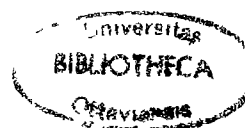


CAUSAL THOUGHT IN SCHIZOPHRENIC CHILDREN

by Bertha Mook

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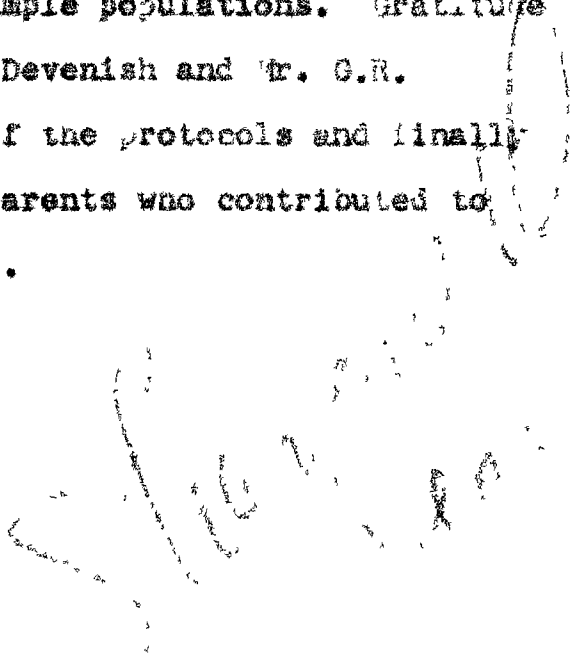
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CURRICULUM STUDIORUM

Bertha Mook was born October 23, 1940, in The Hague, The Netherlands. She received the Bachelor of Science degree from Potchefstroom University, South Africa, in 1962; the Master of Arts degree in Psychology from the University of Ottawa in 1966. The title of her thesis was Retino-Cortical Inhibition and Creative Thinking.

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INTRODUCTION

The genesis of schizophrenic thought is an intriguing, complex problem which has received little attention up to the present time. This is not surprising as the fields of childhood schizophrenia and infantile thought are still relatively obscure. Experts have not yet reached an agreement as to what exactly constitutes the syndrome of childhood schizophrenia. On the other hand, experimental investigations in the realm of primitive thought are shrouded with difficulties. Nonetheless, the genesis of schizophrenic thought is an urgent problem which calls for inquiry.

After a review of the literature of childhood schizophrenia and cognitive development the writer became convinced that a genetic, organismic study of primitive thought in schizophrenic children would be possible and could lead to fruitful insights. In spite of the lack of standard nomenclature in the field of schizophrenia in children, authors do agree upon the most fundamental aspects of this illness. In a nutshell, these children fail to establish affective relationships with things and people and do not succeed in a delineation of boundaries between themselves and their world. These impairments limit interaction between subject and object which consequently affects their growth of knowledge. Clinically, and

experimentally their thought has been characterized as primitive, concrete, subjective and illogical.

The inspiration for the study of primitive thought in schizophrenic children has been provided by the authority in the domain of cognitive development, Jean Piaget. During the last decade Piaget's work has received increased attention. This psychologist and philosopher traced the origins of intelligence from birth to maturity in terms of a bio-social, interactional process between subject and object. He formulated a theory of infantile thought or "pre-causality" in which he studied the child's beliefs about reality and causality. According to him, these pre-causal beliefs are productive, personalized inventions resulting from dynamic participations established between the self, objects and others. They are subjective, pre-logical and concrete in nature. Upon progressive socialization they are gradually transformed into objective, logical and causal ways of thought.

To what extent are schizophrenic children with their impaired affective and subject-object relationships capable of forming pre-causal beliefs? Further, do they, in view of their poor socialization ability, succeed in the discovery of elementary logical and causal relationships? These questions intrigued the writer. Piaget's theory of infantile thought, which is genetic and dynamic with well

defined stages, as well as the recent availability of standardized questionnaires in this domain, made an investigation of causal thought development in schizophrenic children possible. Pathological phenomena can be understood in terms of structural, dynamic and organizational properties of intellectual functioning in view of Piaget's theoretical frame of reference. Application of his theory to schizophrenic children's thought may also help to enrich the meaning of previous research findings on cognitive disorders in such children.

The thesis is divided into four chapters. The review of the literature starts with a discussion of the theoretical and clinical views on childhood schizophrenia supported by experimental contributions on their cognitive disorders. This is followed by an introduction to Piaget's theory on causal thought development and its possible heuristic value for elucidation of child schizophrenic thought. The second chapter presents a description of the sample population, the measuring tools, procedures and techniques for data analyses. The quantitative and qualitative results are presented in the third chapter. Finally, an interpretation of the pre-causal and causal thought patterns in schizophrenic children is offered. Conclusions are followed by suggestions for future research.

CHAPTER I

REVIEW OF THE LITERATURE

The literature on childhood schizophrenia has already reached considerable dimensions. In this chapter an effort will be made to introduce the most relevant theoretical ideas and research findings as they pertain to the topic of this dissertation. First, the theoretical and clinical writings on childhood schizophrenia, including its present status, will be reviewed. A second section will focus on research studies concerning cognitive or personality deviations providing further support to the nature of this clinical syndrome. Subsequently, Piaget's main theoretical principles with a focus on pre-causal thinking will be introduced, followed by experimental verification in this domain. This will form the preparatory ground for introducing the thesis concerning schizophrenic children's thought on reality and causality.

1. Theoretical and Clinical Views on Childhood Schizophrenia.

Up to the present time no universal agreement as to what constitutes the syndrome of childhood schizophrenia has been reached. The conception of this condition has developed since the beginning of this century leading to an accumulation of a variety of opinions, especially during

the last twenty years. In spite of the large amount of material available, the field is characterized by semantic confusion pointing towards an incomplete state of knowledge and a need for the search of unifying factors. Many authors still include in the syndrome of childhood schizophrenia related conditions of infantile autism and child psychosis although attempts at differential diagnosis have been made. As part of the necessary background to the thesis proposed in the present study, a brief review of the theoretical and clinical conceptions as they developed historically will be presented. Emphasis will be laid on the central features incorporated in the contemporary views of this syndrome.

After a few sporadic reports in which schizophrenic illness in children was mentioned, De Sanctis¹ in 1905 was the first to publish a list of behavioral characteristics which occurred in a group of children with a typical "schizophrenic" nature. He suggested the name "dementia praecoxissima" to designate this disorder, but included therein also brain syndromes and severe mental deficiency. Clarity began to emerge when Potter² proposed a set of

1 S. De Sanctis, Neuropsychiatria Infantilis, Rome, Stock., 1925, p. 623-661, quoted by L. Kanner, Child Psychiatry, Springfield, Thomas, 1957, p. 730.

2 H.W. Potter, "Schizophrenia in Children", American Journal of Psychiatry, Vol. 50, December 1933, p. 1253-1270.

diagnostic criteria in which he attempted to take the developmental level and intellectual idiosyncracies of childhood into account. Then Ssucharewa and Grebelskaya-Albats³ followed with distinguishing acute and insidious subdivisions in terms of mode of onset. Early descriptions of the condition remained rather vague and did not succeed in demarcating the syndrome leading to an ill-recognition of its existence.

The first major hallmark in the field of childhood schizophrenia was Bradley's⁴ monograph in 1941. He provided a total personality picture of a schizophrenic child and stressed that adult criteria could not be applied to children. His work was followed in quick succession by publications of Kanner, Mahler, and Bender. Their writings contributed mostly to the establishment of the schizophrenic syndrome in children although none of these authors delineated infantile autistic, psychotic, and schizophrenic states.

In 1943, Kanner⁵ published observations on eleven children who impressed him because of their phenomenological

3 E. Grebelskaya-Albats, "Zur Klinik der Schizophrenie des fruhen Kindesalters", II, Schweizer Archiv fur Neurologie und Psychiatrie, Vol. 35, 1935, p. 36-40, quoted by Leon Eisenberg, "The Course of Childhood Schizophrenia", Archives of Neurology and Psychiatry, Vol. 70, No. 6, 1957, p. 71.

4 C. Bradley, Schizophrenia in Childhood, New York, Macmillan, 1941.

5 L. Kanner, "Autistic Disturbances of Affective Contact", The Nervous Child, Vol. 2, No. 3, 1942-43, p. 217-250.

uniqueness. They were characterized by an inability to relate affectively to people already in their first year of life, an obsessive insistence on sameness coupled with aloofness and apparent self-sufficiency. He designated this group as cases of "infantile autism". He commented on their apparently good cognitive abilities as reflected in their unusual vocabularies and excellent memories. At the same time, however, they did not use language as a means of communication and could not form spontaneous sentences, but persisted in repetitions and echolalia. Kanner classified infantile autism as "one of the schizophrenias" and emphasized the importance of differential diagnosis.

Shortly after Kanner, Mahler⁶ published a brilliant paper on child psychosis and schizophrenia containing clinical-dynamic descriptions within a psycho-analytic frame of reference. She distinguished two subtypes which she called "early infantile autism" and "symbiotic infantile psychosis". Both manifest an alienation, or withdrawal, from reality and a severe disturbance of the individual's feeling of self-identity.

Mahler's description of infantile autism resembles that of Kanner: there is a seemingly self-sufficient

⁶ Margaret Schoenberger Mahler, "On Child Psychosis and Schizophrenia", The Psycho-Analytic Study of the Child, New York, International University Press, 1952, p. 266-361.

contentedness, no affective contact with the environment while any approach or change of the environment is resisted. She described infantile autism as "an attempt at de-differentiation and de-animation".⁷ It develops, according to her, because no affective ties are formed with the mother, and the child consequently cannot use her support to orient himself in his inner or outer world. He resorts to autism as a defense against stimuli with which he cannot cope. The infantile symbiotic child, in turn, forms apparently an excessive emotional tie to his mother. His primary ego develops further but it fragments when he has to separate from her because he cannot cope with his own impulses and emotional panic states. Their manifest symptomatology aims to restore the symbiotic parasitic delusion of oneness with their mother. The ego of the autistic child, in contrast, emerges as "a patchwork of loosely connected parts [...] without the specific matrix of affective correlations".⁸ Although the autistic and symbiotic types can be quite clearly distinguished at an early age, Mahler realized that they overlap when the child grows older and both employ autistic defenses in various degrees against

⁷ Margaret S. Mahler, Manuel Furer, et al., "Severe Emotional Disturbances in Childhood: Psychosis", Silvano Arieti, (ed.), American Handbook of Psychiatry, Vol. I, New York, Basic Books, 1977, p. 616-635.

⁸ Mahler, Op. Cit., p. 291.

the threatening outside world. In a later publication with Ross and De Fries,⁹ she outlined a third type of "more benign" cases of child psychosis where a better contact with reality is maintained and where neurotic defense mechanisms are employed next to psychotic projection, introjection, denial and condensation. The disease develops insidiously and the cases may never come to an overt psychotic breakdown.

The most extensive work in the area of childhood schizophrenia has been done by Lauretta Bender¹⁰ who is regarded by many authors as the authority in this field. In a time span of twenty years, she has diagnosed 850 cases as schizophrenic. Her theoretical position reflects the influence of Schilder's writings, Gesell's maturational patterns, the contributions of the Gestalt school and the analytic contributions of Klein. She attempted to account for the multiple manifestations of the illness in terms of a psycho-biological frame of reference. Bender finally came to define childhood schizophrenia as "a maturational

⁹ Margaret S. Mahler, John K. Ross, et al., "Clinical Studies in Benign and Malignant Cases of Childhood Psychosis", American Journal of Orthopsychiatry, Vol. 19, No. 2, 1949, p. 295-304.

¹⁰ Lauretta Bender, "Twenty Years of Clinical Research on Schizophrenic Children with Special Reference to Those Under Six Years of Age", Gerald Caplan, (ed.), Emotional Problems of Early Childhood, New York, Basic Books, 1955, p. 503-515.

lag at the embryonic level in all the areas which integrate biological and psychological behaviour; an embryonic primitivity or plasticity [which] characterizes the pattern of the behaviour disturbances in all areas of personality functioning".¹¹ She sees plasticity as the initial feature in the disturbance. The undetermined, pluripotential primitive state of plasticity causes the maturational lag at the embryonic level and characterizes all the primary symptoms. Anxiety is seen as "the organismic response to this disturbance which tends to call forth symptom-formation of a pseudodefective, pseudoneurotic or pseudo-psychopathic type".¹² Bender further provided useful clinical descriptions of symptomatology as it occurs at different developmental stages. In the youngest children disturbance in homeostatic equilibrium and vasovegetative patterns are described as most evident. Tone, motility and perceptual disturbances become apparent at an early age. Inability to establish boundaries between inner and outer stimuli leads to body-image distortions which give rise either to a clinging, symbiotic relationship or to autistic behaviour where the child attempts to consolidate his boundaries by withdrawal. In early childhood compulsions, obsessions and phobias tend to develop as well as

11 Ibid., p. 512-513.

12 Ibid., p. 513.

distorted patterns of speech. The psychological problems of the growing child pertain to personal identity, object and interpersonal relations, orientation in space and time and the meaning of language and symbol-formation. In the latency period, the earlier disorganized patterns develop into so-called pseudo-neurotic, -psychopathic and -defective types. The pseudo-neurotic child presents a picture of "pan-neurosis" including anxiety, phobias, obsessions, compulsions, hypochondrical or psychosomatic defenses. The pseudo-psychopathic syndrome presents a predominate picture of paranoid ideation, negativism towards authority figures and aggressive anti-social behaviour. The pseudo-defective type is seen as typically autistic, inhibited, withdrawn, often mute and incapable of object relations.

After Bender's competent but over-inclusive diagnostic descriptions a tendency arose to create a pseudo-diagnostic category into which a variety of heterogeneous clinical pictures were put indiscriminately. Rank's¹³ notion of "the atypical child" comprises all more severe disturbances in early development which have been described variously as Heller's disease, childhood psychosis, childhood schizophrenia, autism, or mental deficiency.

