups on the Nufferno Level and the Vocabulary disappeared. When, however, the groups were matched on vocabulary or level, then the differences between the groups on psychomotor speed were still significant. Shapiro and Nelson (1955) summarised this by saying that the data were consistent with the idea that slowness alone is sufficient to account for apparent impairment on Level and Vocabulary. Ogilvie (1954) examined the discrepancy between the Nufferno Speed and Level scores using their percentile scores and found that almost all of his patients had speed percentile scores below their level percentile scores.

Payne, Matussek and George (1959) found that although schizophrenics were not significantly slower than neurotics on psychomotor or mental speed tests, the schizophrenics had speed scores below their level scores (when these were converted into standard scores), while the neurotics had speed

scores slightly above their level scores.

Payne, Matussek and George (1960) also investigated the stress gain scores of the schizophrenics: this is a score which represents the increase in speed when the subject is put under stress to respond quickly, compared with his speed on a test of equal difficulty on which he works at his own speed. They argued that schizophrenics might compensate for their intellectual slowness by working at their maximum rate, with a small stress gain resulting. They confirmed that the stress gain of schizophrenics was smaller than that of neurotics.

4) Subcategories of schizophrenia. As with flattening of affect and thought disorder, the paranoid-non-paranoid and acute-chronic categories have been considered with respect to speed of function.

a) Paranoid-non-paranoid. Wittenborn and Holzberg (1951) found that speed on the Digit Symbol correlated negatively with a Paranoid Schizophrenic scale and with a Paranoid condition scale. Payne (1960) suggested that, as paranoid delusions were the feature common to both of these scales, it might be that psychotics with delusions tend to be slow while other psychotics do not. In complete contradiction, Payne and Hewlett (1960) stated that:

"It is tempting to speculate that it is the extremely overinclusive schizophrenics who have ideas of reference and paranoid delusions who are nearly normal with respect to speed of functioning".

Payne, Caird and Laverty (1964) supported Payne and Hewlett (1960) when they found a negative, though non-significant, correlation between retardation on the Babcock tests and the presence of delusions. In view of this finding, Yates (1966) related his theory of a reduced rate of data processing to the non-paranoid category.

Foulds et al (1968) found a small non-significant negative correlation between retardation on the Babcock-Levy tests and the number of delusions on the SSI delusional scale. The relationship held for both acute and chronic patients.

Foulds et al (1969) tested 48 patients on two of the speed tests from the Babcock-Levy battery and Digit Symbol. They found no significant differences between paranoid and non-paranoid schizophrenics.

b) Acute-chronic. In Nelson's (1953) study, chronic schizophrenics scored below acutes on all tests and significantly so on six, including speed of Writing U.S.A., speed of Writing Sentence. The differences in scores on the Nufferno Speed tests were not significant.

Foulds et al (1969) found no differences between acutes and chronics on their simple speed measures (speed of Writing Sentence, speed of Writing U.S.A. and Digit Symbol). Similarly, Senf, Huston and Shakow (1955) found no differences between early and late schizophrenics on a timed version of the Army  $\alpha$  Substitution tests although both of these groups were differentiated from normals and neurotics.

Hawks and Marshall (1970) proposed a theory of schizophrenic function which encompassed both overinclusion and retardation. This suggested that the schizophrenic learns to cope with the overinclusion typical of the early stage of his illness by slowing down the rate at which he responds. It follows from this that chronic schizophrenics should be more retarded than acute schizophrenics.

5) Degree of illness. Nelson (1953) found that degree of illness, as rated by the patient's own psychiatrist, had its highest (negative) correlations with speed of Writing U.S.A., Writing Sentence and Digit Symbol; high negative correlations were also found with speed of problem solving on the Nufferno Speed tests.

Harris and Metcalfe (1956) found a strong relationship between flattening of affect and speed of problem-solving on the Nufferno Speed tests. The flattened patients also had a higher incidence of other serious symptoms and less satisfactory outcome and Harris and Metcalfe (1956) commented that the degree of illness of the affectively flattened patients may have caused the apparent relationship between flattening and retardation.

C. Relationship Between Speed of Function, Flattening of Affect and Thought Disorder

Babcock (1933) suggested that retardation could account for most psychotic symptoms and she explained the phenomenon of flattening of affect in this way. She suggested that slowness

caused an inability to give the normal emotional response since the " .... stimuli which normally cause the emotional response may not be perceived promptly and intensely enough to serve as an impetus to action".

Harris and Metcalfe (1956) chose various speed measures as well as an abstract reasoning test, a vocabulary test and others in their study of inappropriate affect. They found that the tests which best differentiated between the grossly flat, moderately flat and normal affect groups were the Nufferno Speed tests and the Digit Symbol subtest from the Wechsler-Bellevue test (which was the only timed subtest used from the Wechsler-Bellevue).

Payne (1960) stated that in a study he had carried out, patients with worse than average prognosis were the most retarded. In view of the strong relationship between flattening of affect and poor prognosis (e.g., Harris and Norris, 1954), Payne's retarded patients could have been the most flattened group.

Buckley (1969) confirmed Harris and Metcalfe's (1956) finding, with patients classified as affectively flattened or non-flattened in terms of %E score on the Dixon test. She found a significant correlation between degree of flattening of affect and slow scores on the Babcock-Levy battery and positive, though non-significant, correlations between flattening and slow scores on the Digit Symbol and GATB Motor Speed Test.

Babcock (1933) argued that retardation was causative in thought disorder but this was heavily criticised by Payne and Hewlett (1960). Payne, Caird and Laverty (1964) provided evidence that there is a negative relationship between over-inclusion and retardation. It has been clearly demonstrated, however, that overinclusion is not related to thought process disorder (Foulds et al, 1967a).

Foulds et al (1969) found no relationship between thought disorder, as rated by a psychiatrist, and retardation on the Babcock-Levy battery and Digit Symbol. They also found a low and non-significant correlation between these retardation measures and scores on the Bannister-Fransella test.

This latter finding was confirmed by Presly (1969) when he found no correlation between scores on two GATB Motor Speed tests and scores on the Bannister-Fransella test. He did find, however, that time spent on the grid test correlated with the Intensity measure.

As discussed above (p. 37), Yates (1966) has suggested that thought disorder is secondary to a primary slowness in information processing which leads to a continuous loss of information from the short-term memory store, and so on to the manifest signs of thought process disorder.

## AIMS OF EXPERIMENT

### Part I. Flattening of Affect, Thought Process Disorder and Personal Constructs

The aim of this part study is to replicate Buckley's (1969) findings (detailed above) that those patients who obtained low scores on the Dixon test were also more likely to obtain low scores on the Bannister-Fransella measures, which she suggested could both be seen in terms of an inability to deal efficiently with personal constructs relating to emotional and personality variables.

### Part II. Flattening of Affect and Thought Disorder and their Relationship with Personal Variables and the Sub-groups of Schizophrenia.

#### A. Flattening of Affect

As discussed above (p. 22), performance on the Dixon test has been well validated against clinical ratings of flattening of affect (Dixon 1968, McPherson et al, 1970a,b), so that relatively infrequent use made of 'emotional' constructs in this task can be used as an operational definition of affective flattening in schizophrenic patients.

It is necessary to investigate the relationship between performance on the test and factors which could lead to artefactual results.

1) Vocabulary level. Dixon (1968) found a positive correlation between performance on the test and the Mill Hill vocabulary scale. Buckley (1969) found a non-significant

positive correlation between these two measures.

Further evidence regarding the relationship between scores on the Mill Hill Vocabulary Scale and the Dixon test will be sought.

2) General Intelligence. There is no evidence regarding the role of general intelligence in the frequency of use of personal constructs in the Dixon test.

Information about the relationship between performance on the Nufferno Level test and the Dixon test will be sought.

A further aim of this part of the experiment is to investigate the relationship of flattening of affect to patient variables and subcategories of schizophrenia. If the Dixon test is shown not to be unduly influenced by vocabulary level or general intelligence, it can be validly used as an operational measure of flattening of affect.

1) Sex. There is no evidence about the relationship of flattening of affect to sex differences and previous authors have combined the sexes. This relationship will therefore be examined.

2) Age. Harris and Metcalfe (1956) found that there were more young patients in their affectively flattened group. The relationship between flattening of affect and age will therefore be examined in the present group.

3) Subcategories of schizophrenia

i) Paranoid-non-paranoid. Many clinical writers (e.g., Mayer-Gross et al, 1960; Fish, 1962) have suggested that flattening of affect is more typical of non-paranoid than of paranoid schizophrenics.

Buckley (1969) confirmed this when flattening was measured using the Dixon test and the subcategory of schizophrenia diagnosed clinically. She was unable to demonstrate the relationship using the SSI diagnosis.

The relationship between flattening of affect as assessed by the Dixon test and the paranoid-non-paranoid classification diagnosed by the SSI will be further investigated.

ii) Acute-chronic. As discussed above (p. 8 ), the clinical evidence regarding flattening of affect and chronicity is equivocal.

Buckley (1969) found no relationship between scores on the Dixon test and chronicity. The relationship between flattening of affect as assessed by the Dixon test and chronicity will be further investigated.

4) Degree of illness. Harris and Metcalfe (1956) found that affectively flattened schizophrenics had a higher proportion of other serious symptoms.

The relationship between degree of illness as measured by the Personal Disturbance Scale of the SSI and flattening of affect as assessed by the Dixon test, will be investigated.

## B. Thought Disorder

As discussed above (p. 46), performance on the Bannister-Fransella grid test has been validated against clinical ratings of thought process disorder (Bannister and Fransella, 1966; Foulds et al, 1967a) and so low scores on the Intensity and Consistency measures can be used as an operational definition of thought process disorder in schizophrenic patients.

As with flattening of affect, it is necessary to investigate the relationship between performance on the test and extraneous factors which could produce artefactual findings relating scores on the test and clinical ratings of thought process disorder.

1) Vocabulary level. Bannister and Fransella (1966) found no relationship between scores on their test and verbal intelligence. This finding will be <sup>examined</sup> ~~replicated~~ in the present study.

2) Nufferno level. The relationship between present intellectual level as measured by the Nufferno Level test, and performance on the Bannister-Fransella Grid Test will be examined.

A further aim of this part of the experiment is to investigate the relationship of flattening of affect to patient variables and subcategories of schizophrenia. If it is found that performance on the Bannister-Fransella test is not strongly affected by Vocabulary level or general intelligence, then it can be validly used as an operational definition of thought

process disorder.

1) Sex. Bannister and Fransella (1966) and Foulds et al (1967a) reported that there were no sex differences in performance on the Bannister-Fransella Grid test. This will be replicated in the present study.

2) Age. Bannister and Fransella (1966) found no relationship between performance on their test and age in non-organic patients.

None of the patients in the present study had an organic component to their illness and so the relationship between thought process disorder, as assessed by the Bannister-Fransella test and age, will be investigated in the present sample.

3) Subcategories of schizophrenia

i) Paranoid-non-paranoid. Clinical evidence strongly favours thought disorder as a feature of non-paranoid schizophrenia (Mayer-Gross et al, 1960), although it may appear in paranoid schizophrenia.

Foulds et al (1970b) found that non-paranoid schizophrenics were more abnormal on the Bannister-Fransella Intensity score than were paranoids.

