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Social Intelligence and Schizophrenia

John P. Mitchell

Loyola University Chicago

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SOCIAL INTELLIGENCE AND
SCHIZOPHRENIA

by

John P. Mitchell

A Dissertation Submitted to the Faculty of the Graduate School
of Loyola University of Chicago in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Philosophy

June
1974
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VITA

The author, John P. Mitchell, is the son of John S. Mitchell (deceased) and Dorothy F. (Ballauer) Mitchell. He was born in Chicago on July 6, 1936.

He attended grammar and high school in Chicago and in that same city received a Bachelor of Arts degree in June, 1959, and Master of Arts in February, 1961 from DePaul University. While at DePaul, he majored in Psychology and was granted an assistantship in 1959.

Following duties as a personnel psychologist in the U.S. Army, he was employed by Jewish Vocational Service. In 1967 he was accepted for an internship at Chicago Read Mental Health Center.
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CHAPTER I

REVIEW AND HYPOTHESES

The purpose of this dissertation is to present evidence of a relationship between the schizophrenic syndrome and a cognitive ability called social intelligence by Guilford (1967) among others. The proposed relationship specifies that social intelligence is impaired in the schizophrenias through peculiarities in the scanning and sorting of interpersonal data.

This posited relationship however, requires an examination of its components, i.e., schizophrenia and social intelligence, not only in a definitional sense, but also in terms of the development of the components' current meanings.

The review of schizophrenia will focus briefly on definitional issues. The main concern, for research, however, is to present evidence that meaningful differentiations can be made within the syndrome, and between it and nonschizophrenic processes.

Next, the construct of social intelligence is reviewed with reference to definition and measurement. This is followed by a discussion of selected variables relevant to cognitive style, i.e., scanning, cognitive categories, and inhibition. The relationship of these variables to
social intelligence is explored.

Finally, hypotheses relating the anticipated deficits in social intelligence to the cognitive styles of paranoid and nonparanoid forms of schizophrenia are presented.

Schizophrenia

In 1911 Bleuler (1950) published his work on dementia praecox. One of his contributions was the renaming of the syndrome as schizophrenia, meaning that the process was marked by a splitting off of so-called psychic functions, e.g., affect from cognition. His work challenged the idea that schizophrenia was a single disease entity. The syndrome had many forms. One central symptom of any form, however, was a thought disturbance which he labeled as autism.

In Bleuler's context, autism represented a dual process. First there occurred a turning away from the stimuli of the outside world which, in turn, aided, and was reinforced by, the development of private symbols often used or associated illogically.

Harry Stack Sullivan (1931, 1953) later proposed that schizophrenia was engendered by poor early interpersonal relationships. These relationships, their messages, and affective content, determined the shaping of the "self"—a fragile repository of attitudes towards oneself and others. Consequently, the schizophrenic who had been subjected to a
host of negative early messages and affects found it extremely difficult to relate later to others. Moreover, he carried a special form of anxiety when dealing with others. This special anxiety or "terror" sprang from the schizophrenic's inability to understand the rules that governed interpersonal relations (Sullivan, 1962).

Like Bleuler, Sullivan conceived a process that would make communication with others difficult. Unlike Bleuler however, Sullivan differentiated those called schizophrenic into so-called true schizophrenics and hebephrenics, the latter representing an untreatable organic state.

Arieti (1955) incorporated the notions of Bleuler, Sullivan, and others to formulate a link between symbolization and desocialization. In that context, withdrawal from or severe limitation of contact with others occurred after a process of private symbolization had been initiated. Thus a paranoid who could not understand the meanings or intentions of others (or to whom understanding was anxiety arousing) would "invent" meanings to be attributed to others. While the resultant thinking might appear to be an uncomfortable persecutory delusion, it was preferable, to the paranoid, to great anxiety. (Note that Arieti's priorities are the reverse of Bleuler's.)

Whichever comes first, desocialization or the invention of private symbols, there appears to be agreement that the two reinforce one another. This is however, a
relatively minor issue when viewed in the perspective of the history of the schizophrenic syndrome, and the arguments that have been (and are) waged around it.

Issues such as treatability, and so-called functional versus organic etiology, are important and deserve additional research. Such issues, while generating much activity, may have hidden a more fundamental question, namely, can schizophrenia be meaningfully defined. This question becomes more complex when the following definition of schizophrenia by Bellak (1958) is considered:

Schizophrenia or dementia praecox is a psychiatric syndrome not a single disease. The somewhat variable symptoms generally associated with this diagnostic label must be understood as the final common path of a number of conditions which may lead to and manifest themselves in a severe disturbance of the ego. These conditions may range from a relatively purely psychogenic weakness of the ego to afflictions of ego functioning by disturbances brought about by infections, arteriosclerotic, enzymatic, toxic, or by traumatic, constitutional, or genetic factors: ... While an outstanding somatic factor may be present, usually this must be accompanied by some psychological predisposition (in terms of ego patterns) to produce the schizophrenic picture ... (pp. 4-5).

The above statement is both a theory and a definition. Bellak's statement that schizophrenia is a syndrome rather than a single disease must be studied more closely. The usual meaning of syndrome is, "... group or set of concurrent symptoms which together are indicative of a disease ..." (Hinsie & Campbell, 1960, p. 714). In Bellak's definition, however, the usage is closer to that of the general adaptation syndrome wherein stress causes a relatively pre-
dictable set of symptoms, but the exact nature of the stress may vary, or, more to the point, the cause of the stress may vary.

Bellak's definition also represented an attempt to take a middle or moderating position. The rift in research on social abilities was mild when compared to that in studies and theories of schizophrenia. Issues regarding treatability, etiology, prognosis etc. remain open and researchers are still beset by the problem that samples diagnosed as schizophrenic may be drawn from different populations.

The issue of this non-unified nature of schizophrenia, i.e., its status as a syndrome, raises another question: is it reasonable to discuss schizophrenic subgroups? Part of the answer is to look for symptom clusters which are found by different investigators in a fairly reliable or consistent fashion.

This sort of inquiry however, has two parts: (a) consistency of differentiating schizophrenias from non-schizophrenias; and (b) consistency of isolating subgroups within the schizophrenias. If these two demands are met, it would be reasonable to begin to describe not a cognitive style, but rather two or more styles, each associated with a relatively well isolated subgroup.

The first requirement is to determine whether or not schizophrenics are differentiated from nonschizophrenics reliably. Schmidt and Fonda (1956) found acceptable con-
sistencies for gross diagnostic categories e.g., organic, psychotic, used by psychiatrists, but very little agreement for subtypes such as hebephrenic. This study reported 90% agreement concerning a schizophrenic-nonschizophrenic distinction. This agreement between pairs of psychiatrists was 78% when nonpsychotic patients were removed from the sample. Sandifer, Pettus, & Quado (1964) reported a 74% figure for similar distinction, a higher figure than found with any other diagnostic category. In a longitudinal study of 1,215 out-patients, Babigian, Gardner, Miles and Romano (1965) found that 70% of those diagnosed as schizophrenic received that same general diagnosis on subsequent contacts. This same study also reported that 70% was the highest figure found. In a review of reliability studies, Spitzer and Endicott (1970) report an average concurrence rate of 75% between pairs of diagnosticians, again for the schizophrenic versus nonschizophrenic distinction.

Agreement rates in the 70s, while not conclusive, were promising. Spitzer and Endicott (1970) suggest that concurrence rates would rise, if more experienced clinicians were used. Briefly, their rationale is that diagnostic signs such as "flat affect" are often confused with other states e.g., "shallow affect" or "constricted affect."

This reasoning and the relative consistency of findings in reliability studies suggest that (a) there are a series of signs or diagnostic indicators to which clinicians
respond, but that (b) the power of these signs vary for purposes of differential diagnosis.

Tables 1 and 2, adapted from Spitzer and Endicott (1970), indicate that the sign approach alone is insufficient. Table 1 shows symptoms by subgroups, presents a brief definition, and finally indicates which other diagnostic categories, if any, are suggested. Table 2 provides a brief listing of possible diagnostic "errors" associated with subgroup schizophrenic diagnoses. The validity of some of the distinctions made may be questioned, but the total picture suggests that training and experience could avoid diagnostic errors. The situation here is similar to that of the sign approach in psychological testing (Weiner, 1966).