¹³ Beata Rank, "Intensive Study and Treatment of Preschool Children who Show Marked Personality Deviations of 'Atypical Development' and Their Parents", Gerald Caplan, (ed.), Emotional Problems of Early Childhood, New York, Basic Books, 1955, p. 451.

Similarly, Szurek¹⁴ considers it clinically fruitless, and even unnecessary, to draw any sharp dividing lines between psychosis, autism, atypical development or schizophrenia but at the same time he writes that a more precise differentiation is possible and necessary, for scientific understanding.

Recently a number of efforts have emerged to enhance differential diagnosis. The strongest contemporary proponent to draw a sharp distinction between infantile autism and childhood schizophrenia is Rimland.¹⁵ His thorough study of both syndromes and his psychoneurological theory of infantile autism is admirable in spite of its speculative character. He hypothesizes that "in autism necessary neural associations are made with extreme difficulty, [...] while in schizophrenia associations are made too freely, sometimes perhaps almost randomly."¹⁶ He sees the autistic child as basically hyposensitive, endowed with an under-associative capacity and the schizophrenic child as hypersensitive with an over-associative tendency.

¹⁴ Salata T. Footman, and S.A. Szurek, "A Clinical Study of Childhood Schizophrenia", Don T. Jackson, (ed.), The Etiology of Schizophrenia, New York, Basic Books, 1960, p. 404.

¹⁵ Bernard Rimland, Infantile Autism, New York, Appleton-Century, 1964, x-202 p.

¹⁶ Ibid., p. 105.

Despert¹⁷ proposed distinguishable criteria for autistic psychosis, childhood schizophrenia not necessarily psychotic, psychosis in mental deficiency and organic psychosis. Schizophrenia is seen as fundamentally characterized by affective dissociation which is apparent in interpersonal as well as in intrapsychic relations.

Brask¹⁸ added a further contribution with his lucid description of borderline schizophrenic conditions which occur more frequently than full-blown schizophrenic states. The behaviour of these children is characterized by extremes and their symptoms show a paradoxical quality. Their fragmentary ego manifests itself in frail relationships to reality, strong anxiety characterized by obsessive-compulsive defenses and a striking unevenness in their intellectual functions.

Progress in attempts at differential diagnosis has also been achieved by a group of interdisciplinary professionals on the basis of a detailed study of sixty-five severely disturbed children diagnosed as schizophrenic. The group felt that impaired capacity for human relationships

17 J. Louise Despert and Albert C. Sherwin, "Further Examination of Diagnostic Criteria in Schizophrenic Illness and Psychoses of Infancy and Early Childhood", American Journal of Psychiatry, Vol. 114, No. 7, 1957, p. 784-790.

18 Birte Høeg Brask, "Borderline Schizophrenia in Children", Acta Psychiatrica et Neurologica Scandinavica, Vol. 34, No. 3, 1959, p. 265-282.

was the most basic disturbance in childhood schizophrenia. They further delineated nine diagnostic criteria which have been widely accepted since. These criteria can be presented briefly as follows:¹⁹

1. Gross and sustained impairment of emotional relationships with people.
2. Lack of appropriate awareness of personal identity.
3. Pathological pre-occupation with particular objects without regard for their respective functions.
4. Sustained resistance to change and a striving to maintain or restore sameness.
5. Abnormal perceptual experiences apparent in excessive, diminished or unpredictable responses to sensory stimuli.
6. Acute, excessive and seemingly illogical anxiety.
7. Impaired or delayed speech development.
8. Distortion in motility patterns.
9. A background of intellectual retardation with "islets" or normal, near normal or exceptional intellectual functions.

Although efforts at differential diagnosis between infantile autism, child psychosis and childhood schizophrenia are made by many contemporary leaders in the field, a considerable amount of overlap and confusion still prevails which poses serious hindrances in communication.

¹⁹ Hugh Clegg, "Schizophrenia in Childhood: Progress Report of a Working Party", British Medical Journal, Vol. 2, 1961, p. 667-668.

More research is needed in which age levels are controlled. Where the syndromes of infantile autism and childhood schizophrenia are, for instance, relatively clearly distinct at early age levels, it may be difficult to maintain this distinction in older children who all resort to autistic defenses in various degrees.

In spite of a lack of standard nomenclature in the field of childhood schizophrenia, many clinicians have been impressed by basic similarities in behavioral patterns. Rabinovitch and Dubo write:

Because the symptomatology varies with age of onset and the child's developmental level, there are many divergent clinical pictures. [...] Understanding of psychopathology can be simplified by recognizing that, regardless of divergent behavioral manifestations, there is a core problem, a basic disturbance. [...] This is the child's inability to experience a clear-cut self-percept and to appreciate identities, their boundaries and limits. [...] Other symptoms can be understood as secondary to this 'basic dysidentity'.²⁰

The inability to define boundaries within the self and the outer world has also been described as a fundamental factor by Bender, Mahler, Rank and others.

Contemporary theoretical formulations on childhood schizophrenia are inclined to view the lack of differentiation

²⁰ R.D. Rabinovitch and S. Dubo, "Dysidentity - The Core Problem in Childhood Schizophrenia", paper read at the Annual Meeting of the American Psychiatric Association, May 1951, quoted by A. Hendrickson, "Etiology in Childhood Schizophrenia - An Evaluation of Current Views", The Nervous Child, Vol. 10, No. 1, 1952, p. 4-10.

between the self and the outer world as the basic disorder and contribute it to a defective ego development. Bergman and Escalona's²¹ work on unusual sensitivities in young children led to their belief that childhood schizophrenia develops in children who are hypersensitive with a too thin "protective barrier", causing a premature, vulnerable ego development which fragments under the impact of intolerable inner and outer stimulation. Similarly, Goldfarb²² views schizophrenia as characterized basically by severe ego defects where the latter is described as the 'self-regulating, self-directing part of the organism'²³ which aims at maintaining a sense of continuity and constancy in regard to personal identity. Des Lauriers,²⁴ in a comprehensive theoretical study on the experience of reality in schizophrenic children, points out that reality and ego are two sides of the same coin as they develop in a parallel and interacting fashion from the beginning of life. The nature of schizophrenia can be described in terms of broken

21 Paul Bergman and S.R. Escalona. "Unusual Sensitivities in Very Young Children", The Psychoanalytic Study of the Child, Vol. 3-4, New York, International University Press, 1949, p. 333-352.

22 William Goldfarb, Childhood Schizophrenia, Cambridge, Harvard University Press, 1961, xxvi-215 p.

23 Ibid., p. 26.

24 Austin N. des Lauriers, The Experience of Reality in Childhood Schizophrenia, New York, International University Press, 1962, vii-215 p.

relations with reality or in terms of a defective ego. As a psychoanalyst, he attempts to account for the lack of boundaries between self and non-self and writes:

The schizophrenic patient [...] is essentially an individual who has lost the capacity to experience himself as real, separated, and differentiated from others because of a severe diminution of narcissistic cathexis of his bodily boundaries.²⁵

He thus sees the schizophrenic child as incapable of relating to his own body which subsequently prevents him from relating normally to things and people.

The symptomatic-descriptive contributions outlined so far preceded most of the experimental efforts on cognition and personality in schizophrenic children. In spite of confusing terminology and lack of precision, it provided the necessary preliminary theoretical understanding.

The next section will deal with research studies on the schizophrenic child's personality with a focus on cognitive disorders.

2. Experimental Research on the Schizophrenic Child's Personality with a Focus on Cognitive Disorders.

In comparison with a mass of clinical and theoretical descriptions, only a few controlled experimental studies are available. Most of the studies suffer from a lack of specification of diagnostic criteria, normal controls, and

²⁵ Ibid., p. 51.

an adequate theory to account for the findings. However, a small number did contribute considerably in refining scientific knowledge of this syndrome.

The research studies to be reviewed can be introduced by a recent publication of Beck²⁶ in which he gave account of his empirical work on the characteristics of the schizophrenic child of school age in terms of the main psychological processes which typify his adaptation. Beck and his coworkers isolated 120 descriptive statements characteristic of schizophrenia which were rated by several psychiatrists through clinical observation and by psychologists on the basis of Rorschach test material obtained from a large number of schizophrenic adults and children. The ratings were correlated and factor analyzed and resulted in the delineation of four adult and two child patterns. Correlations between the adult and children's patterns were significant, while the two children's patterns correlated the highest (.76). Similarities and differences between the children's patterns were described in terms of five psychological processes, i.e. intellectual functioning, fantasy activity, emotional state, defenses used and social adaptation. In the intellectual realm the children's

²⁶ Samuel J. Beck, Psychological Processes in the Schizophrenic Adaptation, New York, Grune and Stratton, 1965, p. 163-221.

patterns were almost identical: both rated high in concreteness in thinking, associational looseness, dreamlike condensations, and subjective logic. Emotionally the two patterns could be distinguished as one of "affect panic", characterized by impulsive, acting-out behaviour, and little resort to fantasy activity; and one of "affect apathy", marked by a predominant internalization of affects and more resort to autistic fantasy. Both child patterns rated high on an inability to control basic drives, general unrest and hypersensitivity. Both resorted to constricted defenses of stereotyped thought and pathogenic defenses of obsessions and phobias. Their social adaptation was very poor as they lacked healthy narcissism and capacity for empathy. They withdrew from reality and constructed it in terms of their own needs distinguishing inadequately between inner and outer worlds. Although Beck's study did not bring any new material to light, it served to enumerate and systematize available psychological knowledge. It also helped to clarify diagnostic criteria, especially, for the schizophrenic child of school age.

It should be noted that the two child patterns could only be significantly distinguished in the emotional sphere where one resembled previously described autistic and the other more symbiotic characteristics. However, intellectually no significant differences were noted.

These results throw doubt on a differential diagnosis between autism and schizophrenia at higher age levels and stress the importance of the control of developmental levels.

One of the earliest and most extensive studies on schizophrenic children's cognitive-personality functioning was conducted by Des Lauriers and Halpern²⁷ at the Bellevue Hospital. They tested one hundred schizophrenic children between the ages of 4 and 11, diagnosed by Bender, on a battery of psychological tests including an intelligence test, the Rorschach, the TAT, and Vyotsky blocks. They found that the pathology pervaded all of their behaviour. Disturbances in thinking occurred on any type of test at any time indicating that the child's reaction depended to a large extent on what caught his awareness at any particular moment. They distinguished no particular pattern, but were struck by the children's concreteness in thought and action and by the unevenness of their intellectual development as manifested in the variability among subtests. Their interpretation was that the children failed to organize their inner and outer worlds which resulted in unpredictable and constantly changing patterns of behaviour,

²⁷ Austin Des Lauriers and Florence Halpern, "Psychological Tests in Childhood Schizophrenia", American Journal of Orthopsychiatry, Vol. 17, No. 1, 1947, p. 57-67.

with a proneness to anxiety at all times. They complained, however, that traditional intelligence tests were inadequate to highlight schizophrenic thinking.

In a Rorschach study comparing schizophrenic children with high-grade defectives, Piotrowski²⁸ found that the schizophrenic group marked themselves by an uneven performance level, a large number of poor original responses, perseveration on one idea, and the absence of inductive reasoning. He remarked:

The possibility presents itself that disturbances of thought and formal reasoning seem to be the primary difficulty in schizophrenia.²⁹

Molish,³⁰ who focussed on the psychological structures of personality as interpreted from the Rorschach, compared fifty schizophrenic with an equal number of neurotic and normal children. He found that the former showed more intellectual energy and more "affective push", but lacked the constructive channeling of these energies.

28 L.A. Piotrowski, "A Comparison of Congenitally Defective Children with Schizophrenic Children in Regard to Personality Structure and Intelligence Type", Proceedings of the American Association of Mental Deficiency, Vol. 42, 1937, p. 76-80.

29 Ibid., p. 70-71.

30 H.B. Molish, "Psychological Structure in Four Groups of Children", Samuel J. Beck, Psychological processes in the Schizophrenic Adaptation, New York, Grune and Stratton, 1965, p. 222-240.

Goldfarb,³¹ in a carefully conducted research study on a sample of twenty-six schizophrenic children compared to normal controls of the same age, made a most thorough contribution to their overall cognitive functioning. Administering a battery of perceptual and conceptual tests, he found no difference in sensory thresholds as compared to the normal controls, but a uniform inferiority in perceptual discriminations as well as in cognitive functions requiring categorization and abstraction. He interpreted his results in terms of a defective or underdeveloped ego incapable of giving patterned form to inner or outer stimuli.

Various authors studied concept-formation in schizophrenic children, but few of the studies were adequately designed. Friedman,³² in her doctoral dissertation on conceptual thinking in schizophrenic children, outlined her diagnostic criteria, selected twenty schizophrenic boys between the ages of 8 and 11, and matched them to twenty normal boys in terms of age and IQ functioning. The battery of tests administered included Goldstein and Scheerer's Object Sorting Test, Color Form Sorting, and

31 Goldfarb, Op. Cit., xxvi-21c p.

32 Gloria Friedman, "Conceptual Thinking in Schizophrenic Children", Genetic Psychological Monographs, Vol. 53, First Half, 1961, p. 147-178.

similarity subtests chosen from two different intelligence tests. Each test was scored for correctness of responses, conceptual level of verbalization, and indications of pathological signs including syncretistic, fabulated, and symbolic thinking, chain and autistic responses. The results showed that the schizophrenic boys, in comparison with normal controls, were significantly more inconsistent in their thinking. They were vague and all-inclusive, and at the same time, more restricted and concrete. They showed some ability to abstract, but were less able to maintain an abstract attitude and revealed significantly less ability to shift from a concrete to an abstract orientation. They also gave more subjective and autistic responses.