The relationship between thought process disorder, as assessed by the Bannister-Fransella test, and the paranoid-non-paranoid classification, will be further examined.

ii) Acute-chronic. Clinical evidence suggests that thought process disorder is typical of both the early and the late illness. Foulds et al (1967b) and McPherson (1969) found no

relationship between scores on the Bannister-Fransella Grid test and chronicity. This relationship will be further examined in the present study.

4) Degree of illness. The relationship between degree of illness, as measured by the Personal Disturbance Scale of the SSI, and thought process disorder, as measured by the Bannister-Fransella Grid test, will be investigated.

### Summary

The aims of this part of the experiment are to examine the effect of vocabulary level and general intelligence on the performance on the Dixon test and the Bannister-Fransella Grid test and to investigate the relationship of sex, age, subcategories of schizophrenia and degree of illness to flattening of affect and thought process disorder, using low E% scores and low I and C scores on the above tests as operational definitions of the symptoms.

### Part III. Speed of Function

#### A. Speed of Function in Schizophrenia as a Non-Unitary Phenomenon

The aim of this part of the study is to investigate the relationship between the speed tests, particularly with respect to the evidence regarding a general speed factor because, as discussed above, Nelson (1953) suggested that retardation in schizophrenia is better considered in terms of independent factors while Payne and Hewlett provided evidence for a general factor; Foulds et al (1969) tentatively supported Nelson (1953).

B. Speed of Function, Personal Variables and the Subcategories of Schizophrenia

The aim of this part of the experiment is to examine the relationship between speed of function and patient variables and the subcategories of schizophrenia.

1) Sex. The mental speed and psychomotor speed indices will be examined for sex differences.

2) Age. As speed of functioning is known to decline with age in normal groups (Bromley, 1967), the relationship of the mental speed and psychomotor speed indices with age will be examined. This could be particularly important when considering other variables such as chronicity or the paranoid-non-paranoid classification where age may be lead to artefactual results.

3) Intellectual level

i) Ogilvie (1954), Eysenck et al (1957) and Payne and Hewlett (1960) all described an important feature of the intellectual deficit in schizophrenia, namely, that while the schizophrenics were slower on the tests of mental speed (notably the Nufferno Speed tests), they were not differentiated from normals on a test of intellectual level (the Nufferno Level test). Nelson (1953) found that schizophrenics as a group were differentiated from normals with respect to Nufferno Level scores although the differences were markedly reduced when speed scores were partialled out. A similar relationship obtained with vocabulary scores. Other authors have provided evidence for intellectual deficit using unspeeeded tests of

present level; Foulds and Dixon (1962) demonstrated this using the Progressive Matrices as a test of present level, compared with vocabulary as a test of acquired information. Ogilvie (1954) found, using a large group of normals as a reference group, that the percentile scores of schizophrenics on the Nufferno Level test were almost always above those on the Nufferno Speed tests. This will be examined in the present group of schizophrenics.

ii) Furneaux (1956) reported that the 'stress gain' score of schizophrenics, that is, the increase in speed demonstrated when told to work quickly at a task of equal difficulty, was less than that of a normal group. Payne, Matussek and George (1959) reported a similar finding. The stress gain of the present group will be examined.

iii) 'Speed slope' is the difference in speed as a subject goes from a less difficult speeded test to a more difficult one. The speed scores in the Nufferno Speed tests are adjusted between tests of unequal difficulty so that the speed slope of normal subjects is zero. Court and Garwoli presented evidence that schizophrenics took increasingly longer to process increasing amounts of information. Thus, it would be predicted that schizophrenic subjects moving from a simple task to a more difficult task would take disproportionately longer on the more difficult task than would normals.

The speed slope of the present group of schizophrenics will therefore be examined.

4) Subcategories of schizophrenia

i) Paranoid-non-paranoid. Payne, Caird and Laverty (1964) and Foulds et al (1968) found that patients with delusions were slower on the Babcock-Levy tests than were patients without delusions. Foulds et al (1969) found no differences between paranoid and non-paranoid schizophrenics.

The relationship between the paranoid-non-paranoid classification and the mental speed and psychomotor speed indices will be examined in the present schizophrenic group.

ii) Acute-chronic. The theory of Hawks and Marshall (1970) would predict that chronic schizophrenics would be more retarded than acutes. The findings of Nelson (1953) accord with this but those of Foulds et al (1969) and Senf et al (1955) are at variance.

The relationship between chronicity and the mental speed and psychomotor speed indices will therefore be examined.

5) Degree of illness. Nelson (1953) found that rated degree of illness correlated most highly with psychomotor speed tests; Harris and Metcalfe (1956) provided tangential evidence confirming this.

The relationship between degree of illness and the mental speed and psychomotor speed indices will be examined in the present group.

C. Speed of Function, Flattening of Affect and Thought Disorder

The aim of this part of the experiment is to relate speed

of function to symptomatology, specifically flattening of affect and thought process disorder.

1) Harris and Metcalfe (1956) found that measures of mental and psychomotor speed best differentiated between groups differing in the degree of flatness of affect. Buckley (1969) found a positive, significant correlation between affective flattening, as measured by the Dixon test and psychomotor speed measures.

An attempt will be made to replicate these findings using the Dixon test as a measure of flattening of affect, relating it to the mental speed and psychomotor speed indices.

2) It is generally argued that schizophrenics, rather than that specifically thought disordered schizophrenics are retarded. Foulds et al (1969) found no correlation between psychomotor speed scores and the measures on the Bannister-Fransella test. This was replicated by Presly (1969). The relationships will be examined in the present group of schizophrenics using the mental speed and psychomotor speed indices and the Bannister-Fransella measures.

3) There is no evidence regarding the relationship between flattening of affect and speed slope on the Nufferno Speed tests. This relationship will be examined.

4) Yates (1966) argued that the primary deficit in thought disorder lay in the reduced rate of information processing. Thus, the speed slope of thought-disordered schizophrenics should be lower than that of non-thought disordered schizophrenics.

This relationship will be examined.

5) Although it is reported (Payne, Matussek and George, 1959; Furneaux, 1956) that schizophrenics obtain a lower stress gain score on the Nufferno Speed tests than normals, there is no evidence regarding the relationship of stress gain and symptomatology. Its relationship with flattening of affect will be examined.

6) Similarly, the relationship of stress gain and thought disorder will be examined.

#### Summary

The aims of the present part of the experiment are as follows:-

- a) to examine the relationship between the speed tests in the present group of schizophrenics.
- b) to investigate the relationship of the mental and psychomotor speed indices with sex, age, intellectual level, subcategories of schizophrenia and degree of illness.
- c) to investigate the relationships of the mental and psychomotor speed indices and stress gain and speed slope scores from the Nufferno Speed tests, to flattening of affect and thought disorder.

### HYPOTHESES

On the basis of the discussion and aims detailed above, the following hypotheses were formulated (the number following each hypothesis refers to the part and section in the Aims from which it derives):

1. (I) That there will be a positive correlation between E% scores on the Dixon test and intensity and consistency scores on the Bannister-Fransella Grid Test (hereafter called I and C scores).
2. (I) That there will be a positive correlation between E scores on the Dixon test and I and C scores on the Bannister-Fransella Grid Test.
3. (I) That those schizophrenics who obtain E% scores of less than 10% on the Dixon test (i.e. those classified as affectively flattened) will have significantly lower I and C scores on the Bannister-Fransella test (i.e., more thought-disordered scores).
4. (IIA) That there will not be a significant correlation between E% scores and Mill Hill Vocabulary scores.
5. (IIA) That there will not be a significant correlation between E% scores and Nufferno Level scores.
6. (IIA) That there will be no difference between the sexes for E% scores on the Dixon test.
7. (IIA) That there will not be a significant correlation between E% scores and age.

8. (IIA) That paranoid schizophrenics so diagnosed by the SSI will have significantly higher E% scores than non-paranoid.
9. (IIA) That there will be no difference between acute and chronic schizophrenics on E% scores.
10. (IIA) That patients scoring 5 or more on the Personal Disturbance scale of the SSI will have significantly lower E% scores than patients scoring less than 5.
11. (IIB) That there will be a significant correlation between neither I nor C scores and Mill Hill Vocabulary scores.
12. (IIB) That there will be a significant correlation between neither I nor C scores and Nufferno Level scores.
13. (IIB) That there will be differences between the sexes on neither I nor C scores.
14. (IIB) That there will be a significant correlation between neither I nor C scores and age.
15. (IIB) That paranoid schizophrenics so diagnosed by the SSI will have higher I and C scores than non-paranoids but that, owing to some paranoids being thought-disordered, the difference may not be significant.
16. (IIB) That there will be significant differences between acute and chronic schizophrenics on neither I nor C scores.
17. (IIB) That patients scoring 5 or more on the Personal Disturbance scale of the SSI will have significantly lower I and C scores than patients scoring less than 5.
18. (IIIA) That speed of function in schizophrenia is best considered in terms of two or more relatively independent factors rather than a general factor.

19. (IIIB) That there will be significant differences between the sexes on neither mental nor psychomotor speed indices.
20. (IIIB) That there will be significant correlations between neither psychomotor nor mental speed indices and age.
21. (IIIB) That the majority of schizophrenics will have higher percentile scores on the Nufferno Level test than on the Nufferno Speed test.
22. (IIIB) That the mean stress gain of the schizophrenics will be less than 5, the mean stress gain of the normals in Furneaux (1956) sample.
23. (IIIB) That the mean speed slope of the schizophrenics will be less than zero.
24. (IIIB) That paranoid schizophrenics so diagnosed by the SSI will be significantly more retarded on the mental and psychomotor speed indices than non-paranoids.
25. (IIIB) That there will be significant differences between acute and chronic schizophrenics on neither the mental nor psychomotor speed indices.
26. (IIIB) That patients scoring 5 or more on the Personal Disturbance scale of the SSI will be significantly more retarded on the mental and psychomotor speed indices than patients scoring less than 5.
27. (IIIC) That there will be significant positive correlations between E% scores on the Dixon test and the mental and psychomotor speed indices.

28. (IIIC) That there will be significant correlations between neither I nor C scores on the Bannister-Fransella test and the mental and psychomotor speed indices.
29. (IIIC) That there will not be a significant correlation between E% scores on the Dixon test and speed slope on the Nufferno Speed tests.
30. (IIIC) That there will be significant correlations between I and C scores on the Bannister-Fransella test and speed slope on the Nufferno Speed tests.
31. (IIIC) That there will not be a significant correlation between E% scores on the Dixon test and stress gain scores on the Nufferno Speed tests.
32. (IIIC) That there will be a significant correlation between neither I nor C scores on the Bannister-Fransella test and stress gain scores on the Nufferno Speed tests.

METHOD

1) Subjects. The subjects were 24 patients, 17 male and 7 female, from the admission wards of a psychiatric hospital. In addition to a clinical diagnosis of schizophrenia (by the patient's doctor), the subjects each satisfied the following conditions:-

- 1) less than 70 years of age
- 2) have no known brain damage
- 3) be not receiving ECT
- 4) have a score of at least 15 on the Mill Hill (Synonyms) Vocabulary Test
- 5) obtain a score of at least 15 categories on the Dixon flattening of affect test in order to exclude those who were unco-operative or who, for some other reason, were unable to complete the task.

Two patients, who were both severely deluded, refused to co-operate in the testing. No patients were excluded on account of condition 5. Four patients failed to complete the Nufferno Level and Speed tests: one because of delusions about her eyes, two because even the simplest items proved too difficult and the fourth because she discharged herself from hospital before testing was complete.