The purpose of Table 1 was to show some possible sources of diagnostic error assuming a simple sign approach were used. It does not indicate what information could be used to differentiate between such items as flat, as opposed to, constricted affect. This consideration adds another dimension, i.e., amount of information, to the experience-training issue raised by Spitzer and Endicott (1970). The question of diagnostic error as a function of both experience and amount of data given, or used, awaits further research.

The error source mentioned above interacts with another difficulty, namely, the number of subtypes of schizophrenia. Even assuming that these subtypes are valid and
Table 1
Diagnostic Value of Different Signs in Schizophrenia

<table>
<thead>
<tr>
<th>Sign</th>
<th>Definition</th>
<th>Other Diagnoses</th>
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</thead>
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<tr>
<td>A. Symptomatology practically pathognomic</td>
<td></td>
<td></td>
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<tr>
<td>1. Flat affect</td>
<td>Generalized impoverishment of emotional reactivity</td>
<td>Shallow affect in organicity and hysteria</td>
</tr>
<tr>
<td>2. Thought Disorder</td>
<td>Thinking appears confused, bizarre, incorrect or abrupt</td>
<td>Distinguish from looseness of association in mania</td>
</tr>
<tr>
<td>3. Posturing</td>
<td>Assumption of bizarre or inappropriate posture</td>
<td>Sometimes seen in organic brain disease</td>
</tr>
<tr>
<td>B. Symptoms seen in schizophrenia--rarely in other conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Catatonic Stupor</td>
<td>Marked decrease in reactivity to environment, reduction of spontaneous movement. Patient seems unaware of surroundings but generally very aware</td>
<td>Common to catatonia but rule out depression, hysteria and organicity</td>
</tr>
<tr>
<td>2. Inappropriate Affect</td>
<td>Affect incongruous to situation or thought content</td>
<td>As above</td>
</tr>
<tr>
<td>C. Symptoms common to schizophrenia and other states</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Extreme social</td>
<td>Avoids contact or involvement with people</td>
<td>Alcoholism and depressions</td>
</tr>
<tr>
<td>2. Excessive concern with body symptoms</td>
<td>Symptoms real or imagined; fears of becoming ill. Health rituals</td>
<td>Rule out depression and hypochondriasis</td>
</tr>
<tr>
<td>3. Hallucinations</td>
<td>Sensory impression in waking state in absence of external stimuli</td>
<td>Rule out LSD use, other psychoses</td>
</tr>
<tr>
<td>4. Delusions</td>
<td>Belief apparently untrue and extremely resistant to modification</td>
<td>Rule out organic and other functional psychoses</td>
</tr>
</tbody>
</table>
Table 2

<table>
<thead>
<tr>
<th>Subtype</th>
<th>Differential Diagnoses</th>
</tr>
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<tr>
<td>Paranoid</td>
<td>Involutional State</td>
</tr>
<tr>
<td></td>
<td>Paranoia</td>
</tr>
<tr>
<td></td>
<td>Amphetamine-Toxic State</td>
</tr>
<tr>
<td>Schizoaffective</td>
<td>Manic-Depressive Psychoses</td>
</tr>
<tr>
<td>Chronic Undifferentiated</td>
<td>Chronic Organic Brain Syndrome</td>
</tr>
<tr>
<td></td>
<td>Chronic Use of stimulants or Hallucinogens</td>
</tr>
</tbody>
</table>
universally agreed upon does not remove the chance for error. Table 2, taken from Spitzer and Endicott (1970) suggests some of the problems of differential diagnoses.

Table 2 only hints at the complexity of the issue, several subtypes are not listed, e.g., acute undifferentiated, hebephrenic, simple and pseudoneurotic to name a few. Worse, the reported lack of agreement for subtypes confounds diagnostic error with styles of usage. That is, there is lack of agreement between clinicians as to which subtypes represent viable diagnostic entities (Lehmann, 1971).

The disparity regarding the useful number of schizophrenic subtypes reflects the general difficulties in the history of psychiatric nosology. While the use of corrections, primarily through added information, might serve to increase agreement on gross categories, e.g., schizophrenic versus nonschizophrenic, other complications such as "favorite usage" appear to prevent even a complex sign approach from significantly increasing agreement regarding subtypes.

One approach that might be useful is to reduce subtypes to gross dichotomous distinctions. Of most importance here is the distinction between paranoid and nonparanoid forms of the syndrome.

Kraepelin (1925) was the first to provide a comprehensive description of paranoid schizophrenia. While there have been disputes about the formation of symptoms (e.g., Freud versus Sullivan, see Arieti, 1955) its place
as a major subtype has never been seriously challenged (Lehmann, 1971).

Reference to Table 2 however, indicates that paranoid schizophrenia can be confused with other states. Rather than attempt a sign approach for differential diagnosis, the focus will shift to a different tradition.

Moore's (1930) study of psychiatric patients was an early attempt to differentiate disorders by the use of factor analysis. The data gathered by Moore was reanalyzed by Thurstone (1947) and later by Degan (1952). The three studies yielded different numbers of factors, with differing names and interpretations. Thus the results were not conclusive. Degan did isolate two primary factors: A = hallucination-delusion and E = schizophrenic dissociation. In addition he found a second order factor which was labeled as Y or paranoid-depressive.

Wittenborn's work in the early 1950s was summarized by Eysenck (1961, pp. 22-23, 31). Factor analysis of the rating scales used by Wittenborn, Wolzberg, and Simon (1953) yielded nine clusters: (1) acute anxiety; (2) conversion hysteria; (3) manic states; (4) depressed states; (5) schizophrenic excitement; (6) paranoid condition; (7) paranoid schizophrenia; (8) hebephrenic schizophrenia; and (9) phobic-compulsive. While it is encouraging to note the presence of scales 5 and 7, Eysenck noted that the scales, due to item overlap and high intercorrelations, are not independent.
Guertin (1952, 1954) using a sample of hospitalized schizophrenics, isolated six factors, of which one, persecution-suspicion, might relate to the paranoid form. Later, Guertin (1955) found three factors, with an out-patient sample, all of which pertained to lack of interest and withdrawal.

Although later work by Wittenborn (1962) confirmed the earlier finding of a so-called paranoid schizophrenia factor, little had been done to correlate factor titles with traditional psychiatric diagnoses.

Again the picture was encouraging but not conclusive. Analyses by Degan, Wittenborn, and Guertin indicated that a paranoid schizophrenic factor was partially distinct from other schizophrenic factors. Whether this distinction reflected item construction or concurrence with traditional diagnoses was not specified.

Following a theory proposed by Jenkins (1952), Lorr, Jenkins, and O'Connor (1955) (see also Lorr, O'Connor and Stafford, 1957), constructed 81 brief descriptive rating scales which were used on a sample of 423 hospitalized patients. Of the 11 factors extracted, four directly related to Jenkins' theory that there were three types of schizophrenia, namely the withdrawn (I), the disorganized (K), and those marked by psychotic disorganization (C). These factors, moreover, were compared to like named factor generated by other investigators (Lorr & Rubinstein, 1956).
A more graphic form of cross-referencing of factors was done by Rabin and King (1958). Table 3 is a modification of their presentation and indicates that paranoids may form a distinct subgroup of the schizophrenic syndrome. Moreover Klett and Lorr (1966) and Lorr (1966) reported that rating scales comprising Lorr's paranoid projection factor correlate reasonably well with the diagnosis of paranoid schizophrenia.

In conclusion, the status of paranoid schizophrenia as a distinct subgroup of the syndrome is supported by psychiatric theory and by both diagnostic and factor analytic studies. Additional evidence, however, is needed.

Rabin and King (1958) reviewed 10 years of research on intellectual impairment in schizophrenia. They concluded that this sort of deficit had not been demonstrated in the paranoid form. The impairments found for the simple and hebephrenic types could be attributed to factors such as motivation and attention.