The only study, in which a number of Piaget stage-specific tests of cognitive development were used was one by Halpern³³ in which she reported on a ten year follow-up study of a schizophrenic boy. At the age of fifteen he was administered three tests tapping causal thinking ability as standardized by Laurendeau and Pinard, and two tests of logical thinking standardized by herself. While traditional intelligence tests had not revealed any particular pattern, the Piaget tests demonstrated a large discrepancy between the various questionnaires employed. She

³³ Estern Halpern, "Conceptual Development in a Schizophrenic Boy", Journal of American Academy of Child Psychiatry, Vol. 5, No. 1, 1966, p. 66-74.

did not interpret her results, but pointed to the possible heuristic value of Piaget's tests.

Further studies on thought pathology in schizophrenic children did not reveal any additional information. In summary, the empirical research described the schizophrenic child's thought in comparison to normal controls as concrete, vague and over-inclusive, as well as restricted and under-inclusive, pre-logical, syncretic, fragmented and autistic. Generalization and abstraction as well as integrative functions are impaired leaving the child confused and disoriented. Intellectual abilities have been described as uneven with "islets" of normal or superior abilities. Besides these general descriptive notions, no particular pattern has been discerned and no cohesive theoretical interpretation of the schizophrenic child's thinking has been advanced.

Although the syndrome of childhood schizophrenia is still ill-defined, the writer believes that a theoretical-experimental investigation of thought patterns in schizophrenic children as compared to normal controls, and interpreted in view of a developmental theory of cognition, may prove to be of considerable value. It may help to integrate existing research findings and to elucidate thought in schizophrenic children. In this respect appeal will be made to the leading authority in the field of cognition, Jean Piaget.

3. Piaget's Theory of Causal Thought.

Before the thesis to be proposed in this dissertation can be embarked upon, an introduction to and a justification for the application of Piaget's theory of cognitive development to a study of thought disorders in schizophrenic children is called for. This will be followed by a summary of the main principles of his theory. The major periods of intellectual growth described by him with particular emphasis on the evolution of causal thought will be presented.

A. Introduction to Piaget and a Justification for the Application of his Theory to Thought Disorders in Schizophrenic Children.

Piaget, who calls himself a genetic epistemologist, studied the evolution of intelligence, conceptualizing the latter as a bio-social process. As a psychologist he accumulated a mass of behavioral data through observations and ingenious clinical experiments on children of different ages. As a logician he explored the formal qualitative structures of intellectual development. Piaget traced the emergence and evolution of infantile thought and demonstrated how the child moves from an initial fusion between subjective and objective reality through a pre-logical, pre-causal, subjective stage towards logical,

causal, objective thought under the influence of progressive socialization.^{34,35}

Piaget did not apply his theory to psychopathology but several authors have pointed out the importance of his work in terms of child psychiatry, as well as the relevance of a developmental approach to the study of schizophrenic thought.^{36,37} His theory is dynamic and genetic and thus provides well-defined stages. Pathological phenomena such as retardation, regression, acceleration and fixation may be better understood in reference to Piaget's genetic stage scale. Cognitive disorders, which reflect dynamically an imbalance or severe states of disequilibrium, can be interpreted in Piaget's model as due to a lack of coordination and integration of assimilative and accommodative processes. His frame of reference further provides the opportunity of viewing pathology of thought as an abnormality of "system-connections". This transcends the usual descriptions in terms of phenomenologically or empirically

34 Jean Piaget, The Child's Conception of the World, London, Routledge and Kegan Paul, 1951, ix-307 p.

35 -----, The Child's Conception of Physical Causality, London, Routledge and Kegan Paul, 1951, viii-307 p.

36 E.J. Anthony, "The Significance of Jean Piaget for Child Psychiatry", British Journal of Medical Psychology, Vol. 29, Part 1, 1956, p. 30-34.

37 E.S. Lisanin, Language and Thought in Schizophrenia, New York, Norton, 1944, p. 133.

assessed relationships as it takes into account the organization of parts within a whole.

The need for an approach to schizophrenic thought pathology in terms of system-connections has been pointed out by the philosophical psychologist Angyal who wrote:

The thinking of the schizophrenic patient is not impaired so far as apprehending of relationships is concerned; the schizophrenic - where he fails in the solution of an intellectual task - fails in the apprehension of system-connections.³⁶

The focus of interest in the present study falls mainly on the period of infantile thought, the so-called "pre-operational" stage of representation. It is subjective and pre-logical, characterized by various modes of "pre-causality" apparent in the child's concepts about reality and causality. The evolution and gradual outgrowth of the various modes of pre-causality will be investigated through the application of standardized questionnaires.

Piaget was not the only investigator of infantile thought in children. Heinz Werner³⁷ also noted that infantile thought is subjective, syncretic and penetrated by

³⁶ Andras Angyal, "Disturbances of Thinking in Schizophrenia", Language and Thought in Schizophrenia, New York, Norton, 1944, p. 117.

³⁷ Heinz Werner, Comparative Psychology of Mental Development, New York, Science Editions, 1948, p. 213-276.

pre-causal notions. He pointed to the directionality in the development of cognition in terms of processes of differentiation and hierarchical integration through which thought becomes centralized and abstraction is made possible. Psycho-analytic writers have described thought in young children as dominated by "primary processes" which render abstraction impossible. However, these authors did not provide experimental support nor analyze the evolution of cognitive processes in terms of qualitative structures. Even today, Piaget's studies and theory of infantile thought are the most authoritative in the field. His work is not only based on a mass of behavioral data gathered through ingenious clinical experiments, but these psychological data have been integrated with a logical analysis of intellectual structures which gave rise to a dynamic, genetic-stage theory of cognition. Piaget's theory has been chosen as the major theoretical frame of reference in the present study because of the above-mentioned advantages and the inherent possibilities for the study of schizophrenic thought pathology.

B. Main Principles of Piaget's Theory Relevant to the Development of Causal Thought.

Piaget's foremost aim was to investigate the qualitative development of intellectual structures. This he achieved by applying logical analyses to psychological

data. His terminology is to a large extent derived from the fields of biology, mathematics and logic and needs to be understood in its proper context.

Piaget distinguishes content, function and structure. Content refers to the raw behavioral data and function to the manner in which an individual makes cognitive progress. Structure, interposed between the two, refers to the inferred, organizational properties of intelligence. Intelligence is seen essentially as a bio-social process characterized by the functions of organization and adaptation.^{4C} It is a problem of establishing relationships between the mind of the child and the external world or "reality" in terms of what contemporary science believes it to be. The establishment of relations between thought and things is a fruit of their interaction: it is by structuring things that thought organizes itself and by organizing itself that it structures things. In Piaget's terms, internal organization of thought and external adaptation to things is made possible through the operation of the functional invariants called assimilation and accommodation. Through assimilation one's own actions upon the world are incorporated in the form of motor and affective schemata, while accommodation modifies the

^{4C} Jean Piaget, The Origin of Intelligence in the Child, London, Routledge and Kegan Paul, 1952, xi-425 p.

assimilating schemata in terms of external reality. These two processes are thus in essence indissociable; accommodation of mental structures to reality implies the existence of assimilating schemata and the formation of structural schemata through assimilation entails the use of sensorial elements derived from the external world. The qualitative changes in the organizational aspects of intelligence are conceptualized in terms of a hierarchical order of stages which follow a constant ontogenetic sequence. The achievement of each stage is preceded by a period of preparation characterized by a state of flux and disequilibrium. When a stage is reached, structural integration of existing elements into a whole has taken place, while each preceding stage becomes incorporated and integrated into subsequent ones. Structural evolution parallels a growth in equilibrium which is in turn dependent on the extension of the cognitive field and the degree of coordination achieved.⁴¹

In the course of intellectual development Piaget distinguishes four major periods. In the beginning the child and his surroundings are non-differentiated. Through acting upon his environment the child decenters from this position and a gradual differentiation takes place through successive stages. Towards the end of the second year the

⁴¹ Jean Piaget, Logic and Psychology, New York, Basic Books, 1957, xix-48 p.

initial successive but unrelated processes of assimilation and accommodation have been integrated and his sensory-motor intelligence enables him to manipulate concrete space, time and causality on the plane of physical activity.⁴²

From the point of logic, this period is characterized by autism since perceptual data are completely fused with the child's wishes.

The advance of symbolic representation announces the second period in which the same developmental cycle is repeated at a level of encounter with the human world. In this realm of primitive thought the child is initially unaware of the difference between his thought and beliefs and those of others. Because of the lack of differentiation between internal and external reality he is "realistic", meaning that he sees his own view as absolute. Systematization of established dynamic participations between himself and his surroundings give rise to various pre-causal beliefs characteristic of infantile thought.

During the third, concrete operational stage, a new equilibrium is reached where thoughts are reversible and elementary logical relations are formed. The child in the concrete operational period can master the logic of classes and relations and can thus structure his immediate reality.

⁴² Jean Piaget, The Construction of Reality in the Child, New York, Basic Books, 1954, xiii-306 p.

Earlier perceptual and representational regulations have become integrated into an elementary stable equilibrium. Transformations within static situations are now understood through logical relations.

During early adolescence the fourth stage is reached. Here generalizations and abstractive processes have developed to the extent that hypothetical deductive reasoning and propositional logic can be applied. At this level the differentiation between psychological and physical realities approaches adult standards. The formal operations are reversible and equilibrium conditions have increased in stability and mobility.⁴³

When the child is still in the pre-operational period his infantile beliefs and thoughts about reality and causality vividly illustrate his pre-logical and pre-causal orientation of mind. The child when questioned about the origin and purpose of natural events unconsciously systematizes his feelings of participation and takes recourse to finalistic, animistic, dynamistic and artificialistic notions. Through the sensation and projection of his own movements he endows his universe with forces and activities and perceives it finalistically as organized along well-determined plans centered around human

⁴³ Barber Inhelder and Jean Piaget, The Growth of Logical Thinking, New York, Basic Books, 1958, xxvi-356 p.

activities. Through animism he believes that objects in his surroundings are endowed with a will and purpose while dynamistic forces enable them to carry out their activities. Further influenced by the social relations with his parents and adults who regulate his life, he comes to believe that man is the center of the universe and the maker of all things expressed in artificialistic notions. For the young child his world is thus subject to psychological, social and moral laws intimately linked to his own inner experiences and his felt relationships with objects and people. During this pre-causal, pre-logical stage the child is unconscious of his thoughts. Therefore it lacks coherent systematization. Reasoning is transductive and proceeds from one particular to another with a total disregard for logical relations. From a structural point of view a dualism can be discerned: on the one hand, the child is very close to his immediate perceptual surroundings which leads to a juxtaposition of elements, images and ideas but on the other hand, syncretism operates due to an excess of subjective and affective relations. This condition results from a lack of synthesis between assimilation and accommodation. At times the child only imitates which gives rise to juxtaposition. At other times assimilation dominates as expressed in syncretism. The child is baffled by transformations in perceptual

configurations and can only account for it in non-logical terms. Under the influence of progressive socialization the child grasps the intrinsic relationship between what he feels and knows, and between what he sees and does. Primitive realism consequently gives way to an increase in objectivity, reciprocity and relativity in thought and beliefs.

Following this theoretical account Piaget's methodological procedures will be discussed. Experiments carried out to verify his main hypotheses on infantile pre-causal thought will be presented.

4. Experimental Verification of Pre-Causal Thought.

Piaget derived his theory on pre-causality on the basis of experimental work conducted on the spontaneous beliefs of young children.^{44,45} In these investigations Piaget was interested in cognitive content primarily as it reflects underlying cognitive structure and orientation. He warns that these studies pose unique problems of methodology and interpretation. He used his clinical method which comprised a non-leading questioning of the child in which his spontaneous tendencies of thought served as a

⁴⁴ Piaget, The Child's Conception of the World, ix-397 p.

⁴⁵ -----, The Child's Conception of Physical Causality, viii-309 p.

partial guide to the examiner. He stressed that the aim was not to test ideas which the children had already thought out, but to examine how their ideas are formed in response to certain questions and in what direction their spontaneous attitude of mind tends to lead them. He investigated the occurrence of realism through a study of the child's concepts about various psychic phenomena such as thought and dreams; animism through the study of the type of objects he would endow with life; artificialism as expressed in the child's concepts about the origin of natural phenomena, and other forms of pre-causality in similar ways. After evaluating each individual protocol globally he found that between the ages from 2-3 to 7-8 egocentricity dominates leading to an excess of subjective and affective relations at the expense of logical ones. Within this period causality is derived from a confusion between psychological motives and physical causes. With the growth of deductive logic the child starts to analyse the various components and moves towards a genuine mechanical and physical causality. In each mode of primitive thought a genetic sequence through various stages can be discerned. Piaget points out that age progression is not fully consistent and may fluctuate "with regression and jumps". He warned that the greatest reservations have to be made before drawing conclusions from results.

Since Piaget's publications many experimenters have attempted to replicate his studies or used comparable methods to refute or support his position. These studies were mainly confined to the investigation of animism and/or anthropomorphism. Samples were selected from various Western and primitive cultures, with different ages and from different socio-economic groups. In general the majority of the investigators found that pre-causal thought did occur in the youngest children examined with a decline of such responses upon an increase in age. However, while some investigators found ample evidence of pre-causality, others claimed that it is a rare occurrence and argued that naturalistic and physical thought is typical of the young child. A critical review of these studies revealed that they are hardly comparable because content of the experiments, mode of questioning, age of the subject and technique of analysis varied from one experiment to another.