Sub-diagnosis. Seven of the subjects were diagnosed by the SSI as paranoid schizophrenic and the remaining 17 as non-paranoid schizophrenic. A retrospective investigation of the case notes revealed that 9 were clinically diagnosed as paranoid schizophrenic. The SSI diagnosis will be used throughout this thesis.

Chronicity. The criteria used was the time since first admission to a mental hospital or the first diagnosis of schizophrenia, whichever was the earlier. In accordance with Brown's (1960) finding that the probability of discharge from hospital markedly decreased after two years' hospitalisation, the term 'chronic' was applied to those schizophrenics who had been admitted at least two years previous to the date of testing.

Data on only 20 patients were available. Of these, 11 were acute and 9 were chronic cases.

Mean age. The mean age of the experimental group was 32.6 years (S.D. 13.5 years).

Mean intelligence level. The mean score for the Mill Hill Vocabulary Test was 28.2 (S.D. 5.39). This is at the 42nd percentile for the general population.

The mean score on the Nufferno Level test was 272.7 (S.D. 185.5). This is at the 52nd percentile for the general population.

Sedation effects of drugs. Almost all of the patients were taking drugs, mainly one of the phenothiazines. It was not felt necessary to control for this as there is evidence of the lack of drug effect on most of the tests used. For example, Brody (1944) found no effect of sedative drugs on the performance of cognitive tests; Shapiro and Nelson (1955) found no effect on the performance of a variety of cognitive and speed tests; Broadhurst (1958) found no effect on the Nufferno Speed Tests; and Court and Garwoli (1968) found no drug effect on the

performance of speeded psychomotor tasks.

2) Measuring Instruments

A. Flattening of Affect Material. Dixon (1968)

i) Material and administration

The test material consists of five pairs of photographs depicting people as the main feature. The pairs were chosen so that there are clear contrasts or differences between the people.

The photographs are presented in pairs, the subject being asked to give all the differences he can see between the people on them. Three minutes are allowed for each pair; the subject's responses are tape recorded.

Shakow (1963) suggested that schizophrenics have difficulty in maintaining a set and, to counteract this, between each pair of photographs, the subject is reminded that he is to give all the differences between the people which he can see in the photographs.

The responses thus elicited may then be analysed into categories previously listed in the Introduction (p.23) and examples of verbatim responses, together with their categories, may be seen below.

Activity (A): reference to what the people in the pictures are doing, e.g.,

"It's like cricket they're playing".

"Looking down to another boy".

"Giving the young baby a pick-a-back".

Clothes (C): reference to anything the people in the pictures are wearing, e.g.,

"It's a short-sleeved shirt".

"Wearing a headscarf".

"One's got a watch".

Emotion (E): reference to the feelings, emotions or personality of the people in the pictures, e.g.,

"Probably a sadist by nature".

"She is much happier".

"Traces of worry on her forehead".

"Does a lot of worrying".

"Rather fearsome looking".

Age (G): explicit reference to the age of the people in the pictures, e.g.,

"He's just over seventy".

"Roughly the same age".

"They're slightly older".

Nationality (N): reference to the country of origin or race of the people in the pictures, e.g.,

"White coloured father and son".

"Rather like a negro".

"The people have white skin".

Occupation (O): references to the social, economic, occupational or religious status of the people in the pictures, e.g.,

"Peasant lady".

"Could be a pioneer somewhere".

"A smoker".

"One's poor looking".

Physique (P): reference to the physical characteristics of the people in the pictures, e.g.,

"He hasn't got any teeth".

"The boy looks completely tired out".

"Bush eyebrows and closely cropped hair".

"His ears protrude more".

Stance (S): reference to the bodily pose of the people in the pictures, e.g.,

"Sitting down".

"She's folding her arms".

"He has his left hand up to the wood".

Background (B): reference to anything in the pictures other than the people or the clothes they are wearing, e.g.,

"Background is rather derelict".

"Outside a shop".

"Snow on the ground".

"Loaf of bread".

Denial (D): indication that no (further) differences can be seen, e.g.,

"That's about all I can see really".

"There's not much difference".

Irrelevance (I): intrusion of irrelevant material of a delusional or personal nature, e.g.,

"I'm very conscious of the noise".

"How did you know I was in this morning?"

"I have to put my knitting down sometimes".

"We haven't got our worries to seek".

Photography (X): comment on the photography or the stimulus materials rather than the contents of the pictures, e.g.,

"The photograph has been taken of him".

"Photograph is not quite so clear".

"Those two have been snapped".

"One's taken outside".

"One's very glazed; the other isn't".

#### ii) Scoring Procedure

It was noted whether or not each category was used for each pair of photographs. Only first category responses were used and these were totalled to give the 'raw category score'. This score has a range of 0-5 for each category.

This score was then converted to a 'percentage category score' by dividing it by the total of the 'raw category scores' over the 5 pairs of photographs. The 'percentage category score' gave an indication of the relative use of each category and so controls for the reduced rate of responding in flattened schizophrenics reported by Salzinger and Portnoy (1968). Buckley (1968) also analysed 16 protocols, with each and every category of response noted to the five stimulus pairs of photographs. The percentage emotion score was calculated for each protocol using i) first occurring responses, ii) all responses. A correlation of 0.76 ( $p < .001$ ) was found between these two scores and it was therefore concluded that it was sufficient to use the more convenient method of noting first category responses for each pair of photographs.

iii) Cut-off Points

Dixon (1968) found that whereas all normals and non-flattened schizophrenics used 4 or 5 emotional responses, flattened schizophrenics used 3 and under. Similarly, McPherson et al (1970b) found that none of 15 normals or 15 non-flattened schizophrenics gave emotional responses to 3 or fewer of the 5 pairs of photographs whereas 8 of the 15 non-flattened did.

Thus, in the present sample, the members of the group referred to as 'flattened schizophrenics' may be assumed to have scored up to 3 emotional responses on the Dixon test whilst the non-flattened group have scores of 4 or 5.

When considering percentage category scores, a cut-off point of 10% is observed. Those schizophrenics scoring 10% and under are termed 'flattened', those scoring above 10%, 'non-flattened'.

B. Bannister-Fransella Grid Test of Schizophrenic Thought Disorder

i) Material and Administration

The test material used was the standard photographs of 4 men and 4 women. The method of administration was that advised by the Manual, with the subject rank-ordering the photographs in terms of the constructs kind, stupid, selfish, sincere, mean and honest, twice on the same occasion.

ii) Scoring Procedure

The Intensity of relationship between the constructs, together with the Consistency between the two grids, was

calculated for each subject. The Intensity of the relationship score is calculated from the squared differences between the rank orders as applied to each construct. This gives a total of 16 comparisons. Relationship scores are then allotted a high negative or a high positive score indicating a relatively "tighter" construct system and a lower probability of thought disorder. The total Intensity of relationship score is the sum Intensity of relationship scores of both grids.

The Consistency score involves calculating the degree of agreement between the two grids. The Spearman rho coefficient thus obtained indicates the extent of thought disorder - a high score indicating the relative absence of thought disorder.

### iii) Cut-off Points

The cut-off points were those suggested by Bannister and Fransella (1966) in the Manual, namely, a score of below 1000 on Total Intensity and a score of below .49 on Consistency indicating thought disorder.

### C. Symptom Sign Inventory

The Symptom Sign Inventory is appropriate as a research instrument because, although the interviewer may differ from study to study, the same questions are asked of each patient and a differential diagnosis is reached on the basis of empirically derived criteria. It was not designed as a 'Yes-No' questionnaire but as a clinical inventory so that questions are followed up until the interviewer is sure that the patient is answering the right question appropriately and

that the interviewer understands what is meant by the reply.

Items were selected from the full SSI so that the following scales could be scored for each sex:

Personal Disturbance Scale

Delusional Scale (Foulds and Hope, 1969)

Non-paranoid vs Paranoid Scale

The administration and scoring were in accord with the Manual (Foulds and Hope, 1968). The items included in each of the scales are shown in Appendix I.

D. Mill Hill Vocabulary (1948)

The Synonym Selection (Set B) (Senior) was administered. The task involves recognition alone and is not timed.

E. Psychomotor Retardation Measures

1) These consisted of:

i) The Babcock-Levy Battery

The speed of writing subtests from the Babcock-Levy battery were administered but, in accord with Foulds' et al advice (1969), 'Writing Name' was omitted as it has been found not to correlate significantly with the other measures, probably because the length of name contaminates the speed measure. Therefore, the two sentences administered were: "I hope to leave here very soon". "United States of America". These were presented printed on a card and also verbally and the sum of the time taken to write them was noted.

ii) General Aptitude Battery (G.A.T.B.) Motor Speed Test

The score recorded was the number of cells fitted with two

dashes in two minutes after two practice runs.

iii) Wechsler Digit Symbol Test

The test was administered in accord with the instructions in the W.A.I.S. Manual so that, after a short practice, the subject was given 90 seconds to complete as much of the coding as possible. The score noted was the number of digits correctly coded in that time.

2) The 'Psychomotor Speed Index' was computed by converting the scores on the above three tests into Z-scores (within each test) and then summing these for each subject over the three tests.

F. Nufferno Level and Speed Tests

i) Nufferno Level Test (Furieux, 1953)

This is a test of problem solving ability and is administered under unspeeded conditions. Each item consists of a series of letters with a dot after the last letter and the task is to find out what rule or rules are involved in replacing the dot with the letter which satisfies the rule.

Example: AAABBBCCDD.

The test was administered in accordance with the instructions in the Manual for individual testing. The test cards given were those in Test 1L/2(AB)36 for determining individual level.

The score is based on the number of items of those attempted, solved correctly, so that the test rewards persistent application.

ii) Nufferno Speed Tests

These tests measure the time taken to solve correctly problems similar to those in the Level Test. All the items of the Speed Tests can be passed by 80% of the normal population. The scores are based on the logarithm of the number of seconds taken to solve each problem which the subject solved correctly so that the test measures mental speed.

i) The tests were administered and scored in accordance with the instructions for individual administration in the Manual so that a speed score was obtained for:

A(1) 'stressed' (i.e., Subject instructed to go quickly and being obviously timed).

A(2) 'unstressed' (This test is equal in difficulty with A(1) but the subject is instructed to work at his own speed and is unobtrusively timed).

B(1) 'unstressed' (This test is slightly more difficult than A(1) and A(2) and again the subject is instructed to work at his own speed but is unobtrusively timed).

The 'speed score' for each test is derived from the Manual which converts from the logarithm time taken to speed score.

ii) The 'stress gain' score was derived. This is the difference in speed score between A(1) and A(2) so that it represents the difference in speed when tests of a similar level of difficulty are administered under stressed and unstressed conditions.

iii) The 'speed slope' score was derived. This is the difference in speed score between B(1) and A(2) so that it represents the difference in speed when tests of a different level are administered under similar unstressed conditions.

iv) A 'mental speed index' was also derived for each subject by converting scores on tests A(1), A(2) and B(1) into Z-scores within each test and then averaging the Z-scores for each subject over the three tests.

3) Procedure. The battery of tests was divided into two sessions as total testing time was approximately 3 hours. The sessions were usually spaced so that one night elapsed between the two.

The tests were administered under the following conditions in the following order:-

The subjects were tested in a room off the wards rather than in a "Psychology Department". The patient was seated at a table, facing the tester. Every effort was made to ensure co-operation and to give encouragement.