Later reviews (Shakow, 1962, 1963; Payne, 1961; and Lothrop, 1961) all concluded that paranoid schizophrenics showed less conceptual or intellectual impairment than did nonparanoid forms. The parallel of these results to differences found between acute and chronic schizophrenics led to questioning of the difference between paranoids and acute schizophrenics. In response, Johannsen, Friedman, Leitschuh, and Ammons (1963) classified 52 schizophrenic patients in
Table 3
Comparison of Factors Obtained in Four Studies Based on Symptom-Ratings

<table>
<thead>
<tr>
<th></th>
<th>Degan</th>
<th>Lorr et al.</th>
<th>Wittenborn</th>
<th>Guertin</th>
</tr>
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<tbody>
<tr>
<td>Hyperprojection = Perceptual Distortion = Par. Schiz. = Persecuted</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyperprojection = Paranoid Projection = Par. Schiz. = Persecuted</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schiz. Disociation = Conceptual Disorg. = (None) = Personality disorganization</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deterioration = Withdrawal = Deterioration = Psychomotor Retardation</td>
<td></td>
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</table>

= indicates comparable factors; + indicates factorial overlap
terms of four variables or dimensions: (a) process-reactive in terms of developmental data criteria developed by Kantor, Wallner and Winder (1953); (b) acute-chronic defined by length of hospitalization; (c) good versus poor premorbid adjustment as measured by the Phillips Scale (1953); and (d) paranoid versus nonparanoid schizophrenic diagnosis. The first three dimensions correlated significantly and positively with each other, but negatively with the paranoid versus nonparanoid distinction. This finding indicates a difference between paranoid schizophrenia and acute schizophrenia.

Finally, Johannsen (1961) found evidence suggesting differential impairment of social communication skills between paranoid and nonparanoid schizophrenics.

There appears to be sufficient evidence to make three gross distinctions among psychiatric patients with functional disorders, namely, non-schizophrenic, paranoid schizophrenic, and nonparanoid schizophrenic. However, two qualifications must be restated: (a) each group is composed of subgroups (Klett & Lorr, 1966), and (b) the relative lack of impairment attributed to the paranoid schizophrenic's intellectual functioning may be due to other variables (Weiner, 1966).

Social Intelligence

In broad terms, social intelligence can be viewed as awareness of the thought and feelings of others. With
this context in mind, a continuum of this particular sensitivity can be found in the field of fiction. The negative pole was exemplified in a story by Henry James, *Beast in the Jungle* (1958). John Marcher was the passionless anti-hero of this tale whose fatal flaw was near blindness to the feelings of others.

The positive pole of this sensitivity, carried to sometimes painful examples of empathy, was pressed onto selected characters of Dostoevsky. His Prince Myshkin, the hero of the *Idiot* (1958), confused other characters with his mixture of naivete and insight.

Early writers in the "pulp" genre presented a slightly different view of sensitivity to people in their characterizations. Thus Edgar Rice Burroughs in his *A Princess of Mars* (1911), typified his hero with all virtues save understanding of women.

While this last example is primarily a literary device, it, together with the aforementioned writings of Henry James and Dostoevsky, indicates that at least some writers saw their characters as possessing varying degrees of social sensitivity.

This special awareness of others however, was more than a creative fiction, for E. L. Thorndike speculated that social acumen was a distinct form of intelligence, that is, not necessarily correlated with other forms of human ability i.e., verbal or mechanical. Thorndike's (1920) definition
of "Social Intelligence" was, "... the ability to understand and manage men and women, boys and girls ... to act wisely in human relations ... (p. 228)."

Thorndike's definition helped spur interest in social intelligence and its measurement. At about the same time, as indicated by Walker and Foley (1973), interest arose in person perception. Walker and Foley defined this latter term as, "how people make judgments regarding others, their accuracy in so doing, and personality characteristics of 'good' versus 'poor' appraisers of others ... (p. 840)."

The next three decades, roughly from the mid 1930's to around 1965, were marked by two curious patterns. The first was the development of a gap between investigations of person perception and those centering on social intelligence. The second was intense but sporadic research on the concept of social intelligence.

These patterns reflected a major difference in two traditions in Psychology, namely a matter of focus. Person perception examined stimulus differences while research on social intelligence was directed to matters of individual differences. In turn, focus influenced methodology and measurement. Stated very simply, this became a case of the standardized paper-pencil test used in measuring intelligence, versus the rating scales of social perception. The choice of instrument however, had at least two other ramifications: (a) There was limited success in constructing tests of social
intelligence. (This also relates to the sporadic interest in the subject.) (b) It appears that the choice of instruments directed the researcher's attention to distinct portions of Thorndike's definition, i.e., the difference between understanding others and the management or action component involved in acting wisely. Each of these points will be elaborated.

From Thorndike's definition in 1920 to the early 1960's only two paper-pencil tests of social intelligence received extensive research attention. These were the George Washington Social Intelligence Test (GWSIT) and the Chapin Social Insight Test (CHSIT).

Though revised in 1949, the GWSIT was one of the earliest instruments developed to measure social intelligence or SI (Thorndike & Stein, 1937). The revised form contained five subtests of which four were in multiple choice format. Examples of these subtests are (a) Observation of Human Behavior which contained true-false statements or questions concerning interpersonal functioning; and (b) Sense of Humor which required the selection from four alternatives of the best ending of a joke.

Early validity studies such as Hunt's (1927) showed promising relationships between GWSIT scores and ability to deal with people in work situations. This was soon challenged however. For instance, Garrett and Kellogg (1928) among others, cited a significant correlation between the GWSIT and
measures of abstract intelligence or AI. Later work by Thorndike (1936) and Woodrow (1939) indicated that the GWSIT primarily measured verbal factors. This same conclusion was noted by Cronbach in a later review (1960).

Chapin was familiar with the GWSIT and probably its lack of success in measuring SI as a distinct factor. In 1942 he presented some initial standardization data and the test items of the Chapin Social Insight Test or CHSIT. The CHSIT was composed of 25 items, each describing a social situation. The testee was expected to read each item and then choose which of the four alternate statements was most relevant to the situation presented.

However, there arose a parallel in research findings between the CHSIT and the GWSIT. Like the latter instrument, Chapin's test was found to relate well to external criteria such as leadership (Chapin, 1942), but Gough (1965, 1968) found significant correlations of the CHSIT to measures of abstract intelligence.

Thus hopes to establish SI's relative independence from verbal or abstract intelligence were frustrated, for high correlations implied redundancy in measurement. Perhaps the ebb and flow of interest in SI was connected to the development of new and always promising tests. Perhaps too, investigators of social perception had not made this assumption of relative independence. In any event, their progress,
as Walker and Foley (1973) pointed out, was generally smoother and more consistent.

As noted, investigators of social abilities diverged into relatively independent streams with little cross-fertilization. A possible contributor to this divergence could be the already set state of affairs wherein difference of method meant more than "choice of device." Cattell (1966) noted the various rifts between segments of psychology. The earmarks of such rifts ranged from lack of cross-referencing to mutual challenging of claimed results. More specifically, Cattell cited the multivariate versus bivariate experimental designs as representing distinct traditions in the philosophy of science.

Walker and Foley (1973) however, pointed out a less speculative cause of this lack of communication. Workers on SI and those on social perception or social action were focusing on different parts of Thorndike's definition. As Walker and Foley stated:

... Thorndike specified two types of SI, namely, understanding others and wise social action. ... it must be understood that knowing and action must be evaluated separately before their interaction can be assessed. ... social understanding itself is a necessary but not sufficient cause for wise social action. ... This type of problem and research is not new to psychology and can be seen as analogous to other comparisons, such as that between learning and performance (p. 846).

Definitions. As noted above, Thorndike's definition of SI included both understanding and action. This distinction, in part, reflects the later splitting of research
directions. Subsequent definitions of SI added to the complexity of the picture.

In an early review of SI literature, Vernon (1933) stated:

... 'social intelligence' apparently includes ability to get along with people in general, social technique... susceptibility to stimuli from other members of a group, as well as insight into the temporary moods... of friends and of strangers... (p. 44).