Deutsche⁴⁶ for instance added ten simple "physical" experiments to a few questions from Piaget which seven hundred children between the ages of 5 and 16 were asked to explain. Dissatisfied with Piaget's grouping of

⁴⁶ Jean Marquis Deutsche, The Development of Children's Concepts of Causal Relations, Minneapolis, University of Minnesota Press, 1937, vi-104 p.

pre-causality into seventeen different types she decided to divide her data into materialistic and non-materialistic categories according to the causal agent employed. Within the former, she grouped all "mechanical and naturalistic" reasons offered including the primitive mode of phenomenism, and discriminated four levels in terms of the adequacy of the "scientific" explanations. The non-material category included magical, finalistic, animistic, dynamistic and artificialistic causes. She found that eighty per cent of all the answers fell in the material category and concluded that child thought is logical, mechanical and naturalistic rather than pre-logical and pre-causal as asserted by Piaget. Obviously her concepts of pre-causality and logic differ from Piaget and therefore her refutation of his position is invalid. She also denied the existence of stages in the development of infantile thought on the basis of her findings that no answer was typical of a single stage. Piaget recognized the fact that ages and stages overlap which does not mean that evolutionary trends cannot be discerned in the dynamics of intellectual development. In view of the kind of experiments used by her it can be said that her results do not necessarily contradict Piaget's findings as they are not directly comparable to his.

Huang,⁴⁷ another well-known critic of Piaget, conducted a series of physical experiments comparable to Deutsche's on forty-seven children between the ages of 5 and 10. He enumerated the number of "pre-causal" and "physical or naturalistic" answers given by the group of children. He found that the former category comprising magical, animistic, and anthropomorphic answers was negligible in number in comparison to the latter. He observed further that the "physical" answers included a large number of explanations where causal relations were formed on the basis of perceptual features and "if then" explanations where the child assumed the presence of a physical agent to account for the phenomena observed. Where Piaget would undoubtedly regard those answers as indices of pre-logical thinking, Huang is of the opinion that "the child's concept of reality and causality, as revealed under these experimental conditions, is very much naturalistic, factual, and logical [...]"⁴⁸

In an experimental analysis on child animism, Huang and Lee⁴⁹ questioned forty children between the ages of

⁴⁷ I. Huang, "Children's Explanations of Strange Phenomena", *Psychological Forschung*, Vol. 14, 1930, p. 63-102, quoted by I. Huang, "Children's Conception of Physical Causality: A Critical Summary", *Journal of Genetic Psychology*, Vol. 63, Second Half, 1943, p. 70-84.

⁴⁸ *Ibid.*, p. 84.

⁴⁹ I. Huang and H.W. Lee, "Experimental Analysis of Child Animism", *Journal of Genetic Psychology*, Vol. 65, First Half, p. 67-74.

3.5 and 3.7 about ten different objects with the aim of investigating the incidence of animism and anthropomorphism. Dealing with only "yes" and "no" answers, they found that life was attributed to inanimate objects in thirty-four per cent of the cases with a higher incidence amongst the younger children, and that twenty per cent of the sample ascribed anthropomorphic traits to the objects. In spite of their statistics they concluded that animism occurred rarely and proposed that the Piaget-animism-hypothesis should be disregarded in favour of Huang's hypothesis of differentiation.⁵⁰ Huang does not believe that pre-causal thinking constitutes a universal tendency in the young child. In referring to the physical sensory-motor intelligence of animals he argues that since physical "concepts" precede magical, moralistic, artificialistic and animistic explanations phylogenetically, why should the reverse be true ontogenetically? But here Huang confuses the level of infantile representational thinking with the physical sensory-motor intelligence of animals which the child has already outgrown by the age of two.

Most investigators who contradict Piaget's thesis of pre-causality claim that the child's thought is logical and naturalistic based on their explanations of simple "physical" experiments. The main source of confusion

⁵⁰ Ibid., p. 51.

seems to arise from a misunderstanding of Piaget's theoretical position when his concepts of pre-causality and logic are taken out of context. A false distinction is made between physical, naturalistic thinking where material causal agents are employed, and pre-causal thought which resorts to non-material agents. The former is called logical while the latter is referred to as pre-logical. Piaget recognized that material or non-material causal agents are incorporated in child thought. He nevertheless described all infantile thought as pre-causal and pre-logical in view of the young child's inability to handle causal and logical reality relationships from the viewpoint of formal logic. His critics, however, reject his application of logic to the structure of infantile thought. Deutsche writes:

The final criticism of the Piaget classification has been recognized by all students of the problem - that by classifying children's explanations into finalistic, moralistic and animistic types, he is interpreting the child's world in terms of the adult conception, and reading philosophical and logical implications into the child's thoughts which may not be there at all.⁵¹

Substantial contributions in favour of Piaget's position have been made by Dennis and Russell, Grigsby, Davighurst and Neugarten, Laurendeau and Pinard, and others.

⁵¹ Deutsche, Op. Cit., p. 93.

Following Piaget's procedures Dennis and Russell⁵² standardized a questionnaire on animism. In analyzing the reasons children gave for attributing or refusing life to various animate and inanimate objects they discovered several qualitative levels or stages comparable to stages outlined by Piaget. In a series of studies these stages were encountered among children with normal intelligence, mentally defective and among Hopi children. In comparing his results on forty-four Hopi children between 12 and 13 years of age with Russell's 12 to 13 year old⁵³ American children, Dennis⁵⁴ found that more than eighty per cent of the Hopi children fell in stages 1 and 2, when sixty per cent of the American children were already in stages 3 and 4, revealing a persistent occurrence of animism in the primitive tribe. Interested if experience with natural phenomena would influence animism, Russell⁵⁵ applied his

⁵² R.W. Russell and Wayne Dennis, "Studies in Animism: I. A Standardized Procedure for the Investigation of Animism", Journal of Genetic Psychology, Vol. 55, Second Half, 1939, p. 389-400.

⁵³ Roger W. Russell, "Studies in Animism: II. The Development of Animism", Journal of Genetic Psychology, Vol. 56, Second Half, 1940, p. 353-366.

⁵⁴ Wayne Dennis, "Animism and Related Tendencies in Hopi Children", Journal of Abnormal and Social Psychology, Vol. 38, No. 1, 1943, p. 21-30.

⁵⁵ Russell, Op. Cit., p. 353-366.

standardized technique to 774 children between 7 and 15 years of age divided into urban, suburban, and rural groups. He found the development of animistic concepts very nearly the same for all these groups despite their varied geographical locations and socio-economic status. He found these stages of animism equally correlated to both mental and chronological age (.59 and .62 respectively). All the individuals passed sequentially through the stages with increasing mental and chronological age, although it was impossible to limit the age range of the stages as Piaget attempted to do because each concept stage was nearly covered by the complete age group.

With a slightly modified questionnaire Bruce,⁵⁶ using a group of Negro and white children, confirmed the results of Dennis and Russell and found that the four stages describing the evolution of animism could easily be distinguished.

In general investigators confirming Piaget's thesis followed his theoretical frame of reference and used similar methods and techniques of analysis. By globally evaluating all of the child's answers and by examining his reasons they easily discovered the operation of pre-causal

⁵⁶ Myrtle Bruce, "Animism vs. Evolution of the Concept 'Alive'", Journal of Psychology, Vol. 12, First Half, 1941, p. 61-90.

modes of thought. The opponents instead did not take the reasons of the child into account but only the number of errors he made, as Laurendeau and Pinard⁵⁷ have pointed out. In reference to animism Laurendeau and Pinard demonstrated that the number of errors made is not a significant discriminating factor between younger and older children as this kind of "item analysis" tends to mask the real dimensions of animism.⁵⁸ Piaget stressed that it is absolutely necessary to analyse the questions globally in order to make a correct assessment of the child's level of thought, for even correct answers are often steeped in primitive thought. It has also been shown previously that researchers who reported only minimal evidence of primitive thought tended to make classification errors and therefore did not seem to understand Piaget's position. Although the criticisms voiced do not lead to a universal proof of the existence of pre-causal thinking as formulated by Piaget, it does point out that studies in this domain are in need of a thorough critical evaluation before any definite interpretive conclusions can be reached.

The most extensive empirical study on infantile thought aimed at verification of Piaget's main experiments

⁵⁷ Monique Laurendeau and Adrien Pinard, Causal Thinking in the Child, Montreal, Institute of Psychological Research, 1962, p. 20-36.

⁵⁸ Ibid., p. 153.

was carried out by Laurenceau and Pinard in Montreal⁵⁹ under stricter methodological conditions. Interested in investigating the development of the child's symbolic representation of the world, they constructed modified Piaget questionnaires on the concept of dream, the concept of life, the origin of night, the movement of clouds, and the floating and sinking of objects. They administered their modified questionnaires to five hundred children between the ages of 4 and 12. The answers were classified in three general stages: stage one, which was reserved exclusively for pre-causal thought; stage two, where pre-causal and objective causal factors were invoked; stage three, which marked the disappearance of the form of pre-causality with which the questionnaires were concerned. These stages were in turn subdivided. The investigators confirmed the existence of primitive beliefs and constructed an age and stage scale indicative of the diminution of pre-causality and the evaluation of causal thought. Their standardized questionnaires will be employed in the present study.

3. Causal Thought in Schizophrenic Children.

From a review of the literature and a summary of the experimental studies on child schizophrenic thought

⁵⁹ Ibid., xvi-293 p.

it has become apparent that schizophrenic children suffer from a cognitive defect which has been described from various theoretical angles. Their intellectual functioning is called concrete, illogical, over-inclusive and also restricted and impaired in generalization and abstractive ability. The presence of pathological thought indicators like autism, chain responses, confabulation and contamination has also been pointed out. In efforts at explanation authors ascribed the defects to an impaired ego and a consequent lack of ability to establish firm boundaries between the self and the outside world. Theoretical explanations remained vague.

The writer makes an attempt to approach the problem of thought pathology in schizophrenic children in terms of a detailed theory of cognitive development. It was felt that Piaget's theory of infantile thought on which experimental questionnaires have been standardized could provide a useful initial vantage point.

In view of Piaget's cognitive theory child schizophrenic thought can be described as sharing similar characteristics of the pre-causal, pre-logical phase encountered in normal thought of children at the pre-operational level. During this stage the child's thinking is dominated by egocentrism and is, like child schizophrenic thought, subjective and concrete in character. Normal

children between the ages of eight and ten have already reached the stage of concrete operations and show only residual traces of pre-causality. The question can be raised whether schizophrenic children of a similar age range have reached the level of concrete operations or do they still function at a pre-operational level? It may be hypothesized that the level of causal thought development in schizophrenic children when compared experimentally to normals of similar ages and to younger six year olds, will resemble the latter more than the former. In other words, eight to ten year old schizophrenic children may be expected to manifest still pre-causal and pre-logical thought characteristics of six year olds.

Cognition in schizophrenic children has not only been described as retarded but also as showing "islets" of normal and accelerated functions. In terms of Piaget's genetic stage-scale causal thought development in schizophrenic children, when compared to normal controls of similar and younger ages, may show a greater variability across stages reflecting an unevenness in cognitive functioning.

Although schizophrenic children between the ages of eight and ten may resemble younger normals in terms of the level of causal thought development reached, a content analysis of various modes of pre-causal thinking may

reveal differential characteristics. Pre-causal roles of thinking are affective in nature and result from dynamic participations established between the child and his surroundings. They may be hypothesized to occur less frequently in a group of schizophrenic children as compared to a group of normal six year olds in view of the former's inability to establish affective participations.

The hypotheses outlined in the preceding paragraphs were subjected to experimental verification. The design of the experiment forms the topic of the next chapter.

CHAPTER II

EXPERIMENTAL DESIGN

The theoretical hypotheses outlined in the preceding chapter were verified experimentally. The total design involved various aspects treated under separate headings. First, the samples selected will be elaborated upon followed by a description of the psychological tools and the testing procedures. In the final section the theoretical hypotheses will be formulated in a statistical manner and the techniques of analysis will be presented.

1. The Sample Population.

The total sample population was composed of sixty-five normal and twenty schizophrenic children. The normal children were pupils of the Cowling Public School in Ottawa. They were selected in order to meet certain criteria of chronological and mental age as these variables are relevant in a developmental study of cognition. In terms of age, twenty 6-year olds and fifteen 9-, 11- and 12-year olds equally representative of both sexes were chosen to provide a younger and a comparable age group with reference to the experimental sample. All these children fell within the average and bright average range of intellectual functioning. The latter was determined on the basis of

teacher's ratings for the kindergarten group and on previous psychological assessment of intellectual functioning for the other age groups by means of the Binet Group Test of Learning Capacity. All the children came from intact homes of an average and low-average socio-economic status. The children were seen by their teachers as "normal" and had no record of psychiatric illness.

The schizophrenic sample consisted of twenty children between the ages of 8 and 10. Table I presents a summary of age and sex of the normal and schizophrenic children.

The diagnostic criteria in selecting a representative sample of schizophrenic children posed a problem because of the lack of agreement as to what constitutes the nature and characteristics of this illness. The difficulties surrounding differential diagnosis have been discussed in the previous chapter. At this point a detailed description of the selected sample is called for.

The group of schizophrenic children were drawn from various treatment centers. Ten of the cases came from a follow-up group of schizophrenic children of the West End Creche Center in Toronto, 2 were in treatment at the Thistletown Hospital, Toronto, 3 were selected from a psychiatric population at the Douglas Hospital in Montreal, 2 were private psychiatric cases, 2 are presently,

Table I.-

Age and Sex Characteristics of the Normal and Schizophrenic Samples.

Groups	N	Age		Sex	
		Mean	Range	Boys	Girls
Young Normal	20	6.0	5.5-6.6	5	11
Older Normal	15	8.0	7.0-8.2	6	7
	15	9.0	8.3-9.2	8	7
	15	10.0	9.9-10.3	8	7
Schizophrenics	7	7.11	7.0-8.2	6	1
	6	8.1	8.7-9.6	6	0
	7	10.2	9.9-10.8	5	2

enrolled as students at the Child Study Center of the University of Ottawa, and 1 was in treatment at the Royal Ottawa Sanatorium in Ottawa. Thirteen of the twenty children lived at home while under psychiatric care and seven were resident at the respective treatment centers. Criteria for selection of the sample were the following:

1. Psychiatric diagnosis of childhood schizophrenia with mild to moderate degrees of severity.
2. A developmental history indicative of an underlying schizophrenic process noticeable from a minimum age of four.
3. No gross neurological involvements.
4. An intellectual potential within or above the average range and a functional intelligence within or above the dull-normal range.
5. Age between eight and ten years.