1) Symptom Sign Inventory

The items from the subscales detailed above were administered.

2) Mill Hill Vocabulary Synonym Section (Set B) (Senior)

3) Bannister-Fransella Repertory Grid Test

The eight photographs were laid out in random order in front of the subject. The subject was assured that the photographs were of people unknown either to the experimenter or to

the subject himself. He was also told that it was a matter entirely of personal judgement and that there were no right or wrong answers.

The patient was asked which of the people in the photographs was most likely to be kind. The photograph selected was turned over and the patient was asked which of those remaining was most likely to be kind. The order of selection was noted by the experimenter on the Record Sheet provided by Bannister and Fransella. Five other rankings were made in the order: stupid, selfish, sincere, mean and honest.

Difficulty was encountered with both male and female patients in that they were unwilling or unable to use the 'negative' constructs about the people. If this proved insurmountable, they were asked to give their opposite polar meaning of the construct and to rank the cards in terms of this pole.

When the second grid was administered (immediately following the first), the patient was told that it was not a memory test but that he was simply to rank the people again now that he had had longer to look at them.

#### 4) Nufferno Level Test

It was explained to the patient that the orders of the letters in the problems followed a certain rule and that the task lay in finding the rule and thus inserting the next letter. It was also explained that some of the items were easy and

some difficult but that they were not arranged in order of difficulty. Five cycles were administered to each patient, unless the patient was finding great difficulty and becoming dispirited. This occurred with four patients. A further three patients did not complete the test, one because of a delusional difficulty with her eyesight and the other two because even the simplest items proved too difficult.

With two subjects it was necessary to copy the Level Test onto large squared paper as they both complained that their drugs were making it difficult to perceive detail. The level test was then administered on the second session.

#### 5) Dixon Flattening of Affect Test

No patient objected to the use of the tape recorder but difficulty with the instrument resulted in three protocols being written down verbatim. None of the three patients was particularly verbose and so it was not felt that any of the material was missed.

The following instructions were given:

"I am going to show you five pairs of photographs and I want you to tell me all the differences which you can see between the people in the two pictures. I will show you each pair of photographs for 3 minutes and I want you to tell me all the differences you can see between the people".

Each pair of photographs was placed in front of the subject and he was told,

"Now, I want you to tell me all the differences which you can see between the people in the photographs".

6) Nufferno Speed Tests

The subject was told that the problems on the sheet were similar to those which he had done previously on the cards but that they were a little simpler. He was asked to work through the list one at a time, not missing any out, and to put a dash if he found the solution to any impossible. The examples were given and also the speed of writing test.

Test A(2) was administered first and the subject was asked to work through the list at his own pace. The stop watch was left running from the Flattening of Affect Test and the time at which the patient wrote down each answer was noted on the record form.

Test B(1) was then administered under similar conditions.

Test A(1) was finally administered and this time the subject was asked to go as quickly as possible. The stop watch was ostentatiously 'clicked' three times and held in front of the tester so that the patient could see it.

Four patients did not complete the Nufferno Speed tests, three for the same reasons as given above for the level test, and the fourth because she discharged herself from hospital between testings; all the previous testing had been completed on two sessions the previous day but the speed tests had been held over as she was tired.

#### 7) Retardation Measures

The three tests were administered as described above in the 'Instruments' section.

One patient did not complete the Digit Symbol because of the difficulty with her eyesight.

#### 4) Statistical Analysis of Results

Non-parametric statistics were used throughout the analysis of the results as the scores of the tests were not distributed normally nor were they truly numerical. The only departure from this was to give mean scores of groups and standard deviations as an indication of the range of scores involved. These were not used, however, for assessing the significance of differences between sets of scores.

Correlative techniques were used when the degree of association between two sets of scores was required. The Spearman Rank Correlation was used for the following hypotheses: 1, 2, 4, 5, 7, 11, 12, 14, 20, 27 and 28, that is, those hypotheses concerning the association between the Dixon measures and the Bannister-Fransella measures, and their associations with age and the mental and psychomotor speed indices.

The degrees of association between the speeded tests were also calculated, using the Spearman Rank Correlation.

The significance levels of the correlations were obtained from Table P in Siegel (1956).

For computational ease, the Kendall Rank Correlation coefficient was used to test the following hypotheses: 29, 30, 31 and 32, that is, those relating the Dixon and Bannister-Fransella measures to speed slope and stress gain on the Nufferno Speed tests. Siegel (1956) reports that the Spearman and Kendall correlation techniques are equally powerful and either is suitable for the present data.

The Mann-Whitney U test was used when the difference in scores of two groups was being analysed. Siegel (1956) states that it is one of the most powerful non-parametric tests and is a useful alternative to the parametric t-test. It was used to test the following hypotheses: 6, 8, 9, 10, 13, 15, 16, 17, 19, 24, 25 and 26, that is, those hypotheses concerning the differences between the sexes, between the paranoid and non-paranoid schizophrenics, between the acute and chronic schizophrenics and between the more and less severely ill, on the Dixon, Bannister-Fransella and the mental and psychomotor speed indices.

As clinicians talk in terms of patients being either affectively flattened or not, the Mann-Whitney U test was also used to test hypothesis 3, that is, to test the difference between flattened and non-flattened patients on the Bannister-Fransella measures, using the cut-off score suggested by Dixon (1968).

A McQuitty Elementary Linkage Analysis was used to test hypothesis 18, which concerned the relationships between the

speeded tests. This is a technique for reducing a set of variables to more fundamental constructs in terms of types where a type is defined as a category of tests (or persons, test items, jobs) of such a nature that everyone in the category is in some way more like some other person in the category than he is like anyone not in the category (McQuitty, 1957). McQuitty (1957) argues that such a method has more relevance for clinical studies than does factor analysis.

## RESULTS

### Hypothesis 1

The results only partly supported the hypothesis (see Table 1). Although the correlation of E% scores and Intensity was significant, that with Consistency was almost zero.

Table 1

Correlations Between Dixon E and E%  
Scores and Bannister-Fransella I and C Scores

n = 24

Spearman rho between:	I and E%	= 0.43	p<.05
	C and E%	= -0.09	n.s.
	I and E	= 0.31	n.s.
	C and E	= 0.04	n.s.
	I and C	= 0.43	p<.05
	E and E%	= 0.82	p<.01

### Hypothesis 2

The results did not support this hypothesis (see Table 1). Although the correlation of E with Intensity was positive and almost significant, that with Consistency was almost zero.

The data were further analysed to examine whether the correlations between the Bannister-Fransella and Dixon measures were improved if acute and chronic schizophrenics were dealt with separately (see Table 2).

Table 2

Correlations Between Bannister-Fransella  
I and C Scores and Dixon E and E% Scores  
for Acute and Chronic Schizophrenics

Acute Schizophrenics n = 11

Spearman rho between:	I and E%	= 0.52	p<.05
	C and E%	= -0.39	n.s.
	I and E	= 0.49	n.s.
	C and E	= 0.12	n.s.

Chronic Schizophrenics n = 9

Spearman rho between:	I and E%	= -0.03	n.s.
	C and E%	= -0.07	n.s.
	I and E	= 0.03	n.s.
	C and E	= -0.33	n.s.

While the correlations between Consistency and E and E% scores remained non-significant in both the acute and chronic groups, the significant correlation between I and E% was found only in the acute group.

The correlations between the two Bannister-Fransella measures and between the two Dixon measures were both significant. As the Dixon E% score gives a wider spread of scores than, and correlates highly with, the E score, E% will be used in future calculations.

Hypothesis 3

The results did not support the hypothesis (see Table 3).

Table 3

Mean Bannister-Fransella I and C Scores of Patients Scoring 10% and Under, and Over 10%, on the Dixon Test

	≤10%	>10%	U	p
n	7	17		
mean I	855.3	1164.6	44.5	n.s.
S.D.	433.2	583.2		
mean C	0.379	0.486	61.5	n.s.
S.D.	0.419	0.323		

Although the patients who obtained higher scores on the Dixon test obtained higher means on both the Intensity (I) and Consistency (C) scores on the Bannister-Fransella test, the difference was not significant as assessed by the Mann-Whitney U Test.

Hypothesis 4

The hypothesis was supported (see Table 4). There was a non-significant correlation between E% scores and Mill Hill Vocabulary scores. The patient's use of emotion and personality constructs is therefore not significantly related to vocabulary level.

Hypothesis 5

The hypothesis was supported (see Table 4). There was a non-significant correlation between E% and Nufferno Level scores. The patient's use of emotional and personality constructs is therefore not significantly related to present intellectual level.

Table 4

Correlations between Age and  
Intelligence Measures and Dixon E% Scores

Spearman rho between: E% and age	=	0.09	n.s.	n = 24
E% and Mill Hill	=	-0.09	n.s.	n = 24
E% and Nufferno Level	=	0.04	n.s.	n = 21

Hypothesis 6

The hypothesis was supported (see Table 5). There was no significant difference in the E% scores of male and female

Table 5

Mean Dixon E% Scores of Male  
and Female Schizophrenics

	<u>Male</u>	<u>Female</u>	<u>U</u>	<u>p</u>
n	17	7		
mean E%	13.55	12.71	51	n.s.
S.D.	6.31	3.70		

schizophrenics on the Dixon test.

Hypothesis 7

The hypothesis was supported (see Table 4). The correlation between E% scores and age was non-significant.

Hypothesis 8

The hypothesis was not supported (see Table 6). The difference in E% scores of the paranoid and non-paranoid schizophrenics was non-significant.

Table 6

Mean Dixon E% Scores of Paranoid and Non-Paranoid Schizophrenics

	<u>Paranoid</u>	<u>Non-Paranoid</u>	<u>U</u>	<u>p</u>
n	7	17		
mean E%	12.80	13.52	50.5	n.s.
S.D.	3.96	6.25		

Hypothesis 9

The hypothesis was not supported (see Table 7). Chronic schizophrenics obtained significantly lower E% scores on

Table 7

Mean Dixon E% Scores of Acute and Chronic Schizophrenics

	<u>Acute</u>	<u>Chronic</u>	<u>U</u>	<u>p</u>
n	11	9		
mean E%	15.84	9.56	21	<.05
S.D.	4.76	5.43		

the Dixon test than acute schizophrenics.

Hypothesis 10

The hypothesis was not supported (see Table 8). There was not a significant difference between patients who were more and less seriously ill, in terms of the score obtained on the Personal Disturbance scale of the SSI, although patients who obtained lower scores on the SSI obtained a higher mean E% scores on the Dixon test, which is in the direction of the hypothesis.

Table 8

Mean Dixon E% Scores of Patients  
Scoring Under 5 and 5 or More on  
the Personal Disturbance Scale  
of the SSI

	<5	≥5	U	p
n	11	13		
mean E%	14.65	12.16	53	n.s.
S.D.	2.90	7.05		

Hypothesis 11

The hypothesis was supported (see Table 9). The correlations of both I and C scores with Mill Hill Vocabulary scores were non-significant and negative, which is the opposite of what would be expected if vocabulary level was an important factor in the scores on the Bannister-Fransella test.

Table 9

Correlations Between Age and Intelligence  
Measures and the Bannister-Fransella I and C Scores

Spearman rho between:	I and age	= -0.01	n.s.	n = 24
	I and Mill Hill	= -0.25	n.s.	n = 24
	I and Nufferno Level	= 0.01	n.s.	n = 21
	C and age	= 0.14	n.s.	n = 24
	C and Mill Hill	= -0.23	n.s.	n = 24
	C and Nufferno Level	= 0.09	n.s.	n = 21

Hypothesis 12

The hypothesis was supported (see Table 9). The correlations of both I and C scores with Nufferno Level were non-significant. The patient's performance on the Bannister-Fransella is therefore not significantly related to present intellectual level.