Vernon's definition (or overview) widened the boundaries of SI considerably. The inclusion of susceptibility to group stimuli, which is viewed as a personality factor by Cattell (1971), raised the question of the relationship of other factors i.e., personality to SI.

Later definitions appeared to limit the scope of SI. Thus Chapin (1942) made a distinction, so far unsupported by data, between SI and "social insight."

Wechsler (1958), on the other hand, offered a brief and general definition, namely ability to deal with people. The relationship of this ability to WAIS scores or to a subtest such as Picture Arrangement has not been stipulated.

The situation of SI then, up to and through 1960, was one of definitional haziness. Consequently it was (and is) difficult to determine its boundaries. The relationship between SI and such areas of research as empathy remain unknown in any detail. Moreover the relative independence of SI from other types of intelligence was not established.

However O'Sullivan, Guilford and deMille (1965)
proposed another definition of SI as a cognitive variable, namely, "... ability to understand the thoughts, feelings and intentions of other people as manifested in discernible, expressional cues ... (p. 6)."

The work of O'Sullivan et al. was predicated on a model initially suggested by Guilford (1956, 1957). This model was Guilford's structure of intellect theory which hypothesized 120 distinct intellectual aptitudes. In this structure of intellect model (hereafter referred to as SOI), 30 forms of SI are proposed.

It is important to consider the background of the SOI model, at least in general outline, so that the reason for the generation of so many factors can be appreciated.

In The Nature of Human Intelligence, Guilford (1967) provided a thorough analysis of the thinking and research that led to the SOI model. There were three key points in this analysis.

The first point was a negative finding, namely that little or no research supported a hierarchial structure within which the known intellectual factors could be arranged. According to Guilford this type of structure would follow from concepts such as Spearman's "g" and "s" type factors. In Spearman's theory, "g" represented general intelligence and by definition correlates with any test of intellectual ability. "S" was a specific component peculiar to a given type of intelligence test. Thus a given test score could be
analyzed into "g" and "s" factors. The presence of "g" in tests, however, not only stipulated a superordinate factor, but also predicted a degree of correlation between tests of intelligence that has not been demonstrated.

Guilford's second point also stems from negative findings, that is, the sparsity of so-called broad group factors or those represented by a large number of tests. On the other hand, a large number of narrow group factors (close to 40, Guilford, 1956), have been identified. This too militates against a hierarchical structure.

The third and most important point is summarized by Guilford (1967)

... many factors have obviously parallel properties. For example, if one collects a half-dozen nonverbal factors in another, it is clear that the factors in the two sets can be paired off in a meaningful manner. The psychological operation is the same in each pair; only the content of the test items is different. Yet the members of each pair come out of an analysis as separate factors. ... Extensive factor analytical results have proved wrong the belief that the same ability is involved regardless of the kind of information with which we deal ... (p. 61).

Thus Guilford reasoned that tests of intelligence may be alike in some respects i.e., involve the same operation, but differ in others i.e., content. Moreover a third dimension, product was added. Therefore for a test, X, to measure the same factor as test, Y, tests X and Y would have to have the same content, utilize the same psychological operation and have correct responses expressed in the same level of product. Conversely, any intelligent act can be described
in terms of the above dimensions.

The dimensions with their respective subcategories form a large block comprised of subcubes with each of the latter representing a cognitive ability. For purposes of this paper the SOI model has two chief implications: (a) the interlocking of dimensions to form subcubes should aid in the construction of tests to measure the ability specified in that cube; and (b) tests targeted to the same subcube should correlate more with each other than with tests targeted to other subcubes. (It may be argued that tests of behavioral content should correlate more with each other than, say, with those in the verbal content area, however, this is not strictly predicted by the SOI model.)

There are 30 distinct SI abilities proposed by the SOI model. Tests of six of these abilities have been devised (O’Sullivan et al., 1965; O’Sullivan & Guilford, 1966). Three of these six tests were selected as an aid in defining SI in the present study.

The selected tests are Expression Grouping, Missing Pictures and Cartoon Predictions. The first requires that the examinee relate facial or postural cues into a congruent whole which expresses one thought, feeling or intention. The latter two tests require understanding of the development and probable conclusion, respectively, of social situations. The definition of SI is therefore the ability to recognize the feelings, or intentions of another person, and, the ability
to understand basic interpersonal situations. The examination of test items also indicates that attention to behavioral cues is essential to both abilities (O'Sullivan et al., 1965).

The next part of this overview relates to the development of the concept of cognitive style. The focus will center on those elements of the schizophrenic's cognitive style which could affect attention to behavioral cues.

Cognitive Style

In a broad sense cognitive style is related to Freud's (1909) concept of the ego as moderator between the demands of the id and those of external reality. This idea was amplified by Gardner, Holtzman, Klein, and Spence (1959) under the name of "cognitive control."

... the organism must not only bring needs, impulses and wishes into continual harmony; it must also resolve the many independent claims of reality. A person is always in a state of motivation, i.e., never without purpose. But while much of his behavior is concerned with reaching satisfying and desirable objects or states, his attempts at need satisfaction are molded by an even more central requirement of survival. ... In our view, a cognitive control describes an organizational tendency that relates the functioning of these structures (i.e., appraisal of reality) to each other within the person. It is an intervening structural condition accounting in part for the particular impact of a need on cognition (Gardner et al., 1959, pp. 3-4).

In less analytic terms, cognitive style represents an interaction of intellectual, perceptual, and personality variables. This interaction has three components or dimensions which are of main concern to this paper, environmental
scanning, cognitive filtering or categorization, and social inhibition.

**Scanning and Filtering.** Sullivan (1960) cited the vigilance of paranoids as a defense against intimacy. Arieti (1955) elaborated this theme and speculated that the pre-paranoid learns to defend against accusations by anticipation, an activity that contributes to alert scanning of the social environment.

Broen (1966) and Broen and Storms (1966) noted that arousal level could influence scanning. Earlier, Broen (1964) had speculated that nonparanoids coped with high arousal by limiting their scanning.

Cromwell (1968) proposed that deviant scanning was but one facet of the schizophrenic's approach to problem solving. Moreover, amount of scanning was insufficient to differentiate schizophrenic subgroups. Cromwell stated that schizophrenics are characterized by a maladaptive participatory set which included not only extremes in scanning activity, but also defects in the make-up of cognitive categories, i.e., categories were unstable with shifting definitions or were too rigid.

Silverman (1964; 1967) found evidence that paranoid schizophrenics scanned more widely than nonparanoid schizophrenics. Silverman's formulation was based on two principles identified by Gardner et al. (1959), namely scanning control and cognitive filtering, aspects of cognitive control.
Scanning control reflected the amount or breadth of environmental searching done by an individual. Cognitive filtering pertained to the structure of the cognitive categories used to organize information. The primary dimension of this categorical structure was that of narrowness versus wideness. The implications of either end of the continuum being rigid, restrictive compartmentalization versus diffuse disorganization respectively, Silverman found evidence that paranoid schizophrenics tended to be characterized by extensive scanning and filtering of data into narrow conceptual categories. Nonparanoid schizophrenics, on the other hand, showed a reverse tendency, i.e., little scanning and diffuse categorization.

Silverman further hypothesized that the wide scanning of the paranoid leads to the reception of many unpleasant stimuli. Rather than limit scanning, which would reduce vigilance, the paranoid copes by forcing data into rigid nonthreatening categories.

For the paranoid process at least, the relationship between scanning and filtering appears to serve a defensive purpose, cognitive complexity is reduced to preserve vigilance. In like fashion, the nonparanoid schizophrenic reduces scanning in an effort to control stimulation. The relationship between low scanning and diffuse categorization, however, is not clear.

McGonaghy (1960) postulated that there were two ways
of deviating from normal associative patterns. A person might develop heightened capacity to assign logical meanings to events. However, a "triumph of logic over common sense" occurs when a person resists data that would conflict with the original assignment of meaning. The other type of deviation is marked by a weakening of the capacity to assign meaning. This second pattern leads to vague, fragmented, and loose associations. McGonaghy assigned the first pattern to paranoids and the second to nonparanoid schizophrenics.