Only cases that met the above-mentioned criteria were included. They were decided upon by the writer in co-operation with the psychiatrist and/or psychologist in charge of the child on the basis of a study of the files. Profiles of the symptoms of individual children illustrating the above-mentioned criteria can be found in Appendix 1.

To further delineate the entity of the schizophrenic condition of the selected cases, a list of criteria for the evaluation of childhood schizophrenia was composed in terms of the psychological processes most affected by this illness. The selected criteria were mainly drawn from

Beck¹ who isolated the most important behavioral traits characteristic of childhood schizophrenia on the basis of an experimental-statistical study. The cases were rated by the respective psychiatrist and/or psychologist in a joint effort with the writer. A copy of a rating scale is enclosed in Appendix 2.

Control of the administration of drugs was not possible in the present study. Most of the children in the hospital were under drug treatment and a few of the West End Creche follow-up sample were engaged in an experimental Niacin drug project. The drugs administered in the hospitals were used for therapeutic purposes. The Niacin drug is hypothesized to be beneficial to the child suffering from schizophrenia. It was reasoned that the drug treatment would induce a positive rather than detrimental effect on the child's performance.

The schizophrenic children were all enrolled in an educational program and were capable of participating in the testing procedures.

¹ Samuel J. Beck, Psychological Processes in the Schizophrenic Adaptation, New York, Grune and Stratton, 1965, p. 163-221.

2. The Psychological Tools.

The psychological tools used in this study were five standardized Piaget tests² tapping the evolution of causal thought in young children. A copy of each questionnaire is attached as Appendix 3. Originally Piaget devised at least forty different questionnaires all directed towards the study of various beliefs of children.^{3,4} On the basis of Piaget's work Laurendeau and Pinard⁵ divided the domain of pre-causality into five sections, i.e. realism, animism, artificialism, dynamism and prediction and understanding of elementary physical laws. Selecting a problem most illustrative of each mode of pre-causality, they systematically replicated Piaget's main experiments under conditions that conformed closely to the requirements of the experimental method. At the same time the spontaneous nature of the child's beliefs was preserved as much as possible. They standardized their questionnaires

2 Monique Laurendeau and Adrien Pinard, Causal Thinking in the Child, Montreal, Institute of Psychological Research, 1962, p. 263-275.

3 Jean Piaget, The Child's Conception of the World, London, Routledge and Kegan Paul, 1951, ix-397 p.

4 -----, The Child's Conception of Physical Causality, London, Routledge and Kegan Paul, 1951, viii-309 p.

5 Laurendeau and Pinard, Op. Cit., p. 50-57.

on five hundred Montreal children between the ages of 4 and 12. They succeeded in verifying Piaget's main conclusions and thus provided a normative complement to Piaget's work.

The aims and characteristics of the causal thinking tests employed will be presented briefly.

The Concept of Dream test taps the presence of realism in the child's thought. Realism leads the young child into a lack of discrimination between different levels of reality, for instance between what is subjective and objective, internal or external. Hence he is questioned on how he perceives the dream phenomenon which is highly subjective. The stage one child believes in the reality of dreams and perceives the latter as external to himself. Between the stages of absolute realism and integral subjectivism, the progressive interiorization of the dream takes place in which various substages are distinguished. The realistic child often adds artificialistic causes to his explanations.

The Concept of Life test explores the child's animism or his tendency to consider all objects as living, endowed with consciousness, intentions and feelings. The main phases of the evolution of animism are demarcated through an analysis of the criteria for differentiation between animate and inanimate. The youngest children's

thinking tends to be animistic because of the use of imperfect criteria of classification, for instance criteria of usefulness, anthropomorphism and general movement. In a subsequent stage the child has advanced to the discovery of autonomous movement but it is only when he has become aware of the distinction between immanent and transmittant movement that his animistic errors disappear.

The Origin of Night questionnaire taps the pervasiveness of artificialism expressed in the belief that everything is the result of human industry. In explanations of the origin of night, artificialism is first expressed in a finalistic form followed by a stage of absolute artificialism. In the transition stage semi-artificialistic and semi-physical reasons begin to play a role until he reaches the level of physicalistic answers. Then the origin of the night is seen as natural although explanations may at first still be tainted by finalism or animism.

The Movement of Clouds test was designed to tap dynamism but resulted in giving rise to almost all forms of pre-causal thought. In dynamistic thinking the child endows his animistic world with energies and forces enabling objects to move by themselves. He is questioned on the movement of clouds which do not possess an intrinsic dynamism. In stage one, causes foreign to meteorology and physics are given because realistic and artificialistic notions satisfy the child's intelligence. In the

next stage the child adds the cooperation of an intermediary agent chosen from amongst atmospheric phenomena or he believes that clouds move through intrinsic dynamism alone. The stage three child finds the correct explanations by himself and holds predominantly to mechanical or physical principles. At all levels finalism, animism or dynamism may permeate explanations.

The Floating and Sinking of Objects test aims at the child's understanding of elementary, physical laws. Although pre-causal thought is often expressed especially in the early stages, the stage scale does not describe the evolution of pre-causal thought as such. Instead it provides direct information on the developmental levels of the child's logical reasoning processes. This test was added to the battery as it completes the observations from other tests and makes it possible to establish a relationship between illogical and logical thought processes. In stage one, the explanations do not go beyond the pre-causal level. Only finalistic, animistic or dynamistic reasons account for the floating and sinking of bodies. In stage two, the child uses physical explanations but in an illogical and contradictory manner. When his stricter operational logic increases, all pre-causal notions fade away.

For all the questionnaires described, age and stage norms are available. The validity of a genetic scale is supported by the regular ascending gradation of age.

3. Procedure.

The questionnaires were administered individually by the examiner. For the normal group testing took place at school during school hours. In case of the pathological sample testing was conducted in the hospital or at home if the child lived with his family.

Before the actual testing procedures were initiated, the examiner established rapport with the child in order to stimulate his interest and motivation. No standardized instructions were given but each child was told that the examiner was interested in what he knows and believes about familiar things in his surroundings. The examiner told them that she was going to ask questions about living and non-living objects, dreams, clouds and night. The order of test administration did not need to be rigorous as the tests are independent and call for different solutions to specific problems which are not transferable. The Concept of Life test was usually administered first as the questions are easy and non-threatening to the child and was followed by the more

difficult questionnaire on dreams. After these two verbal tasks, the examiner introduced the Floating and Sinking test in which the child could manipulate concrete materials. This usually led to a visibly increased interest. A rest period was provided after the first three tests. This was especially important for the youngest normal and for the pathological group.

The testing of the schizophrenic children posed additional problems. Most of these children were hypersensitive and felt threatened by the variable of the "unknown" in the situation. Additional time was spent therefore in the formation of a working relationship. They were tested in familiar surroundings which was an important factor to these children. The pace of the procedure was left up to them and they were free, within limits, to interrupt the sequence when they felt a personal need to do so. Within this atmosphere all the schizophrenic children were able to participate and the objective requirements of testing were not violated.

4. Techniques of Analysis and Statistical Formulation of the Hypotheses.

The qualitative data obtained from the psychological tests described previously, were quantified in order to render them statistically accessible. Upon quantification the theoretical hypotheses outlined in the preceding

chapter were reformulated statistically and submitted to analysis.

An objection may be raised against the use of refined parametric techniques on the kind of qualitative data gathered in the present study which are tool- and population-bound to some extent. However, it was felt that quantification would increase objectivity of the study and would open the possibility of discerning possible trends which could be regarded as distinct on statistical grounds. The quantitative results should not be regarded as absolute. They are in need of supportive qualitative analysis.

The raw protocols were scored according to the stage criteria representative of the evolution of causal thinking. As the scope of the conclusions depends largely on the validity of its classification precautions were taken to increase objectivity. Problems in classification were discussed with one of the judges of the Montreal study who was thoroughly familiar with the material and doubtful cases were classified on the basis of mutual agreement. The writer then selected two clinical child psychologists as judges to provide an estimate of inter-judge agreement. The rationale of the study, the nature of the questionnaires and the criteria for classification of the protocols were discussed with and illustrated to

the judges. After this introduction the judges relied solely on the description of the characteristics of each stage. The percentage of agreement between the classification by the writer and each of the two judges as well as between the two judges themselves was subsequently determined.

In order to submit the qualitative data to a quantitative analysis a numerical scale with equal units was required. Each of the five stage scales was first translated into a chronological scale in terms of the age of accession to each stage. To facilitate computation this scale, ranging from four to twelve, was then translated into a numerical scale. A value of one was attributed to the smallest stage category to assure maximum discrimination. The numerical scale thus paralleled the age scale starting with a value of zero at the age of four. A sample of this quantification is shown in Appendix 3.

In the Montreal study the age of accession at which each of the stages in the different questionnaires was reached had been calculated. In order to apply this chronological sequence of stages to the stage-classified data of the present study, a justification was called for. To obtain this it was first determined if the transitivity of stages, which underlies the computation of an age scale, could be assumed. Secondly, the distribution of

the normal sample data was compared to the distribution of the Montreal data for similar age ranges. To determine if the assumption of transitivity of stages could be made for the present normal sample data, the median ages of the children located at each one of the stages were computed. Correspondence of the scale of median ages and the scale of stages would lead to acceptance of the transitivity of the various levels. The distributions of data from each questionnaire used in the present study were compared to the Montreal distributions for similar ages by means of the χ^2 technique which provides an index of the degree of similarity between them. The χ^2 formula employed was:

$$\chi^2 = \sum \left[\frac{(fo - fe)^2}{fe} \right]$$

where χ^2 - chi square
fo - observed frequencies
fe - expected frequencies

At this point the first theoretical hypothesis, concerning a comparison between schizophrenic and normal children of similar and younger ages in terms of the stage-level reached in causal thought development, could be transcribed in the form of a statistical null hypothesis as follows:

There is no significant difference between the scores of schizophrenic versus normal children of similar and younger ages as derived from the mean stage-levels of functioning measured through;

- a. a total battery of Piaget tests of causal thought;
- b. the different tests of causal thought considered separately.

To investigate the possibility of a statistically significant difference between mean-stage levels of the three groups, the t test of significance for the difference between independent means was applied:

$$t = \frac{M_1 - M_2}{\sqrt{\sigma_{M_1}^2 + \sigma_{M_2}^2}}$$

where σ_M = standard error of the mean.

The variances of the samples were combined to increase the stability of the measurement when the assumption of homogeneity of variance could be made.

The second main hypothesis, where a comparison between schizophrenic and normal groups of similar and younger ages was drawn in terms of the degree of variability across stage-levels, could statistically be formulated as follows:

There is no significant difference between the scores of schizophrenic versus normal children of similar and younger ages as derived from the scatter across stage-levels measured through:

- a. a total battery of Piaget tests of causal thought;
- b. the different tests of causal thought considered separately.

The scatter across stages was investigated by application of the F test which measures the degree of heterogeneity:

$$F = \frac{\sigma_1^2}{\sigma_2^2}$$

where the larger variance is divided by the smaller variance.

The final hypothesis reflected an interest in a comparison between schizophrenic and younger normal children in terms of the frequency of occurrence of various modes of pre-causal thinking. It was formulated statistically as a null hypothesis:

There is no significant difference between the scores of schizophrenic children as compared to normal six year olds in:

- a. the sum-total of occurrence of modes of pre-causality;
- b. the profiles of the different modes of pre-causal thought.

This hypothesis called for an analytical approach in which the frequency of occurrence of the different modes of pre-causality was enumerated across the questionnaires of the schizophrenic and younger normal groups. In order to investigate statistically the differences between the various means of the two groups a pseudo three-way analysis of variance was employed.⁶

The next chapter will be devoted to a presentation of the experimental results obtained.

⁶ Quinn McNemar, Psychological Statistics, New York, Wiley, 1954, p. 335.

CHAPTER III

PRESENTATION OF RESULTS

In this chapter the results of the statistical analysis will be presented. The first section will deal with the reporting and discussion of the validity of the classification and the comparison of data of the present study with the Montreal data. This will be followed by a presentation of the results derived from the experimental verification of the main hypotheses.

1. Validity of the Classification and Comparison with the Montreal Data.

Interjudge comparisons obtained in the classification of the different questionnaires and expressed in percentages has been summarized in Table II. Comparing the results of the writer who was most familiar with the subject matter with those of each of the two judges, a high and uniform level of agreement was found. The level of agreement between the two clinical child psychologists who acted as judges was slightly lower. Correct classification depended on a global clinical evaluation of the answers, and further assumed knowledge of the questionnaires, of cognitive processes as dealt with by Piaget and of child schizophrenic thought. Their higher degree of judgment errors may be partially due to the fact that they

Table II.-

Interjudge Comparisons of the Classification of the
 Protocols into the Main Stages of the Piaget
 Questionnaires Expressed in Percentages.

Questionnaire	Judges*		
	IxII	IxIII	IIXIII
Concept of Dream	67	63	76
Concept of Life	65	66	69
Origin of Night	67	66	75
Movement of Clouds	64	60	60
Floating and Sinking of Objects	81	78	73

*Judges: I - writer
 II - clinical child psychologist
 III - clinical child psychologist

were less acquainted with the topic of the study. In general it can be said that the interjudge agreement found was sufficiently high to support the reliability of the classification.