Hypothesis 13

The hypothesis was supported (see Table 10). There were no significant differences in the I and C scores of males and females.

Table 10

Mean Bannister-Fransella I and C Scores  
of Male and Female Schizophrenics

	<u>Male</u>	<u>Female</u>	<u>U</u>	<u>p</u>
n	17	7		
mean I	1086.8	1044.1	53	n.s.
S.D.	562.8	557.6		
mean C	0.43	0.51	56	n.s.
S.D.	0.38	0.29		

Hypothesis 14

The hypothesis was supported. (See Table 9). The correlations of I and C with age were both non-significant.

Hypothesis 15

The hypothesis was not supported (see Table 11). The differences between the paranoid and non-paranoid schizophrenics were non-significant on both I and C scores and although the non-paranoid schizophrenics obtained a lower mean Consistency score, as predicted, they obtained a higher mean Intensity score.

Table 11

Mean Bannister-Fransella I and C Scores  
of Paranoid and Non-Paranoid Schizophrenics

	<u>Paranoid</u>	<u>Non- Paranoid</u>	<u>U</u>	<u>p</u>
n	7	17		
mean I	982.4	1112.2	51	n.s.
S.D.	523.4	578.7		
mean C	0.47	0.45	59	n.s.
S.D.	0.33	0.37		

The range of scores of both groups was very large; for example, on the Intensity score, the non-paranoid group varied from 292 to 2482 and the paranoid group from 375 to 2059.

To examine further the relationship between thought disorder, as assessed by the Bannister-Fransella test and the paranoid-non-paranoid classification, patients were classified as either thought-disordered or non-thought-disordered in accordance with Bannister and Fransella's suggested cut-off point. The frequency of thought-disordered patients in the paranoid and non-paranoid groups was then found (see Table 12). A greater proportion of paranoids than non-paranoids were thought-disordered. In this group of schizophrenics, therefore, there was no tendency for thought disorder to be a feature of the non-paranoid schizophrenics.

Table 12

Frequency of Thought-Disordered and Non-Thought-Disordered Schizophrenics, as Assessed by the Bannister-Fransella Test, in the Paranoid and Non-Paranoid Categories

	<u>Paranoid</u>	<u>Non-Paranoid</u>
Thought-disordered	3	5
Non-thought-disordered	4	12

Hypothesis 16

The hypothesis was only partly supported (see Table 13). There was no difference in the Consistency scores of acute and chronic schizophrenics, although the mean Consistency score of the chronics was lower than that of the acutes. The mean Intensity score of the chronics was significantly lower than that of the acutes.

Table 13

Mean Bannister-Fransella I and C Scores of Acute and Chronic Schizophrenics

	<u>Acute</u>	<u>Chronic</u>	<u>U</u>	<u>p</u>
n	11	9		
mean I	1337.0	733.2	19	<.05
S.D.	629.2	309.4		
mean C	0.51	0.30	32.5	n.s.
S.D.	0.33	0.40		

Hypothesis 17

The hypothesis was not supported (see Table 14). There was not a significant difference between patients who were more and

less seriously ill, in terms of the score obtained on the Personal Disturbance scale of the SSI.

Table 14  
Mean Bannister-Fransella I and C  
Scores of Patients Scoring Under 5 and  
5 or More on the Personal Disturbance Scale  
of the SSI

	<5	>5	<u>U</u>	<u>p</u>
n	11	9		
mean I	1106.90	1046.84	70	n.s.
S.D.	595.87	530.28		
mean C	0.53	0.39	63	n.s.
S.D.	0.29	0.40		

Hypothesis 18

The hypothesis was supported (see Table 15). The correlations of the Nufferno Speed tests with each other were highly significant while the correlations with the remaining tests were low and non-significant. The correlations of the remaining tests with each other were highly significant.

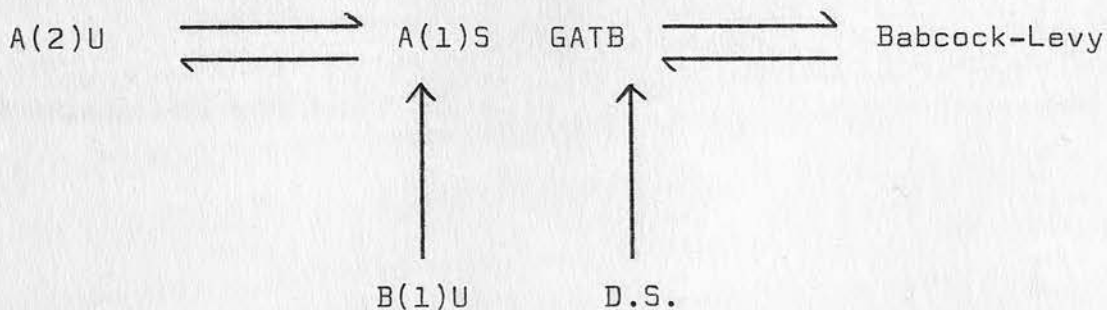
Table 15

Correlations Between Nufferno Speed Tests, Babcock-Levy Battery, Digit Symbol and GATB Motor Speed Test

	<u>A(2)U</u>	<u>B(1)U</u>	<u>A(1)S</u>	<u>D.S.</u>	<u>GATB</u>	<u>Babcock-Levy</u>
A(2)U		.685 p<.01	.773 p<.01	.283	.183	-.014
B(1)U			.692 p<.01	.130	.166	-.038
A(1)S				.225	.265	-.017
D.S.					.783 p<.01	.687 p<.01
GATB						.836 p<.01
Babcock-Levy						

The McQuitty Elementary Linkage Analysis confirmed what can be seen clearly from inspection (see Figure 1). The correlations fall neatly into two non-overlapping clusters, with no tendency for them to <sup>be</sup> part of a general speed cluster; the correlations of every member within each cluster were higher than with any member of the other cluster.

Figure 1



Hypothesis 19

The hypothesis was supported for both the mental and psychomotor speed indices (see Table 16). The differences between males and females were non-significant.

Table 16

Means of Male and Female Patients on the Mental (M) and Psychomotor (PM) Speed Indices

	<u>Male</u>	<u>Female</u>	<u>U</u>	<u>p</u>
n	15	5		
mean M	6.36	4.91	27	n.s.
S.D.	2.39	2.92		
n	17	7		
mean PM	6.11	5.85	51	n.s.
S.D.	2.85	1.56		

Hypothesis 20

The hypothesis was only partly supported (see Table 17). While the correlations between speed on the Nufferno Speed tests and age was non-significant, there was a significant negative correlation between age and psychomotor speed. This means that the younger patients were slower than the older patients on the psychomotor speed tests.

Table 17

Correlations Between Mental and Psychomotor Speed Indices and Age

Spearman rho between: M and age = 0.09      n.s.      n = 20  
PM and age = -0.45      p<.05      n = 24

### Hypothesis 21

The hypothesis was not supported. Of the 20 patients who completed both the Nufferno Level and Speed tests, 10 had Level percentiles above their Speed percentiles, using the standard norms in the manual as a reference group, and 10 had Level percentiles below their Speed percentiles.

### Hypothesis 22

The hypothesis was not supported. The mean stress gain of the schizophrenics was 19.6 (S.D. = 10.8). None of the individual scores was less than zero, the range, in fact, being from 1 to 44.

### Hypothesis 23

The hypothesis was not supported. The mean speed slope of the schizophrenics was 3.2, with a range from -51 to +24.

### Hypothesis 24

The hypothesis was not supported (see Table 18). The differences in the means of both mental and psychomotor speed indices for paranoids and non-paranoids were non-significant.

Table 18

Means of Mental and Psychomotor Speed Indices for Paranoid and Non-Paranoid Schizophrenics

	<u>Paranoid</u>	<u>Non-Paranoid</u>	<u>U</u>	<u>p</u>
n	15	5		
mean M	6.44	4.85	37	n.s.
S.D.	2.16	2.72		
n	18	6		
mean PM	6.63	5.84	46	n.s.
S.D.	2.11	2.65		

Hypothesis 25

The hypothesis was only partly supported (see Table 19). The difference between the means of the acute and chronic schizophrenics on the mental speed index was non-significant but the difference in means on the psychomotor speed index reached significance for a one-tailed test, the chronic schizophrenics being slower than the acutes, as predicted.

Table 19

Means of Mental and Psychomotor Speed Indices for Acute and Chronic Schizophrenics

	<u>Acute</u>	<u>Chronic</u>	<u>U</u>	<u>p</u>
n	10	6		
mean M	6.10	6.72	26	n.s.
S.D.	2.14	2.43		
n	11	9		p<.05
mean PM	7.20	5.09	25	one-tailed test
S.D.	2.08	2.53		p<.10 two-tailed test

Hypothesis 26

The hypothesis was not supported (see Table 20). There were no significant differences in the means of patients more and less seriously ill on either the mental or psychomotor speed indices.

Table 20

Means of Mental and Psychomotor Speed Tests of Patients Scoring Under 5 and 5 and Over on the Personal Disturbance Scale of the SSI

	<5	≥5	U	p
n	8	12		
mean M	5.97	6.02	44	n.s.
S.D.	3.20	2.11		
n	11	13		
mean PM	5.40	6.58	50	n.s.
S.D.	2.48	2.48		

Hypothesis 27

The hypothesis was not supported (see Table 21). The correlations between E% scores on the Dixon test and the mental and psychomotor speed indices were both non-significant.

Table 21

Correlations Between E% Scores on the Dixon Test and the Mental and Psychomotor Indices

Spearman rho between:	E% and M = -0.03	n.s.	n = 20
	E% and PM = 0.23	n.s.	n = 24

Hypothesis 28

The hypothesis was supported (see Table 22). The correlations between I and C scores on the Bannister-Fransella test and the mental and psychomotor speed indices were non-significant.

Table 22

Correlations Between I and C Scores on the Bannister-Fransella Test and Mental and Psychomotor Speed Indices

Spearman rho between: I and M	= 0.13	n.s.	n = 20
C and M	= -0.18	n.s.	n = 20
I and PM	= 0.23	n.s.	n = 24
C and PM	= 0.06	n.s.	n = 24

Hypothesis 29

The hypothesis was supported (see Table 23). The correlation between E% scores on the Dixon test and the speed slope on the Nufferno test was non-significant.

Table 23

Correlations Between E% Scores on the Dixon Test and Speed Slope and Stress Gain Scores on the Nufferno Speed Tests

Kendall's tau between: E% and speed slope	= 0.20	n.s.	n = 20
E% and stress gain	= -0.05	n.s.	n = 20

Hypothesis 30

The hypothesis was not supported (see Table 24). The correlations between both I and speed slope and C and speed slope were non-significant and negative rather than positive.

Table 24

Correlations Between I and C  
Scores on the Bannister-Fransella Test  
and Speed Slope and Stress Gain Scores  
on the Nufferno Speed Test

Kendall's tau between:	I and speed slope = -0.15	n.s.	n = 20
	C and speed slope = -0.21	n.s.	n = 20
	I and stress gain = -0.20	n.s.	n = 20
	C and stress gain = -0.34	p<0.02	n = 20

Hypothesis 31

The hypothesis was supported (see Table 23). The correlation between E% scores on the Dixon test and stress gain on the Nufferno Speed tests was non-significant.