Bower, Testin, and Roberts (1960) found some support for McGonaghy's hypothesis. Scales of "disorganization" and "arbitrary tightening" were applied to the Rorschach protocols of several diagnostic groups. Nonparanoid schizophrenics were high on the former scale; paranoid schizophrenics were higher than all other groups on the latter scale.

The connection between scanning and filtering may not be limited to the schizophrenic syndrome. Obsessive compulsive neurosis, for example, may represent a state having high scanning and a relatively large number of cognitive categories. This stance would allow for extensive gathering of data yet retard decision making and, therefore, the responsibility for acting on choices.

There is a different question concerning the relationship of scanning and filtering in the general or so-called normal population. Henry Clay Smith in Sensitivity to People (1966) has reviewed a number of studies pertinent to this
question. Smith concluded that six variables were necessary to account for the manner and accuracy with which one individual makes judgments about another. Two of these Smith labels as "judging habits of the perceiver." These habits are defined in terms of rating scale dimensions or response styles. Smith's analysis, plus those of Guilford (1954) and Cronbach (1955), suggest that there are several variables which determine a response or cognitive style. Of these, there is close correspondence between what Smith calls perceiver "level" and "spread" and Guilford's (1954) analysis of the effect of constant errors of judges on rating scale scores.

Smith also proposed that a reciprocal, and not always helpful relationship existed between the individual's skills of observation and his stereotypes, i.e., knowledge or prejudices about various groups, and what attributes would be expected to correlate with group memberships. In Smith's analysis "stereotype" knowledge represents a continuum from over-simplified gross prejudices to multiple analysis of a person in terms of his or her affiliations with several groups. In a similar sense, Gollin (1958) and Gollin and Rosenberg (1956) proposed a concept of "relational thinking." Their studies investigated the ability of subjects to link together seemingly disparate classes of social affiliation, e.g., state what the following have in common: Catholic, Buddhist, Communist. Gollin found that subjects differed not only in cognitive
complexity, i.e., ability to see similarities and differences in affiliations, but also that this complexity or relational thinking ability correlated significantly with accuracy measures of judgments about others. Gollin also suggested that there was a negative correlation of relational thinking to speed of figure closure. Smith (1966) added that closure speed was a possible analog to the speed used to "shut off" data about others so that a decision might be made. This suggests that rapid closure interferes with scanning.

The evidence suggests an inverse relationship between filtering and scanning for the schizophrenias only. The dovetailing of these components for other groups cannot be stated as simply. Figure closure speed may reflect scanning interference for schizophrenics, but not, for example, for workmen engaged in quality control tasks. Closure speed, however, is related to another dimension of cognitive style and is discussed below.

Inhibition. Pemberton (1952) and Pawlik (1966) stated that closure speed is a component test of the personality factor called "inhibition" or "h" by Cattell (1965). Cattell saw one example of this inhibition to be a cautious and timid approach to events. "H" is a bi-polar factor related to inhibition and appears in Cattell's Sixteen Personality Factor Questionnaire (1957). Examination of the items comprising factor H indicates that H has special reference to the approach to social or interpersonal events. Roughly, H appears to re-
late to the comfort experienced while engaging others, or 
being the center of attention. H, a specialized form of 
inhibition, is viewed in the present research as a potential 
influence on SI and shaper of cognitive style. High in-
hibition, for example, could limit the amount of social interactions and result in decreased practice.

SI and Schizophrenic Cognitive Style

A general conceptualization of the relationship be-
tween social intelligence and cognitive style can be made 
by analogy to the relationship between learning and perform-
ance. More specifically, Thorndike's definition of SI was a 
formulation of SI both as "learned" in the sense of a cog-
nitive ability, and "performance" in the sense of "acting wisely." Wise social action, however, might be expected to 
be associated with two aspects of cognitive style, namely 
scanning and cognitive filtering. These two terms approx-
imate the individual's appraisal of the social situation, 
an appraisal which is also influenced by the individual's 
prior experiences with social situations. A resultant function of the person's past dealings with people can be 
formulated as his readiness to deal with others as opposed 
to inhibition.

The cognitive style with which a person approaches a 
situation is describable in terms of his filtering of data, 
scanning of data, and inhibition. His performance or ef-
fectiveness in the given situation, however, is not only a function of his cognitive style and abilities, but also a function of two additional factors, namely, process and situation specific. Process means that the individual's style and ability for a given social event are actualized or retarded by the skills, or lack thereof, of the other participants. Situation specific factors refer to the demands, structure, and purpose of the given social situation.

Table 4 provides a summary statement of how three diagnostic groups might be expected to differ from one another and from an "idealized normal" group in terms of the dimensions.

Social Intelligence, however, is not shown as a dimension but is viewed as a set of cognitive abilities. Extreme positions on any or all of the dimensions shown in Table 4 are hypothesized to impair SI, e.g., a severe constriction of scanning would result in reduced attention to behavioral cues.

A different rationale accounts for the exclusion of inhibition as a dimension in Table 4. As indicated earlier, closure speed is a component of the inhibition factor and bears a possible relationship to the amount of environmental scanning done by the individual. Only extreme scores on both closure speed and inhibition, however, appear to have implications as sources of interference. It may be a sound analogy to relate speedy closure to overly quick decision making, but
Table 4
Relative Projected Positions of 4 Groups on
2 Dimensions of Cognitive Style

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of Categories</th>
<th>Amount of Scanning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idealized Normal</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Nonparanoid Schiz.</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Paranoid Schiz.</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Obsessive Compulsive</td>
<td>High</td>
<td>High</td>
</tr>
</tbody>
</table>
the resemblance is confounded when tests of figure closure are examined (see Appendix B). Such tests combine, in terms of correct response, factors of speed and accuracy. Thus high scores reflect competence in both areas while low scores indicate weakness in speed, accuracy, or both.

The picture for inhibition scores is also difficult. Extremely high inhibition would seem to deflate SI through either decreasing scanning, as an analog of interpersonal anxiety, or as a reducer of social practice. The other extreme, that of relative lack of inhibition, may adversely effect SI, but the "how" of this relationship is difficult to conceptualize. It may indicate a propensity to take the center of attention too often and therefore, "unwisely," but this appears to place too great a burden on the likeness of one personality variable to overt behavior.

The questions of how an SI score is affected by cognitive style variables and that of what factor the given SI scores measures, are interdependent. That is, not all of the SI abilities appear to be equally dependent on scanning or any other single dimension. Thus it remains to reexamine that part of the Structure of Intellect model which Guilford (1967) calls "Behavioral."

O'Sullivan et al. (1965), described the nature and development of several tests of SI. Later, O'Sullivan and Guilford (1966) published the Six Factor Tests of Social Intelligence. Both sources indicated that research has, so
far, focused on the operation called Cognitive in relation to behavioral content.

Four of the areas are: (a) Cognition of Behavioral Classes which requires the assembly of units (facial expressions and postures for example) into congruent expressions of one thought, feeling or attitude; (b) Cognition of Behavioral Systems which requires the interpolation of a missing segment into a pictured social interaction; (c) Cognition of Behavioral Implications. Here the testee must determine which alternative represents the best completion of a serially depicted social event; and, (d) Cognition of Behavioral Transformations wherein the testee must select the alternative that most radically changes a depicted social process.

Some theoretical statements can now be made about the connections of these four factors to previously postulated dimensions of cognitive style. The Expression Grouping subtest requires the subject to integrate cues from different sources into a one unified social message. Low scanning reduces the probability of attending to these various cues and could result in Expression Grouping scores indicating impairment in low scanners.

Less obvious are the effects of the remaining dimensions of cognitive style, number of categories and inhibition. One effect of an extremely low number of categories would be to reduce scores on tests of cognition of behavioral transformations, e.g., Picture Exchange, via lack
of ability to build complex sets. This, however, is problematic. It does appear that the model of cognitive style is too simplistic to predict any main effect for the factor of transformations.