The results of the verification of the assumption of transitivity underlying a developmental stage and age scale are presented in Table III. It can be seen from this table that the condition of transitivity has been verified for all the questionnaires except for the Concept of Life test where the median age of the third stage fell below the median age of the second stage. It should be mentioned that an identical problem was encountered in the Montreal study. They interpreted it as due to the fact that the sample was arbitrarily cut off at the age of twelve leaving the distribution of the stage three children incomplete. Its median age was consequently artificially brought nearer to the median age of the second level. If this hypothesis is considered valid it would provide an even stronger reason for the data of the present study where the sample was arbitrarily cut off at the age of ten.

In addition to the hypothesis mentioned the writer is of the opinion that there may be a second factor at work which finds its basis in the nature of the criteria for classification in the Concept of Life test. In this questionnaire the child is classified in stage one or two

Table III.-

Account of the Median Ages of the Children in the Normal Samples Located at each one of the Stages in the Piaget Questionnaires.

Questionnaires		Stages and Median Ages					
Concept of Dream	Stages	I	IIa	IIb	IIc	IIIa	IIIfb
	Med Ages	—*	6.0	6.4	8.5	8.11	9.5
Concept of Life	Stages	I	II			III	
	Med Ages	7.6	7.3			8.0	
Origin of Night	Stages	Ia Ib	II			IIIa	IIIfb
	Med Ages	—* 6.3	8.3			8.7	9.7
Movement of Clouds	Stages	I	II			IIIa	IIIfb
	Med Ages	7.0	7.3			7.0	9.7
Floating and Sinking of Objects	Stages	I	IIa	IIb		II+8	
	Med Ages	—*	8.4	8.0		9.0	

* Too few children fell at these lowest stages to compute median ages.

on the basis of the quality of his reasons proposed to account for the living or non-living of objects as well as for the presence of animism. However, he is automatically assigned to stage three when animistic notions have disappeared with no attention paid to the quality of his reasons. In the present study several subjects in the normal and especially in the pathological group demonstrated no animism but their proposed reasons resembled those of the pre-causal stage one. It is possible that the median age of stage three will be higher if the quality of the reasons offered in addition to the disappearance of animism are considered in the criteria for classification. It is interesting to mention in this context that the median ages for stage three and one were identical in the schizophrenic sample. But only limited value can be attached to the median ages for each stage in case of the schizophrenic sample due to the small number of cases at each age level and the narrow age range involved.

Comparison of the distributions of the normal samples with the Montreal distributions of similar age subjects by means of the χ^2 technique led to the results presented in Table IV. No significant differences at the .01 level were found in three of the questionnaires and significant differences at the .05 level were found in the other two. This condition may be due to several

Table IV.-

χ^2 Comparisons Between the Distribution of the Normal
Control Samples with Similar Age Montreal
Samples on the Piaget Questionnaires.

Questionnaires	χ^2	Sign.
Concept of Dream	3.692	-
Concept of Life	6.071	-
Origin of Night	1.441	-
Movement of Clouds	10.300	.05
Floating and Sinking of Objects	9.510	.05

reasons. In the first place the classification into stages may include inaccuracies as neither the writer nor the judges selected by her can claim the competence of the Montreal judges who demonstrated a very high degree of interjudge agreement. A further causative factor may be present in the fact that the Montreal sample and the normal population of the present study were not identical; the Montreal children were French speaking and a French version of the questionnaires was administered; secondly, the range of intelligence, educational level and socio-economic status followed a normal distribution while the "normal" sample of the present study manifested more homogeneity with respect to these factors.

On the basis of the results it was considered justified to apply the age scale derived from the classified Montreal data to the stage-classified data of the present study.

2. Presentation of the Results Obtained from the Experimental Verification of the Main Hypotheses.

A. Quantitative Analysis.

Statistical analysis of the main hypotheses brought several distinctive features to light. Experimental verification of the hypothesis of no significant difference between the mean stage-levels of functioning for the

schizophrenic and comparable normal age group, when the battery of tests as a whole was taken into account, led to a rejection of the null hypothesis. The difference between the mean stage-levels of functioning for the two groups considering the total battery was found significant at the .01 level. When the questionnaires were considered separately a difference in mean stage-levels significant at the .01 level was found in four of the questionnaires while the fifth one just missed the .05 criterion. Comparison of the schizophrenic children's mean stage-level of functioning to the performance of the younger six-year old normals yielded no significant differences in mean stage-levels. The results of the differences between the mean stage-level functioning of the experimental and the two normal control groups are summarized in Table V. A graphic illustration is provided in Figure 1. Table VI presents the same data when translated into stage and age scales in terms of accession values.

Regarding the first hypothesis quantitative verification confirmed the theoretical expectation that a schizophrenic group of children will distinguish themselves from a similar age normal group in terms of the developmental levels of causal thought achieved. They functioned in general at a lower level and were comparable to normal six-year olds except for the Movement of Clouds subtest in which they could not be distinguished significantly

Table V.-

Evaluation of the Differences Between the Means of the
Schizophrenic and Two Normal Control Groups on the
Piaget Questionnaires on Causal Thought.

Questionnaires	Groups	N	M	t	Sign.
Concept of Dream	Older Normals	45	14.200	4.276	.01
	Schizophrenics	20	7.400		
	Younger Normals	20	7.450	.063	-
Concept of Life	Older Normals	45	15.622	5.162	.01
	Schizophrenics	20	6.650		
	Younger Normals	20	8.350	.310	-
Origin of Night	Older Normals	45	13.267	3.783	.01
	Schizophrenics	20	10.200		
	Younger Normals	20	7.300	1.577	-
Movement of Clouds	Older Normals	45	16.488	1.754	.01
	Schizophrenics	20	15.000		
	Younger Normals	20	11.250	.633	-
Floating and Sinking of Objects	Older Normals	45	14.266	4.291	.01
	Schizophrenics	20	7.150		
	Younger Normals	20	7.700	.304	-
Total Battery	Older Normals	45	16.240	6.343	.01
	Schizophrenics	20	9.050		
	Younger Normals	20	8.600	.001	-

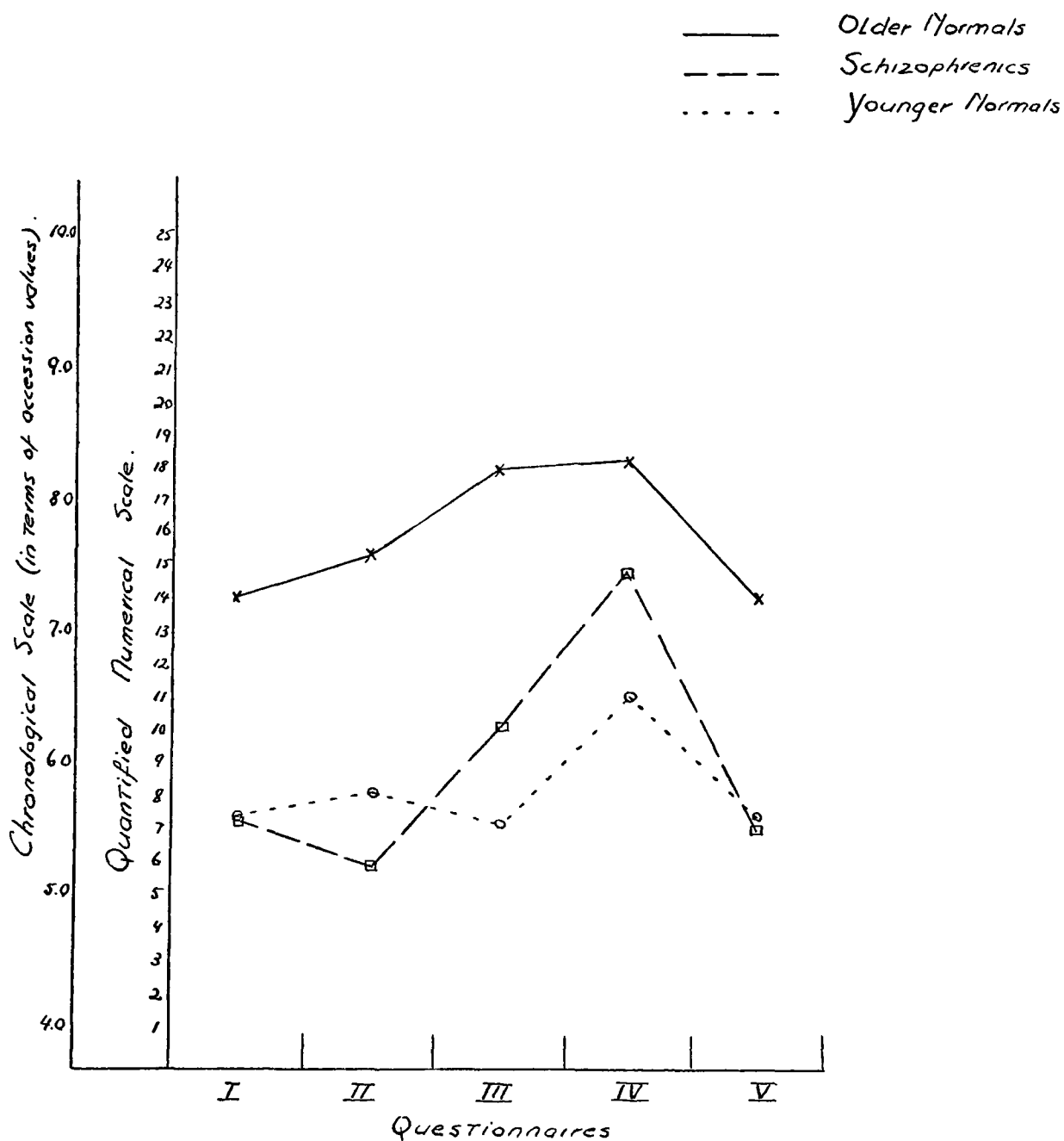


Figure 1.- Representation of the Means of the Schizophrenic and Normal Control Groups Achieved on the Piaget Questionnaires.

- I - Concept of Dream
- II - Concept of Life
- III - Origin of Night
- IV - Movement of Clouds
- V - Floating and Sinking of Objects

Table VI.-

Comparison Between the Schizophrenic and Normal Control Groups in Terms of Mean Stage-Levels and Age of Accession to Stages on the Piaget Questionnaires.

Questionnaires	Groups	N	Stages	Age of Accession
Concept of Dream	Older Normals	45	IIIa	6.5
	Schizophrenics	20	I Ib	5.5
	Younger Normals	20	I Ib	5.5
Concept of Life	Older Normals	45	II	7.4
	Schizophrenics	20	I	5.3
	Younger Normals	20	I	5.3
Origin of Night	Older Normals	45	II	6.2
	Schizophrenics	20	Ib	5.1
	Younger Normals	20	Ib	5.1
Movement of Clouds	Older Normals	45	II	7.3
	Schizophrenics	20	II	7.3
	Younger Normals	20	I	4.8
Floating and Sinking of Objects	Older Normals	45	I Ib	6.7
	Schizophrenics	20	IIa	5.2
	Younger Normals	20	IIa	5.2

from either normal group. However, on this test they were also comparable to the six year olds who revealed a similar heightened performance level although to a lesser extent.

Verification of the second hypothesis concerning the condition of variability across stage-levels did not lead to uniform results. When the battery as a whole was considered the degree of variability across the stages found in the schizophrenic as compared to either normal group was almost identical. In treating each questionnaire separately considering the schizophrenic and older normal children, a significant difference in variability across stages was found for the Concept of Dream and the Floating and Sinking of Objects tests in which the normal group demonstrated a higher degree of heterogeneity in comparison to the schizophrenic group. When the schizophrenics were compared to the younger normals no significant difference in variability was found except for one subtest, i.e. the Origin of Night in which the schizophrenics demonstrated more scatter across stages. These data are presented in Table VII. A graphic illustration of the standard deviations achieved by the three groups on the different questionnaires is also presented.

Table VII.-

Evaluation of the Differences Between the Standard Deviations
of the Schizophrenic and Two Normal Control Groups on
the Piaget Questionnaires on Causal Thought.

Questionnaires	Groups	N	S.D.	t	Sign.
Concept of Dream	Older Normals	45	6.569	6.772	.01
	Schizophrenics	20	2.631		
	Younger Normals	20	2.351		
Concept of Life	Older Normals	45	6.569	1.363	-
	Schizophrenics	20	7.267		
	Younger Normals	20	7.102		
Origin of Night	Older Normals	45	5.635	1.117	-
	Schizophrenics	20	7.613		
	Younger Normals	20	3.114		
Movement of Clouds	Older Normals	45	7.097	1.333	-
	Schizophrenics	20	3.255		
	Younger Normals	20	7.764		
Floating and Sinking of Objects	Older Normals	45	6.044	4.760	.01
	Schizophrenics	20	4.171		
	Younger Normals	20	4.765		
Total Battery	Older Normals	45	4.163	1.123	-
	Schizophrenics	20	4.351		
	Younger Normals	20	3.350		

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_____ Older Normals
 - - - - - Schizophrenics
 Younger Normals.