Hypothesis 32

The hypothesis was only partly supported. While the correlation between I score on the Bannister-Fransella test and stress gain on the Nufferno test was non-significant, that between C score and stress gain was negative and significant. Thus, those patients who obtained low consistency scores on the Bannister-Fransella test, that is, the more thought-disordered patients, increased their speed most in response to stress.

## DISCUSSION

### Part I. Flattening of Affect, Thought Disorder and Personal Constructs

The aim of the first part of the study was to relate disorders in the structure, to disorders of the content, of the conceptual systems of schizophrenics, as a part replication of Buckley's (1969) study.

Dixon (1968) and McPherson et al (1970a) have shown that schizophrenics with the clinical sign of flattening of affect made much less frequent use of psychological constructs than did schizophrenics without flattening.

Similarly, Bannister (1960, 1962) has shown that thought-disordered schizophrenics have loose and inconsistent relationships between constructs compared with non-thought-disordered schizophrenics and other psychiatric groups. Bannister and Salmon (1966) and Buckley (1969) have shown that this deficit is specific to psychological constructs, not physical ones, even if the elements are the same.

Thus, it appears that some schizophrenics tend not to use personality constructs spontaneously, as demonstrated in the Dixon test, and, when they are required to do so, in the Bannister-Fransella test, show thought disorder. Buckley (1969) and McPherson et al (1970b) confirmed that there was a positive relationship between infrequent use of personality or emotion constructs on the Dixon test and loose and inconsistent relationships between constructs on the Bannister-Fransella

test. McPherson and Buckley (1969) suggested that this could be explained in terms of this type of schizophrenic lacking a psychological construct system. Thus when these patients are required to discuss psychological features of themselves or other people, as in a clinical interview, they are in effect being required to make statements which are personally meaningless, which results in an apparent lack of affect appropriate to the situation and which the clinician designates flattening of affect; the patients are also unable to think in terms of these constructs and therefore appear thought disordered. In support of this, there has been a great deal of work on the effect of content on the performance of schizophrenics, much of which indicated the important role of emotional and affective material (see General Introduction pps. 17-26) including the work of Dixon (1968), McPherson et al (1970a) and Rice et al (1969); and Bannister and Salmon (1966), Buckley (1969) and McPherson et al (1970b) indicating the importance of content for flattening of affect and thought process disorder respectively.

McPherson and Buckley (1969) further suggested that an explanation of the disorder specific to emotional constructs could be found in Bannister's invalidation hypothesis (Bannister, 1963, 1965). Constructs are seen as means of predicting and anticipating events and, if attempts at anticipation are continually unsuccessful, the schizophrenic is seen to loosen the relationships between his constructs so that

they no longer generate testable predictions and are consequently not susceptible to invalidation. It would seem probable that a person uses constructs frequently if they generate accurate predictions and does not use those which are unsuccessful. Poch (1952) confirmed this in a study where she demonstrated that if constructs were experimentally invalidated, they were used less frequently than before.

However, the finding by Buckley (1969) that, "... there is a statistically significant relationship between the two disorders measured by the Bannister-Fransella grid test of thought disorder and the test devised by Dixon to measure flattening of affect", was not supported in the present study. Although those schizophrenics who obtained higher scores on the Dixon obtained higher means on both the Intensity and Consistency measures in the Bannister-Fransella test, the difference was not significant because of the wide variation in the scores.

Thought disorder and flattening of affect are probably outward manifestations of disordered processes, with patients differing in degree of severity of the disorder, so that patients can probably be better seen as falling along a continuum rather than into 'present-absent' categories. Correlative techniques are possibly more appropriate in such a case than techniques which rely upon an essentially arbitrary cut-off point. The correlation between Intensity

scores and Dixon E% scores was significant and that between Intensity and E scores almost so; but the correlations of E% and E scores with Consistency scores were almost zero.

In a further part of the study, acute and chronic schizophrenics were found to differ significantly in E% scores on the Dixon test and Intensity score on the Bannister-Fransella test. In view of the wide range of scores in the whole group on E%, Intensity and Consistency, the relationship between the Dixon measure and the Bannister-Fransella measures were analysed separately for acute and chronic schizophrenics. The pattern of correlations for the acute group was essentially similar to that of the whole group, with Intensity and E% significant and Intensity and E almost so. In the chronic group, however, the correlations were all non-significant and three of them were negative. Thus it appears that, while there is evidence regarding the relationship of thought disorder to flattening of affect, and of them, to faulty construct systems in acute schizophrenics, the picture for chronic schizophrenics is less clear.

This by itself cannot explain the significance of Buckley's findings compared with the non-significant result here; while the present group comprised 11 acutes and 9 chronics (plus 4 unknowns), Buckley's group comprised 8 acutes and 12 chronics; thus the proportion of chronics in her group was, if anything, larger. The groups were comparable in sex ratio (17:7 in the present study, 14:6 in Buckley's), age (32.6 years, S.D. = 13.5

in the present study, 29.1 years, S.D. = 12.2 in Buckley's), vocabulary level (28.2, S.D. = 5.4 on Mill Hill vocabulary in the present study, 26.9, S.D. = 6.4 in Buckley's) and the proportion of paranoid to non-paranoid patients (7:17 in the present study, 7:13 in Buckley's), in terms of the SSI diagnosis.

Foulds et al (1967a) found that in acute schizophrenics, while Consistency was positively and significantly related to clinically rated thought disorder, the relationship with Intensity was non-significant, although in the right direction. They reported that these relationships did not obtain in chronic schizophrenics. In the present study, Intensity rather than Consistency was related to E% and so it is not clear whether the disorder associated with the inability to deal with emotional constructs is clinically described as thought disorder. Bannister (1960, 1962) reported positive, significant correlations with both Intensity and Consistency and clinical ratings of thought disorder.

The low correlations between E% scores and Intensity and Consistency scores within the chronic group demands further attention; this will be discussed in Part II.

Part II. Flattening of Affect and Thought Disorder and their Relationship with Personal Variables and the Subcategories of Schizophrenia

A. Flattening of Affect

Previous results (Dixon, 1968; McPherson et al, 1970b) have indicated that infrequent use of emotion constructs on the Dixon

test is significantly associated with clinically assessed flattening of affect and that scores on the Dixon test correlate better with such clinical ratings of flattening than do the clinical ratings together.

1) Vocabulary level. The effect of vocabulary level on performance on the Dixon test was investigated to determine whether performance on the test and the clinical assessment of affective flattening could both be affected by it, resulting in invalid inferences concerning the relationship between test performance and clinically rated flattening of affect.

The results indicated that there was no significant relationship between verbal ability, as assessed by the Mill Hill Synonyms scale, and performance on the Dixon test. This confirms the finding of Buckley (1969) and argues against the caution of Dixon (1968) that a vocabulary test should be administered with the Dixon test.

Buckley (1969) argued that the Definitions scale of the Mill Hill scale would be more appropriate than the Synonyms. However, the two parts of the scale correlate highly ( $r = 0.9$ ) and the poverty of expression which might be picked up in the Definitions scale is controlled in the Dixon test by scoring frequency of use of emotional constructs relative to the total output.

2) General intelligence. The non-significance of the finding with regard to vocabulary level was echoed in the correlation between Nufferno Level and performance on the Dixon

test which was also non-significant.

Thus it seems that performance on the test is not affected by present intellectual level.

In view of the previously quoted validity data of Dixon (1968) and McPherson et al (1970b), it seems reasonable that infrequent use of emotional constructs in the test can be taken as an operational definition of flattening of affect. The performances of different subgroups will therefore be discussed in these terms.

1) Sex. The results indicated that flattening of affect is not differentially associated with either sex and that the practice of previous authors in combining the sexes for analysis of results is justified.

2) Age. The results indicated that there is no relationship between flattening of affect and age. Harris and Metcalfe (1956) found that inappropriate affect was particularly typical of teenagers; there were only two teenagers in the present group and neither was affectively flattened, as assessed by the Dixon test. Of the 6 patients under 25 years in the present study, only 1 was flattened, which was less than the proportion flattened in patients over 25 (6 out of 17). Thus, the finding of Harris and Metcalfe (1956) was not replicated in the present study.

3) Subcategories of schizophrenia

i) Paranoid-non-paranoid. The results indicated that within the present group of patients flattening of affect was

not associated with a diagnosis of non-paranoid schizophrenia, as diagnosed by the SSI. This contradicts the clinical evidence that flattening of affect is more typical of non-paranoid than paranoid schizophrenics. Buckley (1969) found that while there was a positive relationship between non-paranoid schizophrenia and flattening of affect when the former was clinically diagnosed, this relationship did not hold when the SSI diagnosis was used. She interpreted this in terms of denial of symptoms during the SSI administration. As only incomplete retrospective clinical diagnostic data <sup>were</sup> ~~was~~ available in the present study, it is not possible to definitively deal with this point. Of the 7 patients with flattening of affect, 2 were diagnosed as paranoid, both in the case notes and by the SSI, 4 were diagnosed as non-paranoid, both in the case notes and by the SSI, and data was not available on the seventh. However, 4 of the 17 patients diagnosed as non-paranoid on the SSI were diagnosed as paranoid in the case notes and they were all four non-flattened; this would tend to weigh the evidence towards a preponderance of flattened patients in the non-paranoid group. It could be that psychiatrists use 'appropriate affect' as a diagnostic sign of paranoid schizophrenia and, conversely, 'inappropriate affect' as a sign of non-paranoid schizophrenia. If this were the case, the SSI diagnosis may be giving a more realistic picture of the relative frequency of flattening of affect in the paranoid and non-paranoid groups.

ii) Acute-chronic. The results indicated that there was a positive relationship between flattening of affect and the chronic stage of the illness. This is in contrast to Buckley's (1969) finding that flattening of affect was not significantly associated with either the acute or the chronic stage of the illness.

The clinical evidence has been equivocal but authors have tended to equate 'flattening of affect' and chronicity.

It was reported in Part I of the Discussion (p. ) that the correlations between the Dixon scores and the Bannister-Fransella scores in chronic schizophrenics were very low and non-significant. Foulds et al (1970a) have questioned the validity of the Bannister-Fransella test as a test of thought disorder in chronic schizophrenics. It may be pertinent to raise the same question with respect to the Dixon test and flattening of affect in chronic schizophrenics. Salzinger and Portnoy (1968) concluded that chronic schizophrenics were characterised by low rates of responding. If, on the Dixon test, chronics give very few responses but, nevertheless, sufficient to place them above the minimum of 15, then small differences between patients in the use of emotion constructs would be magnified when ratios were calculated and the validation data may therefore not be appropriate. However, the cross-validation study of McPherson et al (1970a) was carried out on patients with a minimum illness length of two years and who were therefore chronic according to the criterion

adopted in this study. Further, the total response scores of the chronic schizophrenics in the present group ranged from 21 to 33 and were not significantly lower than those of the acutes.

Thus, it appears reasonable to assume that in the present group of schizophrenics flattening of affect was associated with the chronic stage of the illness.

One obvious feature of chronic schizophrenics is that they have been hospitalised for a number of years with perhaps limited opportunity for emotional contacts. Some authors (e.g., Goffman, 1961) have suggested that personal contact between patients is actively discouraged in some hospitals. The infrequent use of emotion and personality constructs could, then, be seen as a result of hospitalisation rather than the schizophrenic illness per se. A useful test of this hypothesis would be an investigation of the use of emotion and personality constructs in long-stay patients other than schizophrenics.