To venture beyond the so-called obvious predictions, it may be more useful to consider sets of dimensions as applied to groups and predict selective SI deficits.

In Table 5, are listed three gross diagnostic subgroups and their respective tendencies expressed as high or low, on three dimensions of cognitive style.

Note that while the schizophrenic categories contain other subgroups, the nonschizophrenic grouping is defined by a process of exclusion. Since it is composed of patients with various types of pathology, it is too heterogeneous to be simply characterized on these dimensions.

The schizophrenic subgroups are differentiated most clearly (Table 5) by the dimensions of category number and amount of scanning. Scott (1962) proposed a Differentiation Index which would yield the number of categories used by individuals. Scanning, on the other hand, has been related to the factors of speed of figure closure and inhibition (Cattell, 1965). Measures of these respective factors are the Closure Speed Test (Thurstone & Jeffrey, 1960) and factor "H" extracted from Cattell's 16 PF Test (Cattell & Eber, 1957). Extremely high scores on these tests are expected to indicate low scanning extremely low scores, relatively slow figure
Table 5

Difference Between Subgroups by Dimension of Cognitive Style

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>Number of Categories</th>
<th>Inhibition</th>
<th>Scanning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paranoid Schizophrenic</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Nonparanoid Schizophrenic</td>
<td>High</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Nonschizophrenic</td>
<td>Variable for all dimensions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
closure and low inhibition, are related to high scanning activity.

This analysis leads to the prediction of differences in social intelligence and cognitive style between schizophrenic subgroups. Selective SI deficits are posited to be characteristic of the schizophrenias. While defining the exact place of such deficits in etiology is beyond the scope of this paper, these impairments are proposed to be distinct from other measures of ability and from the effects of hospital confinement. Any evidence for a selective impairment would be negated if schizophrenics were found to score significantly lower than nonschizophrenics on a variety of measures, i.e., verbal intelligence as well as SI.

Hypotheses

1. Subjects diagnosed as schizophrenic have significantly lower scores on the SI tests Missing Pictures and Cartoon Predictions than subjects with diagnoses other than schizophrenia.

2. Subjects diagnosed as paranoid schizophrenic will have higher scores on the SI test, Expression Grouping, than subjects in other diagnostic categories.

3. Subjects diagnosed as paranoid schizophrenic will show a lower mean number of cognitive categories as measured by Scott's Differentiation Index than subjects with diagnoses other than paranoid schizophrenia.
4. Nonparanoid schizophrenics will have a higher mean number of cognitive categories, as measured by Scott's Index, than patients with diagnoses other than schizophrenia.

5. There will be a significant negative correlation between closure speed, as measured by the Closure Speed Test (Thurstone & Jeffrey, 1960) and Expression Grouping scores.

6. Scores reflecting low inhibition (Cattell's factor "H,"") will correlate positively with Expression Grouping.
**METHOD**

**Subjects**

Subjects were drawn from those admitted to Chicago Read Mental Health Center for in-patient psychiatric care. Patients resided in wards D-North and D-South.

Ninety percent of these patients were from the Chicago areas called Lincoln Park, Loop and Lower North. All patients were from lower to lower middle socio-economic level i.e., many were on Public Aid or had a gross income of less than $6,000.00 per year. The mean years of formal education was just under 10 with a range of five to 14.

Testing was attempted on 56 subjects. Of these, 29 could not be given the entire test battery. Fourteen refused to cooperate to the conclusion of the test series. Testing was halted on another seven subjects when evidence was found to make their inclusion doubtful, e.g., organic states, perceptual handicaps. Another eight subjects left the hospital by transfer, discharge, or unauthorized absence before completion of testing.

Of the 27 subjects tested, 14 were female and 13 were male. The breakdown by category was: nonschizophrenic, nine; nonparanoid schizophrenic, ten; and, paranoid schizophrenic, eight. Appendix D shows subgroups composition by sex, age, and educational level.
Two considerations influenced the selection of subjects. First, symptoms such as hallucinations had to be mild so as to not interfere with testing or distort its results. Second, there had to be reasonable agreement as to the subject's diagnosis, i.e., subjects were assigned to one of three groups, paranoid schizophrenic, nonparanoid schizophrenic, or nonschizophrenic on the following bases:

a. If a subject were a readmission, previous diagnoses were considered for agreement.

b. If previous diagnoses were variable, the opinion of two senior clinicians was sought. If there continued to be no agreement, the subject was not tested.

c. If a subject were a first admission, the procedure outlined in "b" above was followed.

Three subtests were taken from the Six Faster Tests of Social Intelligence (O'Sullivan & Guilford, 1966). Expression Grouping requires the testee to integrate diverse behavioral cues such as posture or facial expression into a congruent whole. Missing Pictures presents the subject with a series of photographs of an ongoing social situation in which one picture is left out. The subject's task is to select the alternative picture that best completes the depicted situation. Cartoon Prediction presents a series of social situations in which the last or concluding cartoon is omitted. The subject's task is to select the alternative cartoon that represents the best or most usual conclusion to the situation.
All of these instruments are scored by the formula, number correct minus a fraction of the number wrong. The fraction represents the number of alternate responses. Omitted items were not deducted from the score.

An important consideration is whether or not a deficit in SI, found in any of the above tests, reflects an SI deficit, or merely that a given subgroup is deficient in a number of areas. Accordingly, the Verbal scale of the Shipley-Hartford (1946) series was included to determine if groups were equivalent in areas other than SI. This test is in multiple choice format and requires the testee to select a synonym for each stimulus word. Scoring is done by counting the number of correct choices.

The H scale or inhibition was extracted from the Sixteen Personality Factor Test (Cattell & Eber, 1957). The format is multiple choice and all items are shown in Appendix A. Scores for this test are reported in raw form (Hr) and weighted form (Hw). The latter represents conversions from a table by Cattell and Eber which is based on the general population sample. No standard score tables currently exist for psychiatric samples and the general population conversion made identification of extreme scores easier.

Scott's Differentiation Index (1962) completed the battery. It was used to give an approximation of the number of categories used by a subject in differentiating a small sample of other persons. Time considerations forced the
simplication of the test. Preliminary steps used to define significant others and roles were eliminated. The revised format is shown in Appendix B.

Instructions were taken from Mehrabian (1968). The measure of the number of categories is the Differentiation Score or "H," which was yielded by the formula:

$$H = \log_2 \frac{N-1}{N} \sum (N_i \log_2 n_i)$$

where log is to base 2, $N =$ number of different names or persons used and $n_i$ is an index of those appearing in more than one group.

Procedure

No strict order of presentation of the seven sub-tests was used. The Shipley verbal scale was, however, usually administered first as its format and content was considered to be more familiar to subjects, than that of SI tests.

Factors such as time available to the patient that day, his or her cooperativeness and fatigue, were often decisive in determining which test or tests would follow the verbal scale. For all tests, save Scott's Differentiation Index, instructions were read to the subject. Once timed tests were begun, those in the SI series, no questions were answered. All remarks addressed to patients were those of encouragement.

Before formal testing was initiated, and after the subject gave some indication that he would cooperate, the testee was told that the battery was experimental. Inter-
pretation of the results would be given to his or her treatment coordinator only if such results could help or provide useful information. The subject was also told that while the testing might not provide any definite help to him, the results, in total, might be of some help to other patients.

Most testees required additional encouragement and explanation with the Scott Index. Despite these efforts, nine of the twenty-seven subjects who completed the other tests could not or would not complete the Scott Index.

In no case did a testee respond unfavorably to positive reinforcement, "You're doing fine" or encouragement, "Just keep trying," although such devices did not prevent some subjects from refusing to continue. While the database is small, three cases, it does not appear advisable to proceed with other SI tests, if a subject is unable to cope with the SI instrument that is presented first.
RESULTS

Table 6 presents the means, medians and standard deviations by subgroup and total sample for the following tests: the Verbal scale from the Shipley, Figure Closure Speed, Inhibition raw and weighted scores, Missing Pictures, Cartoon Predictions and Expression Grouping.