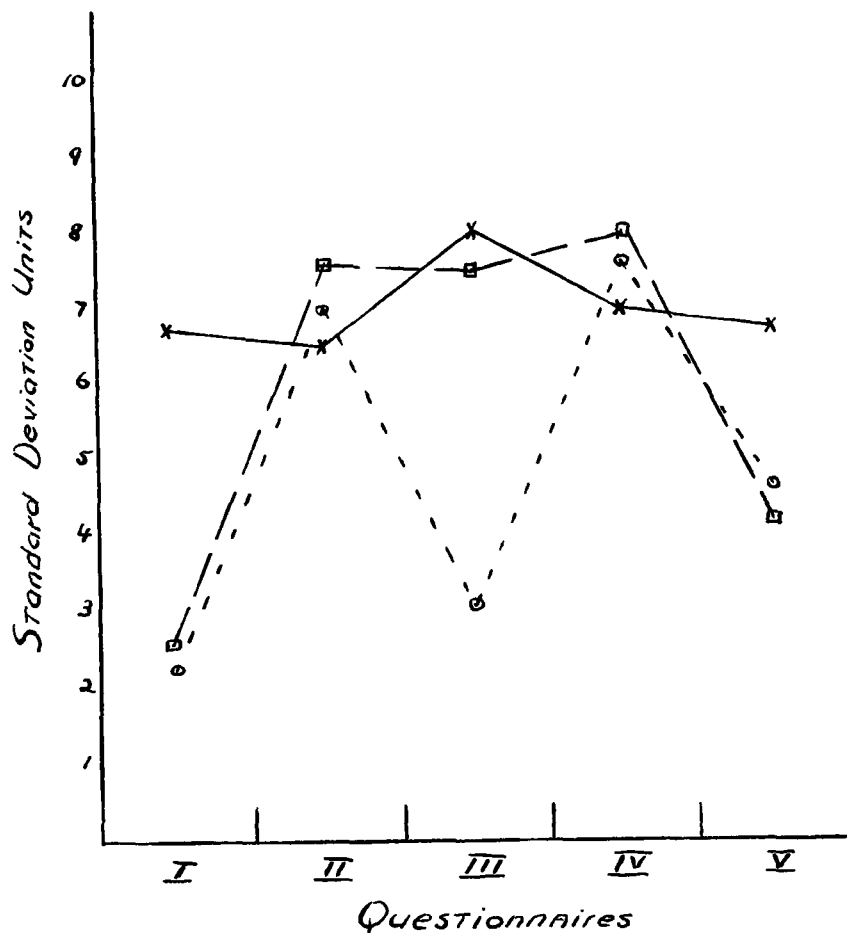


Figure 2.- Representation of the Standard Deviations of the Schizophrenic and Normal Control Groups Achieved on the Piaget Questionnaires.

- I - Concept of Dream
- II - Concept of Life
- III - Origin of Night
- IV - Movement of Clouds
- V - Floating and Sinking of Objects

The second null hypothesis was therefore partially rejected. Intra-test variability was significantly greater for two subtests in favour of similar age normals while the battery as a total did not reveal any significant differences between the unsec groups. However, inter-test comparisons of intra-test variability showed a greater unevenness in the case of the schizophrenic group as compared to the similar age normals. The schizophrenics performed homogeneously in some tests but heterogeneously in others, while the normals tended to perform heterogeneously in all the questionnaires. An uneven degree of scatter across the various tests was also a characteristic feature of the younger normal group.

The third hypothesis proposed dealt more directly with the manifestations of the different modes of pre-causality across the questionnaires. Table VIII presents the results of the pseudo three-way analysis of variance. It can be seen that the null hypothesis could be rejected as the difference between the normals and schizophrenics in the sum-total of occurrence of the modes of pre-causality was significant at the .05 level, while the difference between the separate thinking modes considered for the two groups reached a statistical significance at the .001 level.

Table VIII.-

Summary of the Pseudo Three-Way Analysis of Variance
Comparing the Means of the Modes of Pre-Causal
Thinking for the Schizophrenic and Younger
Normal Groups.

Source of Variance	Sum of Squares	Degrees of Freedom	Est. of Variance	F	Sign.
Individuals	327.350	36	9.094		
Groups	23.045	1	23.045	2.155	.05
Modes of Thought	224.520	4	56.130	10.755	.001
Groups x Modes	277.565	4	69.391	13.258	.001
Remainder	793.315	152	5.219		
Total	1675.795	197			

The younger normal group thus resorted more to pre-causal modes of thinking than the schizophrenic children. In addition to this difference in sum-totals the profiles of the various modes of causal thought for the two groups could clearly be distinguished. Figure 3 presents a graphic illustration of the two profiles. It can be seen that the normal group made much more frequent use of artificialism and animism and also surpassed the schizophrenic group in dynamism. Realism occurred almost equally in both groups. Only the primitive finalistic mode of thinking was more employed by the schizophrenic in comparison to normal six year olds.

B. Qualitative Analysis.

The experimental results obtained regarding the stage-levels of functioning and the scatter across stages in the different groups revealed a complex pattern. In order to further substantiate the quantitative results summarized in the previous section a qualitative analysis was conducted in terms of the content features of the various questionnaires.

It has been mentioned that, in the Concept of Brain test, the schizophrenic group distinguished themselves significantly from the similar aged normals in terms of a lower mean stage-level and a more homogeneous functioning.

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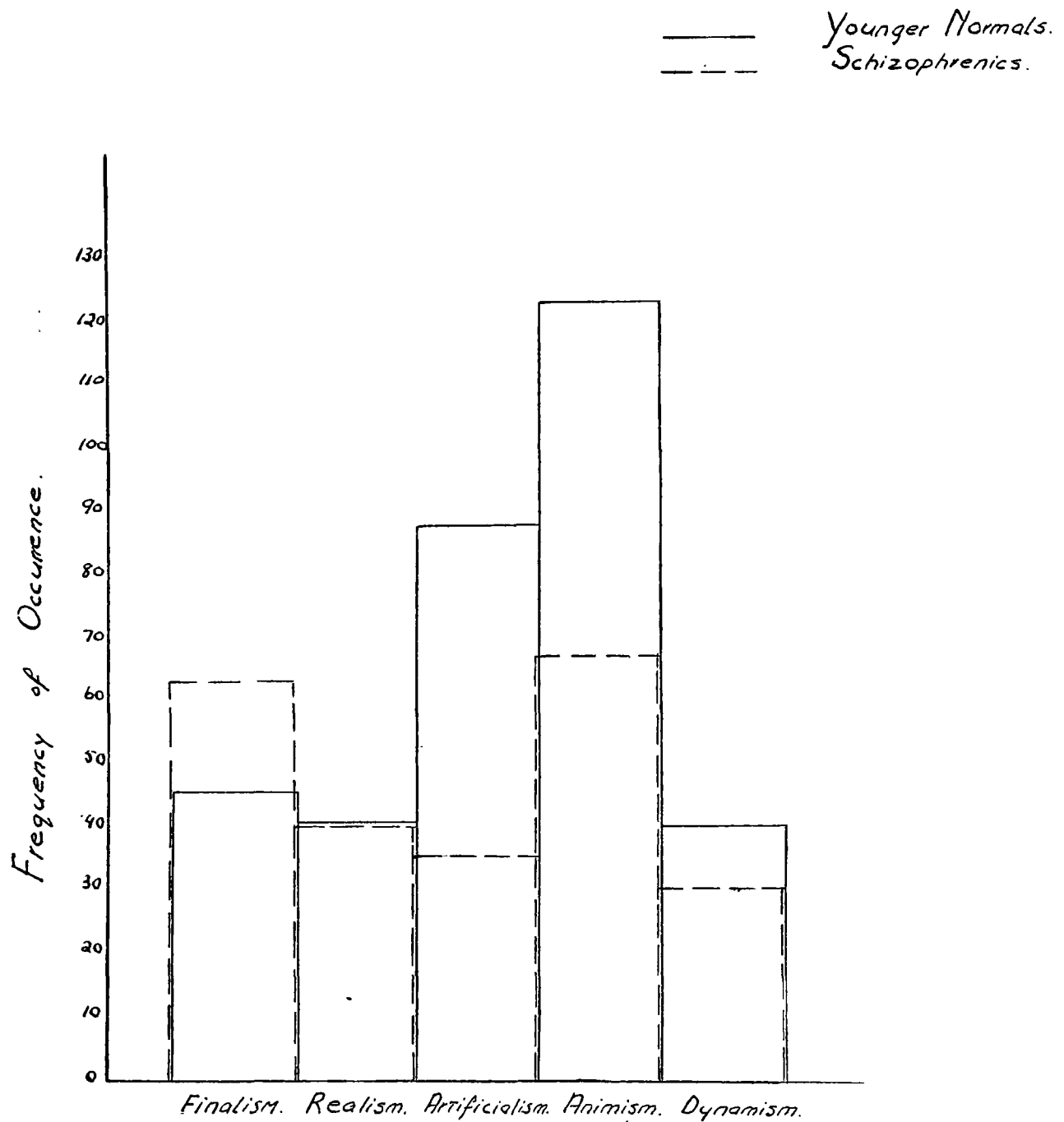


Figure 3.- Illustration of the Schizophrenic and Younger Normal Children's Profiles on the Frequency of Occurrence of Pre-Causal Modes of Thought.

In this questionnaire seventy-five per cent of the schizophrenic children fell in stage two which represents a confusion between the internal and external origin of dream, while the majority of the normals already succeeded in a successful interiorization of the dream concept. Integral subjectification of the dream concept seemed to pose a particularly difficult task for schizophrenic children. In view of their performance the transitional stage two can be regarded as a (temporary) fixation point in their efforts at cognitive mastery of a highly subjective phenomenon.

A similar condition of homogeneously low stage-level performance in contrast to a heterogeneously high stage-level achievement in the case of normal controls was present in the Floating and Sinking of Objects test. In this test no single schizophrenic child succeeded in passing stage two in which physical principles are used in an illogical and contradictory way. Most of the normal eight to ten year olds had already entered the concrete operational stage and were capable of handling elementary logical relations and groupings. The homogeneous low scoring of the schizophrenics in this test can also be regarded as fixational in view of their inability to overcome their illogicity and the dynamic flux inherent in a transitional stage of development.

Qualitative analysis of the Concept of Life test also revealed additional distinctive features. If the child has not yet achieved any criteria for classification and consequently freely associates or contradicts himself, he is considered to fall in stage zero. This indicates that he has not yet grasped the concepts of animate and inanimate.¹ Half of the schizophrenic group of children still fell in this lowest genetic level because of the absence of even the most elementary classification schemata. Further, no schizophrenic child reached stage two because the more mature classification criterion of autonomous movement was not yet discovered. Three schizophrenic children did reach the genetically higher stage three on the sole basis of an absence of animism although the quality of their reasons resembled those of stage one. The adequacy of stage three criteria has already been questioned in a previous section.

In terms of mean stage-level functioning the schizophrenics were found comparable to the younger six year olds, but qualitatively, the two groups differed. Where the latter centralized around stage one because of an abundance of animism, the schizophrenic group manifested little animism but performed poorly because of their inability to formulate

1 Monique Laurendeau and Adrien Pinard, Causal Thinking in the Child, Montreal, Institute of Psychological Research, 1962, p. 141-143.

criteria for classification of objects which resulted in numerous contradictions. Factually, a number of schizophrenic children knew the correct answers but failed when asked to account for their beliefs.

On the Origin of Night and Movement of Clouds tests the schizophrenic children reached higher mean stage-levels and performed as heterogeneously as their normal controls. In these questionnaires they manifested a tendency to account for the origin and activity of removed natural phenomena in mechanical and physical terms. Their performance still fell below the mean stage-levels of the normal eight to ten year olds because of their inability to elaborate a coherent system of physical principles. They consequently fell back on pre-causal reasoning, especially on finalism.

In the Origin of Night test most schizophrenic children made use of semi-physical and finalistic modes of explanation. The normal six year olds who functioned at a similar mean stage-level believed in artificialistic causes and behaved significantly more homogeneously at these lower stage-levels. In contrast the older normal group were elaborating their ideas in terms of semi-physical and physicalistic principles with an increasing logical coherence.

In the Movement of Clouds test the schizophrenic group reached a mean stage-level which could not be distinguished significantly from either normal group. This was due to the fact that at least half or more of the children in all three groups spontaneously designated the role of the wind in the movement of clouds which automatically placed them in the third stage. Pre-causal notions were still frequently encountered among the schizophrenics and the younger normals in spite of the third stage classification which represents essentially a causal mode of explanation. It is felt that the criteria for this final category should be re-examined and made more stringent.

It has been pointed out before that the older normal group performed heterogeneously in all the tests. Although Piaget attempted to limit the age range of the stages, Russell and other investigators found that a sample of school-age children at any age level tends to cover at least a few of the stages in a questionnaire.² Intra-test variability in developmental tests of pre-causality thus seems a characteristic of a normal sample group. In view of this condition the variability encountered within the schizophrenic group can be seen as more uneven for they

² Roger W. Russell, "Studies in Animism: II. The Development of Animism", Journal of Genetic Psychology, Vol. 56, Second Half, 1940, p. 353-366.

manifested homogeneity of variance in two questionnaires and heterogeneity in the remaining three.

Besides qualitative analysis of the main hypotheses, a study of the protocols revealed another important feature. The questionnaires of the schizophrenic group of children could almost always be distinguished from those of the normal groups by the presence of "pathological thought indicators". Although the schizophrenic children were capable of answering the questionnaires to such an extent that their protocols could be classified into various stages, their answers nevertheless were penetrated by features which set them apart from the normals. The answers of the normal children could always be considered as relevant within the context of the task presented although a few of the younger ones tended to confabulate or perseverate. In the questionnaires of the schizophrenic group a minimum total of forty-eight pathological thought indicators appeared. They could be divided into three major groups:

1. "Autistic" responses where thought was unduly regulated by personal needs leading to highly subjective, confused or bizarre responses.
2. "Chain" responses in which completely irrelevant associations were given due to a rapid shift in the conceptual frame of reference from one concept to another, with no awareness on the part of the child.
3. "Contaminated" responses, where two concepts ordinarily distinct, were superimposed.

In the protocols, twenty-four autistic, 20 chain and 4 contaminated responses were counted.

The next chapter will be devoted to an interpretation of the findings obtained from the preceding quantitative and qualitative analyses.