4) Degree of illness. The results indicated that there was not a significant relationship between degree of illness as assessed by the Personal Disturbance Score on the SSI and flattening of affect. This is in contrast to the evidence of Harris and Metcalfe (1956) that flattening of affect was a feature of patients with a high proportion of other serious symptoms.

Foulds (1965) proposed that non-integrated psychosis was the most severe manifestation of a failure in personal relationships and that flattening of affect was a sufficient condition

for a diagnosis of non-integrated psychosis. Thus the present non-significant finding concerning degree of illness and flattening of affect would also appear to invalidate the latter proposal. However, the Personal Disturbance Scale of the SSI was not designed as a check-list of symptoms but rather as the most efficient means of differentiating between Personally Disturbed and Not Personally Disturbed individuals. Although it could be hypothesised that seriously ill patients would gain higher scores than less ill patients, this has not been empirically tested and so the result of this part of the study is largely inconclusive.

B. Thought Disorder

Bannister and Fransella (1966) published their grid test together with validation data as a test of thought process disorder. Vocabulary level and general intelligence were considered here as it seems feasible that they could be confounding variables.

1) Vocabulary level. The results indicated that the relationship between performance on the Bannister-Fransella grid test and verbal ability, as assessed by the Mill Hill Vocabulary Scale, was non-significant; the correlations were negative, indicating that there was a slight tendency for patients of higher verbal ability to obtain low Intensity and Consistency scores on the Bannister-Fransella test. This non-significant finding confirms that of Bannister and Fransella (1966) and demonstrates fairly conclusively that verbal ability has no effect on performance on the test.

2) General intelligence. Similarly, the results indicated that general intelligence, as measured by the Nufferno Level test, is not a significant factor in determining scores on either measure on the Bannister-Fransella grid test as the correlations between Nufferno level and Intensity and Consistency were almost zero.

Thus, as with flattening of affect, it seems reasonable in the light of previous validation studies (Bannister, 1960, 1962; Bannister and Fransella, 1966; Foulds et al, 1967a) to assume that low scores on the Intensity and Consistency measures on the Bannister-Fransella grid test can be used as an operational definition of thought process disorder.

The relationship of personal variables and subcategories of schizophrenia to scores on the grid test will therefore be discussed in those terms.

1) Sex. The results indicated that thought-process disorder is not differentially associated with either sex. This confirms the findings of Bannister (1960, 1962), Bannister and Fransella (1966) and Foulds et al (1967a), all using the Bannister-Fransella grid test.

2) Age. The results indicated that there was not a significant relationship between age and thought process disorder. This confirmed the findings of Bannister (1960, 1962) and Bannister and Fransella (1966).

3) Subcategories of schizophrenia

i) Paranoid-non-paranoid. There were no differences between paranoid and non-paranoid schizophrenics on either the Intensity or the Consistency scores on the Bannister-Fransella grid test, indicating that in the present sample of schizophrenics, thought process disorder was not significantly associated with either subgroup. Foulds et al (1967b) suggested that although thought disorder is generally associated with non-paranoid schizophrenia, the difference might not be significant owing to the presence of thought disorder in a proportion of paranoid schizophrenics. The mean Intensity score of the present group of paranoids was, in fact, less than that for the non-paranoids (although non-significant). When patients were classified as either thought-disordered or non-thought-disordered, in accordance with Bannister and Fransella's cut-off scores, 3 out of 7 paranoids were thought disordered compared with 5 out of 17 non-paranoids. Thus, a greater proportion of paranoid than non-paranoid patients were thought-disordered and the non-significance of the difference between the groups was not due to a minority of the paranoids being thought-disordered.

ii) Acute-chronic. The results indicated that thought process disorder is associated with the chronic phase of the illness. The difference between the groups was significant for the Intensity score and almost significant for the Consistency score.

This result contradicts that of Foulds et al (1967a) and McPherson (1969) who found no differences between acute and

chronic groups on the Bannister-Fransella measures. It is also at variance with the clinical literature which does not associate thought process disorder with either the acute or the chronic phase of the illness.

It will be recalled that while in the acute schizophrenics, the correlations between thought process disorder and flattening of affect were positive and significant, within the chronics, the correlations were non-significant and generally almost zero. The positive significant correlation within the acute group could not be attributed simply to the patients being neither thought-disordered nor affectively flattened because, although they were significantly higher than chronics on both the Dixon and the Bannister-Fransella measures, there were both thought-disordered acutes and affectively flattened acutes.

There is the possibility that the chronic schizophrenics did not understand the instructions to the Bannister-Fransella grid test although great care was taken to ensure that the patient knew what he was doing. However, the acute and chronic schizophrenics did not differ in Nufferno Level scores (Mann-Whitney  $U = 25$ ,  $n_1 = 7$ ,  $n_2 = 10$ ) and, when the correlations between Mill Hill vocabulary scores and the Bannister-Fransella measures and Nufferno Level scores and the Bannister-Fransella measures were calculated separately for chronics, none of them were significant (Intensity and Mill Hill =  $-0.20$ ; Consistency and Mill Hill =  $-0.27$ ; Intensity and Nufferno Level =  $0.13$ ; Consistency and Nufferno Level =  $0.13$ ,  $n = 9$ ). Thus, it appears

that intellectual ability was no more important in the chronic schizophrenics than in the group as a whole.

4) Degree of illness. The results indicated that there was not a significant relationship between thought disorder and degree of illness. Foulds (1965) proposed that thought disorder was a sufficient condition for a diagnosis of non-integrated psychosis which would suggest that the more seriously ill patients would be the more thought disordered.

However, as discussed above, the Personal Disturbance scale has not been empirically related to degree of illness and so the result of this part of the study is similarly inconclusive.

### Part III. Speed of Function in Schizophrenia

#### A. Speed of Function as a non-unitary Phenomenon

The matrix of correlations between the speed tests clearly indicates that speed of functioning in a schizophrenic group is best represented by two relatively independent factors which have been called mental and psychomotor speed. The McQuitty Elementary Linkage Analysis strongly supports this, with two non-overlapping clusters clearly appearing; an obvious follow-up to this would be to find the pattern of scores between tests more widely differing from each other, particularly in the mental speed category. This finding confirms those of Nelson (1953) and Foulds et al (1969) against that of Payne, Matussek and George (1959). Nelson (1953) provided evidence

that, while other psychiatric groups were generally retarded, schizophrenics were more like normals in that different types of speed were affected differently. Rimoldi (1951), working with normal subjects, suggested that perceptual speed as well as speed of cognition and motor speed could be isolated and, if relevant tests had been incorporated in either Nelson's or the present study, this third cluster may also have emerged within schizophrenics: this could also be followed up.

It is noteworthy that while there is ample evidence that some schizophrenics are retarded under certain conditions (e.g., Boring, 1913; Gatewood, 1909; Shakow and Huston, 1936; Payne and Hewlett, 1960), and indeed that some schizophrenics are slower than normals on the Nufferno Speed tests (e.g., Nelson, 1953; Ogilvie, 1954; Eysenck et al, 1957; Payne and Hewlett, 1960), the schizophrenics in the present group were not retarded on the Nufferno Speed tests: the mean unstressed speed score of the present schizophrenic group was 186.3 ( $n = 20$ ) which is at the 47th percentile for the general population and compares with a mean of 189 in Nelson's (1953) normal group (Nelson's figures having been converted from log times to speed scores using the norms in the Manual). Nelson's acute schizophrenics were, in fact, faster than normals on the Nufferno Speed tests but, as one of the diagnostic signs for acute schizophrenia was absence of intellectual deterioration, the criterion was contaminated. Nelson (1953) also found that chronic schizophrenics were significantly slower than acutes:

this was not the case in the present sample where the unstressed speed scores of the acute and chronic schizophrenics were 186.8 (S.D. = 13.3) and 190.5 (S.D. = 15.0) respectively (high scores are faster). The present chronics were displaying active symptoms while those of Nelson may have been burnt-out.

The present group of schizophrenics were not slow on the mental speed tests relative to their intellectual level as, for example, Ogilvie (1954) found. The contrary findings in the present study emphasise again the importance of not treating schizophrenics as a homogeneous group.

B. Speed of Function, Personal Variables and Subcategories of Schizophrenia.

The finding in Part IIIA, indicating that the schizophrenics as a group were not significantly slower than normals on the Nufferno Speed tests, emphasises the importance of comparing subgroups within the schizophrenics. On psychomotor tasks, Payne, Matussek and George (1959) found that schizophrenics were slightly faster than normals on a simple reaction time experiment while Rodnick and Shakow (1940) found that they were slightly slower. It appears therefore that the variation within schizophrenics is relevant, both for the mental and the psychomotor speed tasks.

1) Sex. The results indicated that there were no sex differences on either the mental or the psychomotor speed indices (see p.110).

2) Age. The correlation of mental speed and age was non-significant but that for psychomotor speed and age was

negative and significant. This means that the younger schizophrenics were slower than the older schizophrenics, which is in contrast to results with normal subjects where younger subjects are faster. Age was correlated with neither flattening of affect nor thought disorder; the relationship between age and the paranoid-non-paranoid classification was non-significant (Mann-Whitney  $U = 65$ ) and the relationship of all of these variables to psychomotor speed were non-significant. Thus, it is not clear how the negative relationship between psychomotor speed and age could have occurred.

3) Intellectual level. As noted above, when both Nufferno Speed and Level scores were converted to percentiles in accordance with the Manual, there was no tendency for the speed scores to be lower than the percentile scores. This contrasts with the results of Nelson (1953) and Payne, Matussek and George (1959) who both found that schizophrenics were disproportionately slow. Similarly, while Payne, Matussek and George (1959) found that the stress gain of schizophrenics was smaller than neurotics (and by implication, of normals) and Furneaux (1956) suggested that both the stress gain and the speed slope of psychiatric patients were slower than normals, in the present group, the mean stress gain was far above what would be found in a normal group and the speed slope was above zero, the mean for normals. Such results can only warn against facile interpretations of scores on intellectual tests as aids to diagnosis; within the schizophrenic

group the variation between patients is the most outstanding feature.

4) Subcategories of schizophrenia.

i) Paranoid-non-paranoid. The differences between the paranoids and non-paranoids on the mental and psychomotor speed indices were both non-significant although the paranoids were faster on both scores. This confirms the finding of Foulds et al (1969) where they found no differences between paranoids and non-paranoids on the Babcock-Levy battery. Taken together with the results of Payne, Caird and Laverty (1964) and Foulds et al (1968), it seems that while most non-paranoid schizophrenics are slower than most paranoids, there is very great variability within each group.

ii) Acute-chronic. Chronic schizophrenics were significantly slower than acutes on the psychomotor speed index despite an opposing trend for age: while the younger patients were slower and the older patients chronic, the chronic patients were slower. The finding confirms that of Nelson (1953) against Foulds et al (1969) and Senf, Huston and Shakow (1955). It also lends support to Hawks and Marshall's (1970) proposal that schizophrenics learn to cope with overinclusive tendencies by slowing down the rate at which they respond because it would be expected that during the early stages of the illness the patient would not have learned this adjustment. However, as Hawks and Marshall (1970) were discussing overinclusion in conceptual activity, it would perhaps have been expected that the most marked change would be in mental speed rather than psychomotor

speed. In the present group of schizophrenics, mental speed was not related to chronicity.