Inspection of Table 6 reveals that the paranoid subgroup scored approximately the same as nonschizophrenics on all measures. Both groups showed higher mean scores than the nonparanoid schizophrenics.

Table 7 presents the results of a one-way analyses of variance (Winer, 1962) for the three groups. This analyses yielded significant differences between groups for three measures, Inhibition (standard scores), Missing Pictures, and Expression Grouping. Table 8 presents the results of t tests between all combinations of subgroups for the three tests. This table, in conjunction with the presentation of means in Table 5 shows that paranoid schizophrenics and nonparanoids did not significantly differ in any measure, but that each of these groups scored significantly higher than the nonparanoid schizophrenics on all three measures. Thus Hypotheses 1 and 2 were supported. Subjects diagnosed as nonparanoid schizophrenic scored lower than other subjects on Missing Pictures. Cartoon
Table 6

Mean, Median, and Standard Deviation Scores by Test, Subgroup, and Total Sample

<table>
<thead>
<tr>
<th>Test</th>
<th>Nonparanoid Schizophrenic N=9</th>
<th>Non-Schizophrenic N=10</th>
<th>Paranoid Schizophrenic N=8</th>
<th>Total N=27</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean Md S.D.</td>
<td>Mean Md S.D.</td>
<td>Mean Md S.D.</td>
<td>Mean Md S.D.</td>
</tr>
<tr>
<td>Verbal</td>
<td>23.0 21.5 8.4</td>
<td>28.2 30.0 8.1</td>
<td>26.6 27.5 7.8</td>
<td>25.8 24.0 8.3</td>
</tr>
<tr>
<td>Figure Closure</td>
<td>11.6 11.0 3.0</td>
<td>15.6 15.0 6.1</td>
<td>14.3 14.0 4.2</td>
<td>13.7 14.3 4.9</td>
</tr>
<tr>
<td>Inhibition Raw Score</td>
<td>8.4 8.6 3.2</td>
<td>11.8 12.0 5.0</td>
<td>14.8 14.0 3.5</td>
<td>11.4 13.0 4.8</td>
</tr>
<tr>
<td>Inhibition Weighted</td>
<td>3.8 4.0 1.2</td>
<td>5.0 5.0 1.8</td>
<td>6.0 6.0 1.3</td>
<td>4.9 5.4 2.6</td>
</tr>
<tr>
<td>Missing Pictures</td>
<td>7.1 6.7 1.8</td>
<td>10.3 10.0 2.3</td>
<td>9.5 9.7 2.0</td>
<td>8.9 8.7 2.6</td>
</tr>
<tr>
<td>Expression Grouping</td>
<td>10.8 11.5 3.5</td>
<td>17.0 17.7 4.6</td>
<td>18.3 19.1 3.7</td>
<td>15.4 16.5 5.2</td>
</tr>
<tr>
<td>Cartoon Predictions</td>
<td>14.6 15.7 4.0</td>
<td>17.5 18.3 2.9</td>
<td>17.4 18.3 2.9</td>
<td>16.9 17.4 3.8</td>
</tr>
</tbody>
</table>
Table 7

F Ratio Value from One-Way Analyses of Variance by Test for the Schizophrenic, Non-schizophrenic and Paranoid Groups

<table>
<thead>
<tr>
<th>Test</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbal</td>
<td>1.1</td>
<td>NS</td>
</tr>
<tr>
<td>Figure Closure</td>
<td>1.5</td>
<td>NS</td>
</tr>
<tr>
<td>Inhibition-raw Score</td>
<td>2.9</td>
<td>NS</td>
</tr>
<tr>
<td>Inhibition-standard score</td>
<td>4.7</td>
<td>.05</td>
</tr>
<tr>
<td>Missing Pictures</td>
<td>6.5</td>
<td>.01</td>
</tr>
<tr>
<td>Cartoon Predictions</td>
<td>1.5</td>
<td>NS</td>
</tr>
<tr>
<td>Expression Grouping</td>
<td>7.0</td>
<td>.01</td>
</tr>
</tbody>
</table>
## Table 8

Results of t Tests for Three Measures by Subgroup Pairings

<table>
<thead>
<tr>
<th>Test</th>
<th>Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Paranoid Nonparanoid Schizophrenic</td>
</tr>
<tr>
<td></td>
<td>t</td>
</tr>
<tr>
<td>Inhibition Standard Score</td>
<td>10.5</td>
</tr>
<tr>
<td>Missing Pictures</td>
<td>6.6</td>
</tr>
<tr>
<td>Expression Grouping</td>
<td>11.2</td>
</tr>
</tbody>
</table>
Predictions did not differentiate the subgroups as expected, and the relative superiority of paranoid schizophrenics on Missing Pictures was not predicted. Hypothesis 2 did not predict the obtained lack of difference between paranoids and nonschizophrenics on Expression Grouping.

Table 6 does not show group scores for Scott’s Index. Of the 27 subjects only 16 yielded scorable protocols for this measure. A modification of the Kruskal-Wallis Analysis of Variance (Siegel, 1956) was applied to this smaller N, with a finding of no significance of difference between subgroups. Therefore Hypothesis 3 which predicted significantly lower scores for paranoids was not supported. Similarly, Hypothesis 4, which predicted a higher mean number of cognitive categories for nonparanoid schizophrenics, was not supported.

Hypotheses 5 and 6 concerned correlations. Table 9 presents Spearman Rank Order Correlations between all measures by subgroup and total sample. Hypothesis 5 predicted a significant negative correlation between Closure Speed and Expression Grouping. Although small negative correlations were found for the paranoid (-.24) and nonparanoid schizophrenic (-.08) subgroups for these measures, the correlations were not significant and the hypothesis was not supported.

Hypothesis 6 predicted a significant positive correlation between Inhibition and low scoring on Expression Grouping. Rho ranged from -.25 to +.28 and did not reach significance. Hypothesis 6 was not supported.
Table 9
Rank Order Correlations between Tests by Subgroup and Total Sample

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<th>Raw Score Inhibition</th>
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<th>Cartoon Predictions</th>
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* $p \leq .05$  
** $p \leq .01$ (two tail test)
DISCUSSION

Three concepts had a primary role in generating the hypotheses of this dissertation. These were: (a) the schizophrenic syndrome is characterized by selective deficits in social intelligence abilities; (b) the deficits are selective in that different forms of the syndrome are marked by different performance decrements of SI abilities i.e., paranoid schizophrenics would do well in tests involving scanning, but not well where cognitive flexibility was demanded; and (c) a given deficit can be understood in terms of the cognitive style associated with the syndrome. Thus special attention given to the paranoid's wide scanning, one facet of his cognitive style.

Two SI tests differentiated between the paranoid and nonparanoid forms of schizophrenia. It was hypothesized, however, that only one of these measures, Expression Grouping, would so delineate the groups. Moreover, the deficits predicted for paranoids in SI were not found and an inspection of the mean scores for all tests suggests that the paranoids' functioning was closer to that of nonschizophrenics than to that of the other schizophrenics. This similarity does not appear to mean that the paranoids and nonschizophrenics simply functioned better or more adequately than nonparanoid
schizophrenics. Had this been the case, all or nearly all of the measures employed would have yielded significant differences to the detriment of the nonparanoid schizophrenics.

A different conclusion is more consistent with the results. Namely, the groups used were defined in two instances by the principle of exclusion, i.e., nonschizophrenic and nonparanoid schizophrenic, and were thereby more heterogeneous than the paranoid sample. This leads to the speculation that more clear cut deficits might be demonstrated if additional distinctions had been used, e.g., the continuum of acute-chronic as suggested by Spohn, Thetford, and Cancro (1970). Adding a new dimension would yield more homogeneous groups.

While the use of less heterogeneous samples might be useful, it also appears that the measures of SI and cognitive style may have presented certain problems. First of all, additional evidence is needed to demonstrate the relative independence of the SI measures developed by O'Sullivan and Guilford (1966). Stated simply, such SI measures should correlate more strongly with each other than with tests involving other traits or abilities. O'Sullivan and Guilford reported relatively low but significant correlations (i.e., .20 to .30) between SI and verbal intelligence measures. The tendency of results in the present paper favored the relative independence of SI tests. One measure however, Cartoon Predictions, was found to have a positive significant relationship
(.89) with the verbal scale. This last finding may be an artifact, and so may be the lack of differentiation between groups shown by Cartoon Predictions. However, all of the measures in the Six Factor Tests of Social Intelligence are still in the experimental stage and require further validation before artifact can be sharply distinguished from differential functioning. For instance, studies utilizing the multitrait-multimethod approach (Campbell & Fiske, 1959) would be advantageous in investigating the convergent and discriminant validity of SI measures.

A second problem concerning the tests used in this paper was Scott's Differentiation Index (1962). This was to be a direct measure of the number of cognitive categories used in appraising other people. Even in its simplified form, Scott's Index appeared to be unsuitable for psychiatric in-patients. If possible this index should be simplified and restructured to allow time for the subject to practice with the format.

In view of the above, it is not at all clear that selective deficits in SI differentiate between psychiatric groups. Not only are the results inconsistent with this proposal, i.e., no significant differences found between paranoids and nonschizophrenics, but also the issue is clouded by questions concerning the sample and tests used. It remains to consider the model underlying the hypotheses.

The structure of cognitive style as presented in this
paper was overly simplified. Three dimensions of this style had been identified as scanning, the number of cognitive categories used, and degree of social inhibition. Even if given the assumption that the number of dimensions is adequate, it now appears that the dimensions require further elaboration or that they be replaced. Moreover, it is doubtful that one of the dimensions, scanning, was measured at all. Both points can be illustrated by considering the logical association made between scanning and figure closure. Rapid figure closure was proposed to interfere with scanning. Thus high scores in closure were predicted to correlate negatively with scores of Expression Grouping, a test assumed to require relatively wide scanning. Correlations ranged from -.24 to .24 and did not attain significance. Of most importance is the fact that the relationships of closure and Expression Grouping to scanning are merely inferential. There is no impelling reason to conclude that scanning was measured, even indirectly.

One way of elaborating the dimension of scanning would be to more carefully study the relationship between it and closure. Speed of closure, in itself, is an insufficient index to scanning activity. Of equal or more pertinence is the efficiency of closure as identified by Holtzman (1970), i.e., the ability to select and store relevant data while in the approach phase of problem solving. In the final analysis, scanning should be replaced by speed and efficiency of closure.
as a dimension of cognitive style. This step would provide direct measurement in place of inference.
Selective differences in social intelligence (SI) abilities were hypothesized to differentiate among three psychiatric groups, paranoids, nonparanoid schizophrenics, and nonschizophrenics. The theoretical explanation for differential SI functioning was the concept of cognitive style, defined as a typical approach to problem solving in the face of competing demands. Dimensions of cognitive style were identified as amount of scanning, number of cognitive categories, and degree of inhibition.

Extreme positions on these dimensions were posited to reflect cognitive approaches which could interfere with SI abilities. Paranoids were predicted to evidence more scanning, but less inhibition and to use fewer cognitive categories than other schizophrenics. It was also predicted that paranoids would use fewer categories than nonschizophrenics. Nonparanoid schizophrenics were predicted to show less scanning and more inhibition and to use more categories than nonschizophrenics.

A test battery was devised to assess social intelligence and cognitive style. Three SI measures, Cartoon Predictions, Missing Pictures, and Expression Grouping, were taken from the Six Factor Tests of Social Intelligence. An inhibition scale (H) was extracted from Cattell's Sixteen
Personality Factor Questionnaire. Scott's Differentiation Index was used to indicate number of cognitive categories. Scanning was indirectly measured by speed of figure closure and Expression Grouping. A verbal intelligence scale was included for purposes of control and correlational study.

Subjects were selected from receiving units of Chicago Read Mental Health Center. Of the 56 involved, 27 completed all or most of the battery. Most subjects could not understand the Differentiation Index. That measure was not included in the analysis and predictions about number of categories were not tested.

No significant differences were found between patients diagnosed as paranoids and nonschizophrenics. Both groups scored significantly higher than nonparanoid schizophrenics on the SI measures, Expression Grouping and Cartoon Predictions. Paranoids had significantly lower inhibition scores than nonparanoid schizophrenics. Expected correlations between Expression Grouping figure closure and inhibition were not found. However, the groups were roughly equivalent in verbal intelligence.

Consequently, predicted selective deficits in SI were not demonstrated. Reexamination of the proposed model of cognitive style indicated that it was overly simplistic and that the connection proposed between scanning and the SI test, Expression Grouping, was probably erroneous. The differences found between paranoid and nonparanoid schizophrenics suggest further research in the relationship of SI to Differential diagnosis.
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APPENDIX A
Items from the H Factor of Cattell's 16 PF Test

1. On social occasions I: (a) readily come forward; (b) respond in between; (c) prefer to stay quietly in the background.

2. I get slightly embarrassed if I suddenly become the focus of attention in a social groups (a) yes (b) in between (c) no.

3. I am always glad to join a large gathering, for example, a party, dance, or public meeting (a) yes (b) in between (c) no.

4. I tend to deep quiet in the presence of senior persons (people of greater experience, age or rank) (a) yes (b) in between (c) no.

5. I find it hard to address a large group (a) yes (b) in between (c) no.

6. My reserve always stands in the way when I want to speak to an attractive stranger of the opposite sex (a) yes (b) in between (c) no.

7. I would rather have a job with (a) a fixed certain salary (b) in between (c) a larger salary but depending on my persuading people I am worth it.

8. Quite small setbacks occasionally irritate me too much (a) yes (b) in between (c) no.

9. I have as many friends of the opposite sex as of my own (a) yes (b) in between (c) no.

10. Even in an important game I am more concerned to enjoy it than to win (a) always (b) generally (c) occasionally.

11. I consider myself a very sociable outgoing person (a) yes (b) in between (c) no.

12. In social contacts I (a) show my emotions as I wish (b) in between (c) keep my emotions to myself.

13. I somewhat dislike having a group watch me work (a) yes (b) in between (c) no.

14. I'm the energetic type who keeps busy (a) yes (b) in between (c) no.
APPENDIX B
Instructions to Subjects for
Scott's Differentiation Index

A. Here is a list of words. Think of the person who best fits the meaning of each word. Put his or her name, nickname, or initials on the line after each word.

Father   Mother   Friend
Spouse   Boss   Brother or Sister
Teacher   Relative   Enemy
Therapist

B. Arrange into groups the names you have listed in Part A above. Make as many groups as you can and feel free to place the same person in your different groups. Assign a letter to each of your groups in order to identify it.

Once you have written out the lists of persons in each of your groups, we would like you to do the following. What made you place the different people in each of the groups? Please state your reason briefly.
Please fill in:

Name ________________________________

Age ________ Sex ______ Date _______

Occupation __________________________

Directions

Below is an incomplete picture of a man pushing a wheelbarrow. A description of what the picture represents has been written on the black line under it.

Below are some more pictures for you to identify. Write your answers on the lines.

WHEN YOU GET THE SIGNAL TO BEGIN, open your booklet and identify more pictures of the same kind. Work as fast as you can until you are told to stop. If some pictures are too difficult, skip them, and return to them later if you have time. You may need more than one word to identify the picture fully. You will have three minutes to do as much as you can.

STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

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1225 East 60th Street - Chicago, Illinois 60637
Identify the pictures. Return later to those you find difficult.

DO NOT STOP. GO ON TO THE NEXT PAGE.
### Data by Subgroup-Age, Sex, Years of Education and Test Score

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APPENDIX E
Comparison to Mean and Standard Deviation of Psychiatric Sample to Sample of O'Sullivan and Guilford (1966)

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APPROVAL SHEET

The dissertation submitted by John P. Mitchell has been read and approved by the following Committee:

Dr. LeRoy Wauck
Professor, Psychology, Loyola

Dr. Emil Posavac
Associate Professor, Psychology, Loyola

Dr. Jean Foley
Associate Professor, Psychology, Loyola

The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the Committee with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

May 16, 1974

[Signature]
Director