5) Degree of illness. There was no evidence that those patients who were more seriously ill were more retarded than those less ill. Although this result contradicts those of Nelson (1953) and Harris and Metcalfe (1956), it can probably be attributed again to the inappropriateness of the Personal Disturbance scale of the SSI as a measure of severity of illness.

C. Relationship Between Speed of Function, Flattening of Affect and Thought Disorder

Although it has been proposed, both clinically (Babcock, 1933) and experimentally (Harris and Metcalfe, 1956), that flattening of affect is associated with retardation in schizophrenics, the correlations of the Dixon measure of flattening of affect with the mental and psychomotor speed indices were both small and non-significant. Buckley (1969) found a small positive correlation between Dixon scores and Digit symbol which was one of the tests included in the psychomotor speed index; the other psychomotor tests she used had positive but non-significant correlations with the Dixon scores. Thus it appears that the one significant finding in Buckley's study was a chance result and that there is, in fact, not a strong relationship between flattening of affect, as measured by the Dixon test, and speed of function.

Harris and Metcalfe (1956) used clinical ratings of inappropriate affect and the Nufferno Speed tests and Digit Symbol as speed tests. While they found a significant relationship

between these measures, they suggested that severity of illness could have been a confounding factor. As noted above, the present group of schizophrenics were not particularly slow on the Nufferno Speed tests and so even if a positive correlation had been obtained between flattening of affect and speed, this could not have been taken to be indicative of a causative role for retardation in flattening of affect. Harris and Metcalfe's subjects appeared to have still active symptomatology so that an explanation of the importance of retardation in terms of them being 'burnt-out' is not tenable. It is possible that their group was more severely ill than the present group and that, as they suggested, severity of illness was the important variable.

The finding that the measures on the Bannister-Fransella test were not correlated with the psychomotor speed index confirms the findings of Foulds et al (1969) and Presly (1969) who both showed that thought disorder, as measured by the Bannister-Fransella test, is not related to the speed of performance of psychomotor tests. The non-significant correlations of the Intensity and Consistency measures with the mental speed index indicates that mental speed is similarly irrelevant.

The non-significance of the correlation between the measures of thought disorder and speed contradict Yates' (1966) hypothesis that thought disorder is secondary to a reduced rate of information processing. Although it could be argued that the amount of information processed in the psychomotor speed tests was too low, problem-solving tasks such as the Nufferno Speed tests would certainly be expected to be severely affected by such a breakdown in information processing. The non-significance

of the correlations between speed slope on the Nufferno Speed tests and the Bannister-Fransella measures is similarly in opposition to Yates' theory. Thus, while Yates has provided no direct evidence for his theory, Hawks and Robinson (1970) and the present study have failed to support it.

Although Court and Garwoli (1968) found that schizophrenics were disproportionately slower with tasks involving increasing information, the non-significance of the correlations of the Dixon and Bannister-Fransella measures with speed slope suggest that this difficulty has no specific importance for either flattening of affect or thought disorder.

It is not clear why stress gain on the Nufferno speed tests should correlate negatively with Consistency on the Bannister-Fransella test. It could be that the most thought-disordered schizophrenics react most vigorously to the implied censure in the request to work more quickly; but although the social censure hypothesis is not directly applied to thought disorder, this result could be the opposite of what would be predicted. Hawks and Marshall (1970) suggested that overinclusive patients slow down their rate of responding to combat the overinclusion so that slower patients would be less overinclusive and would be able to speed up more if requested. However, in the present group, the more thought-disordered patients increased their speed more. Possibly more relevant is Broadhurst's (1958) finding that practice allowed schizophrenics to obtain normal speed scores on the Nufferno speed tests compared with slower

performances preceding practice. As the stressed speed tests followed the unstressed test in every case in the present sample, the increase in speed may simply have been due to practice. Shakow (1962) has described how schizophrenics may appear to be abnormally poor on novel tasks but that the apparent deficit disappears with increasing familiarity. It is not clear why thought disordered schizophrenics should be more affected than non-thought-disordered or why only one of the thought disorder measures should be related to the defect. The wide variability of the schizophrenic group on the Nufferno Speed tests would indicate that a replication of the finding would be necessary before such an explanation could be invoked.

Summary and Suggestions for Further Research

The findings of Buckley (1969) and McPherson et al (1970a) that there is a significant relationship between flattening of affect, as measured by the Dixon test, and thought process disorder, as measured by the Bannister-Fransella test, were tentatively supported for acute schizophrenics in the present study. The earlier results were not confirmed for chronic schizophrenics and in the light of Foulds' et al (1967a) validation study, it is suggested that the validity of the Bannister-Fransella test as a test of thought disorder in chronics ~~is~~<sup>be</sup> further investigated. It would be interesting to know, for example, whether their scores on the test differ from those derived from random sortings.

It appears, from the work of Dixon (1968), Buckley (1969), McPherson et al (1970a, b) and Rush (1970), that some schizophrenics find particular difficulty in dealing with constructs relating to personality and emotions. Although this is a broad category, Dixon (1968) found it impossible to break down. There has also been a large body of work, reviewed on pps. 17-22, demonstrating the importance of affective stimuli for a widely differing range of behaviour in schizophrenics. It would be of interest to investigate within individual schizophrenics whether they become increasingly more disrupted on tasks of increasing personal-ness, for example, would affectively flattened schizophrenics perform more abnormally on a task similar to Dixon's involving people known to them? This would not be expected if

the subsystem of constructs relating to personality and emotion is lacking, as suggested by McPherson and Buckley (1970). On the other hand, Bannister (1963, 1965) has suggested that the disordered family relationships described in the theories of such workers as Wynne and Singer (1963), Lidz et al (1965) and Bateson et al (1956) can be usefully considered in the context of faulty learning experiences for the schizophrenic and it could then be predicted that those constructs relating to the self would be the more disordered; fragmented subsystems may operate successfully with the hierarchical organisation severely disrupted.

A further experiment could be conducted to replicate Deering's (1963) finding that schizophrenics gave more associations to affective than neutral words. It would be predicted, from the present findings concerning the importance of personal constructs for flattened schizophrenics, that Deering's results would only be replicated for non-flattened schizophrenics.

Neither the Dixon nor the Bannister-Fransella measures were affected by either vocabulary level or general intelligence. Using these tests to assess symptomatology, neither flattening of affect nor thought disorder were differentially associated with either sex, age or the paranoid-non-paranoid classification; the findings for degree of illness were inconclusive. Both were found to be associated with the chronic stage of the illness, however, and, as noted above, it would be of interest i) to

check the validity of the Bannister-Fransella test as a measure of thought disorder in chronics and ii) to investigate the performance of chronic patients other than schizophrenics on the Dixon test, particularly because of the features of institutionalisation.

When the schizophrenics were timed on different tasks, the tests fell into two distinct clusters, the mental and psychomotor speed tests. This type of clustering is more typical of normal than other psychiatric groups and confirms Nelson's (1953) findings. It would be interesting, as noted above, to examine the pattern of scores on more widely differing mental speed tests; and also on perceptual as well as mental and psychomotor speed tests, as Rimoldi (1951) did with normal subjects.

Speed of performance was not related to sex but younger subjects were found to be slower; with the lack of any explanation this latter finding can only be attributed to chance. Payne and Caird's (1967) suggestion that non-paranoid patients are slower than paranoid patients was not supported. Indeed, although there is ample evidence (reviewed on pps. 72-77) that some schizophrenics are slow on some tests, this study has not shed any light on which schizophrenics these are except that chronic schizophrenics were slightly slower on the psychomotor speed tests. Speed was related to neither flattening of affect nor thought disorder, which argues against the suggestions of Harris and Metcalfe (1956) and Yates (1966).

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APPENDIX I

The following items from the S.S.I. were administered to make up the Personal Disturbance, Delusional and Paranoid-Non-Paranoid Schizophrenia Scales, as instructed in the manual, and Foulds and Hope (1969).

For Males

- A3. Do you suffer from palpitations or breathlessness?
- A9. Are you afraid of going out alone?
- B2. Have you lost interest in almost everything?
- B4. Is the simplest task too much of an effort?
- B6. Have you found it difficult to concentrate recently?
- B7. Does the future seem pointless?
- B9. Are you slower recently in everything that you do?
- B10. Do you ever seriously think of doing away with yourself because you are no longer able to cope with your difficulties?
- C8. When you get bored do you ever like to stir up some excitement?
- C10. Are you a much more important person than most people seem to realise?
- D1. Are people talking about you and criticising you for no special reason?
- D2. Have you an important mission to carry out?
- D3. Are there people who are trying to harm you through no fault of your own?
- D4. Is someone trying to poison you or make you ill in some way?
- D5. Have you some special power, ability or influence which is not recognised by other people?

- D6. Is someone, other than yourself, deliberately causing most of your troubles?
- D7. Are people plotting against you through no fault of your own?
- D9. Do you ever see someone do or say something which most people don't take much notice of but which you know has a special meaning?
- D10. Can people read your thoughts and make you do things against your will by a sort of hypnotism?
- E1. Are you distressed by silly pointless thoughts which keep coming into your mind against your will?
- E3. Are you unnecessarily careful in carrying out simple everyday tasks like folding up clothes, reading notices, etc?
- E6. Do distressing thoughts about sex or religion come into your mind against your will?
- E7. Do you feel you just have to check things again and again - like turning off taps or lights, shutting windows at night, etc. - although you know there is really no need to?
- E8. Have you an unreasonable fear that some careless act of yours might have very serious consequences?
- E10. Do you have an uneasy feeling if you don't do something in a certain order or a certain number of times?
- F1. Do you feel that there is some sort of barrier between you and other people so that you can't really understand them?
- F2. Do you ever see visions or people, animals or things around you which other people don't seem to see?
- F3. Do you often wonder who you really are?
- F4. Do you ever have very strange and peculiar experiences?
- F5. Do you think other people regard you as very odd?
- F6. Do you often feel puzzled, as if something has gone wrong either with you or with the world, without knowing just what it is?

- F7. Do you ever hear voices without knowing where they come from?
- F8. Do you feel you cannot communicate with other people because you don't seem to be on the same wavelength?
- F9. Do you have very strange and peculiar thoughts at times?
- F10. Is there something unusual about your body - like one side being different from the other or meaning something different?
- G4. Do you ever lose all the feeling in any part of your skin - so that you wouldn't be able to feel a pin prick - or do you ever have burning or tingling sensations?
- H2. Are you an unworthy person in your own eyes?
- H3. Have you some bodily condition which you find disgusting?
- H4. Are you a condemned person because of your sins?
- H6. Because of things you've done wrong, are people talking about you and criticizing you?
- H7. Are you ever so low in spirits that you just sit for hours on end?
- H8. Do you cause harm to people because of what you are?

For Females

The following items were omitted from the above list:

A3, C8 and the following items substituted:

- A6. Are you afraid that you might be going insane?
- B3. Have you ever attempted to do away with yourself?
- B8. Are you more absent-minded recently in everything that you do?
- C2. Do you ever become very excitedly happy at times for no special reason?

- C5. Are you ever so full of pep and energy that you carry on doing things indefinitely?
- E5. Are you afraid that you might do something seriously wrong against your will?
- E9. Are you excessively concerned about cleanliness?
- G6. Have you been in poor physical health during most of the past few years?