CHAPTER IV

INTERPRETATION OF THE FINDINGS

In interpreting the quantitative and qualitative findings attention will first be directed to the structural and logical features of the schizophrenic children's thought in comparison to normal controls. Subsequently the dynamic and content features of the various modes of pre-causality will be focussed upon. It will be attempted to throw light on the nature of the structural and dynamic aspects by drawing upon the functional invariants of assimilation and accommodation which constitute the organization of intelligence within Piaget's frame of reference. A final section will incorporate structure and dynamics in considering causal thinking in schizophrenic children as an integrative disorder of the organism. Previous relevant empirical studies on cognition in schizophrenic children as well as additional theoretical perspectives which may provide valuable insights into the possible meaning of the results obtained will be brought in line with the present findings.

1. Structural Features of Thought.

In considering the findings of the present study from a structural and logical point of view the schizophrenic

group of children fell in the pre-operational stage of cognitive development, although qualitatively distinct from normal pre-operational functioning. Incapable of logical, causal thought, they manifested pre-causal modes of thinking in their attempts to express their beliefs about reality and causality. The results of the Floating and Sinking test, which reflects the gradual progression from illogical to logical thought processes, revealed that none of the schizophrenic children succeeded in handling elementary, physical relations in a logical, non-contradictory way. In spite of the fact most of them attempted to reason in physical terms they were carried away by the actual perceptual configurations. Their answers were cast in terms of perceptual similarities between objects or in terms of pre-causal, finalistic or dynamistic notions. This made it impossible for them to solve the problem of floating and sinking of objects in terms of weight, density, or volume. The schizophrenic children were also unable to discover any coherent system of classification as reflected in their performances on the Concept of Life test. They can thus be described as pre-logical and pre-categorical, bound to the immediate perceptual properties on the one hand and to the pull of subjective adherences on the other.

According to Piaget this dualism is the most characteristic feature in the logical structure of infantile thought and results from an initial lack of coordination between assimilative and accommodative processes.¹ When accommodation predominates the child is subject to the immediate perceptual realities of his surroundings or on a conceptual level, to any concepts that may occur to him disregarding their respective meanings. Percepts and concepts are thus juxtaposed without being interrelated. A predominance of assimilation leads to syncretism, pervaded by subjective participations, animism, dynamism, and artificialism.

The dualism inherent in the coexistence of juxtaposition and syncretism was actively present in the thinking structure of the schizophrenic children. They were simultaneously ruled by the perceptual configurations of their immediate reality and by subjective pre-causal modes of thought. Actually it seemed as if the schizophrenic children were caught in this dualism which carried an intensified pathological character. An extreme juxtapositional tendency resulted in pathological chain response in which the conceptual frame of reference shifted from one concept to another with complete disregard for their

¹ Jean Piaget, Judgment and Reasoning in the Child, London, Routledge and Kegan Paul, 1951, viii-12 p.

objective meaning or reality relationships. In a few instances unrelated concepts were even superimposed as shown in contaminated responses. An excessive syncretic tendency led to autistic responses with a highly subjective, confused or bizarre flavour. Cast in different terms it can be said that juxtaposition led to under-association and syncretism to over-association.

Previous investigators who followed Goldstein and Cameron's theoretical orientations were led to believe that child schizophrenic thought is respectively under- or over-associative. Rimland² is of the opinion that this confusion is due to a lack of differentiation between autism and schizophrenia; that autistic children under-associate while schizophrenics over-associate. In the present study schizophrenic children were found to be under- and over-associative. This may be attributed to an inadequate differential diagnosis between autism and schizophrenia although it is questionable to what extent this distinction can be maintained at higher age levels.

The pathological thought indicators encountered in the present study can also be conceived of as regressions to the most primitive manifestations of pre-causality where assimilative and accommodative processes are still

² Bernard Rimland, Infantile Autism, New York, Appleton Century, 1964, p. 163-171.

antagonistic, pulling the subject in opposite directions. According to Piaget the earliest pre-operational representations of reality and causality are cast in magical, phenomenistic and finalistic terms. From a logical point of view magical thinking is autism and phenomenism can be regarded as chain responses. Magic and phenomenism denote the pre-causal content while autism and chain responses refer to the logical structures. In magic as in autism perceptual data are confused with wishes resulting from assimilation without accommodation which leads to an excess of subjective relations. In phenomenism as in chain responses accommodation predominates through which percepts or concepts are related disregarding reality relationships.

Interpreting the pathological thought manifested by the schizophrenic children as a regression to more primitive levels of functioning, the unevenness in their causal thought development became even more pronounced. Verification of the first two hypotheses indicated that they performed at significantly lower mean stage-levels and demonstrated a higher inter-test variability in comparison with similar age normals. Besides this higher inter-test scatter they expressed pathological thought which can be viewed as the most primitive level of causality not present in any normal child tested. At the same time

many schizophrenic children could express themselves in physicalistic terms devoid of pre-causality.

It has been mentioned in the review of the literature that Des Lauriers and Halpern,³ and Halpern⁴ found empirical support for schizophrenic children's unevenness in intellectual functioning. This characteristic has so frequently been encountered that it has led to one of the main criteria of childhood schizophrenia stating that their cognitive development is characterized by a background of general retardation with "islets" of near normal, normal, or accelerated functioning.⁵

Although the schizophrenic children's causal thought development could be described as uneven, it should be stressed that they did not resemble normals at any stage-level investigated. Their lowest level of primitive thought did not occur in any normal child. Pre-causality was significantly less developed than in comparative normals at a similar stage-level. Higher stage functioning was found to be qualitatively distinct. Higher level

³ Austin des Lauriers and Florence Halpern, "Psychological Tests in Childhood Schizophrenia", American Journal of Orthopsychiatry, Vol. 17, No. 1, 1947, p. 57-67.

⁴ Estern Halpern, "Conceptual Development in a Schizophrenic Boy", Journal of American Academy of Child Psychiatry, Vol. 5, No. 1, p. 66-74.

⁵ Hugh Clegg, "Schizophrenia in Childhood: Progress Report of a Working Party", British Medical Journal, Vol. 2, 1961, p. 669-670.

functioning among the schizophrenics was only achieved in the Origin of Night and Movement of Clouds tests in which natural phenomena were questioned, and in some cases in the Concept of Life test on the sole basis of an absence of animism. Where remote, natural phenomena were investigated the schizophrenic children in general did manifest a tendency to conceptualize in mechanical and physical terms. It can be mentioned in this context that a number of schizophrenic boys had been or still were preoccupied with mechanical objects or physical phenomena. Although they knew many facts in this domain their performance was still inferior to normals. Strictly speaking the former had not reached the higher level criteria of substantiated, objectified, physicalistic reasoning which characterized the latter. Instead, when their factual beliefs were questioned, they often resorted to vague explanations or regressed to finalistic pre-causality. The investigation of causal thought development in the present study thus contradicts "normal" functioning at any level and rather supports the findings of Friedman.⁶ She found schizophrenic children predominantly concrete with some ability to abstract, but unable to maintain an abstract attitude. The

⁶ Gloria Friedman, "Conceptual Thinking in Schizophrenic Children", Genetic Psychological Monograph, Vol. 63, First Half, 1961, p. 149-196.

present results are also in agreement with Goldfarb⁷ who found them uniformly inferior to normals in a battery of cognitive tests.

From a structural point of view it can thus be said that the schizophrenic children showed an atypical development pattern as they did not progress normally through the ontogenetic stages. Their developmental pattern could be conceived of as simultaneously reflecting regression to the lowest primitive levels, fixation at some transitional stages, retardation in terms of lower mean stage-level functioning and prematurity in the sense that they proceeded to higher levels while previous stages had not been adequately mastered. Consequently their 'higher levels' were vulnerable and could not be maintained under pressure. The schizophrenic children failed to achieve structural integration at any stage-level of causal thought development. This resulted in regression, fixation or acceleration as well as in extreme dualistic thought tendencies.

2. Dynamic Features of Thought.

In the domain of pre-causality the schizophrenic children differed from normal controls at similar levels of

⁷ William Goldfarb, Childhood Schizophrenia, Cambridge, Harvard University Press, 1961, p. 101-111.

functioning in showing themselves less capable of the formation of pre-causal modes of thought. Like normal children the schizophrenic children were still in the pre-causal stage and could not differentiate psychic motives and physical causes as expressed in their realism. They resorted more frequently than normals to the primitive mode of finalism but were significantly less capable of formulating the more advanced modes of animism, dynamism and artificialism.

According to Piaget, pre-causal beliefs are primitive representational systematizations of dynamic participations established between the self, objects, and other people. They result from a lack of differentiation between the self and the world in the realm of thought. These beliefs are personalized and affective in nature and result from an active interaction between the child and his world. They reflect his feelings of order within and without himself but are still pre-logical because of his egocentrism.

The schizophrenic children's inability to formulate pre-causal beliefs comparable to normals can be related to their emotional and kinaesthetic impairments. Schizophrenic children cannot establish productive emotional relationships with things or with people. Besides they are hampered in experiencing their body as stable and in

being aware of themselves in action." Their capacity for establishing dynamic participations with their surroundings is consequently diminished as the latter is based upon affective cathexis and a projection of subjectively experienced kinaesthesias. Pre-causal modes of thought are creative, personalized inventions of which the schizophrenic children were found to be less capable.

Further insight into the schizophrenic children's poor ability to formulate pre-causal beliefs can be derived from an application of Werner's organismic-developmental theory of cognition.^{9,10} Werner stressed the importance of the organism's active participation in the formation of percepts and concepts about his world. Cognition is an expressive, productive activity which requires involvement of the organism with all his resources. Through processes of dynamic schematization objects and symbols are assimilated to the organism's substratum with its sensory-motor-affective patterns. Infantile thought consequently carries an affective-conative or "physiognomic"

9 William Goldfarb and Irving Mintz, 'Schizophrenic Child's Reactions to Time and Space', Archives of General Psychiatry, Vol. 5, December 1961, p. 43-53.

10 Heinz Werner, Comparative Psychology of Mental Development, New York, Science Editions, 1949, p. 17-37.

11 Heinz Werner and Bernard Kaplan, Symbolic Interaction, New York, Wiley, 1964, p. 1-30.

quality expressed in animism, dynamism and artificialism which are personalized beliefs. Within Werner's frame of reference a poverty of pre-causality points towards an inability of the subject to incorporate and integrate his actions upon objects and his learned symbols into his own organismic substratum. This lack of embeddedness prevents personalization and in extremes leads to a dissociation between sign and signifier or in other words to a loss of meaning. The latter was most evident in the pathological chain and contaminated responses encountered in the schizophrenic group where concepts were simply juxtaposed or superimposed disregarding their respective meanings.

Other writers also found that schizophrenic children cannot personalize their world and lack in creativity. Norman,¹¹ in a clinical study of reality relations of schizophrenic children, concluded that they lack personal participation which results in a reduction of fantasy and reality. Berlin¹² on the basis of extensive clinical experience with schizophrenic children was struck by their thorough lack of creativity.

¹¹ Elizabeth Norman, "Reality Relations of Schizophrenic Children", British Journal of Medical Psychology, Vol. 27, Part 3, 1954, p. 126-141.

¹² I.N. Berlin, "Aspects of Creativity and the Learning Process", The American Imago, Vol. 17, No. 1, 1960, p. 63-74.

The poverty of pre-causal beliefs in schizophrenic children thus reflected their impaired ability to give personal meaning to their experiences through embedding it in their organismic substratum. Their accommodative activity failed to penetrate the essence of things while assimilation or dynamic schematization did not lead to enrichment and personification. It seemed that the interaction between their internal and external worlds was reduced and remained predominantly physical and mechanical in character. The schizophrenic children could not differentiate between their inner and external worlds as reflected in their realism because the interaction between subject and object through which gradual differentiation and correlative coordination is established remained too superficial.

3. Organizational and Integrative Features of Thought.

According to Piaget cognition results from a process of organismic organization through a synthesis of assimilation and accommodation. Lack of synthesis between these functional processes leads to a failure in organization and integration. Schizophrenic thought pathology has been viewed as an organizational and integrative disorder of the organism from various psychodynamic and neurodynamic points of view. It is illuminating to see how these

integrative formulations supplement and enrich the structural and dynamic features of causal thought in schizophrenic children discussed in the previous sections.

Within a psychodynamic frame of reference, Rado¹³ studied the integrative defect in the schizophrenic child's cognitive disorders. He claims their psychodynamic, integrative apparatus is affected by two basic damages of genetic origin, i.e. an integrative pleasure deficiency and a proprioceptive diathesis. At the level of hedonic self-regulation pleasure and pain experiences are inevitable as they form the basis for further emotional and cognitive differentiation. Anhedonia is a fundamental defect which results in a lack of narcissism and impairs primitive emotional-cognitive integration. Additional proprioceptive disturbances distort the child's awareness of his bodily self and further impairs his relations to himself and his environment. These emotional and kinaesthetic impairments can be related to the schizophrenic children's impaired ability to formulate pre-causal beliefs which are derived from affective relations and kinaesthetic projections.

13 Sander Rado, "Understanding the Adaptive Struggles of Schizophrenic Patients", A.E. Schefflen, (ed.), Psychotherapy of Schizophrenia, New York, Grune and Stratton, 1966, p. 63-70.

Psycho-analytic writers trace regulative impairments and dissociative thought tendencies back to early childhood experiences. Following them the infant's personality is unintegrated and ruled by opposing introjective and projective tendencies. These disintegrative tendencies can only be tolerated if the infant also experiences integration through gratifying, instinctual experiences which "gather the personality from within". His experiencing of pain and pleasure and his capacity for hedonic self-regulation provide him with the strongest synthesizing force. When this capacity is too weak disintegrative tendencies will dominate and will result in a dissociation and fragmentation of the personality.¹⁴

Schizophrenic thinking has been attributed to a failure in organization by Rashkis and Rosenzweig. Rashkis¹⁵ approached the problem from the viewpoint of faulty psychological organization. Healthy psychological organization implies, according to him, the capacity to coordinate information from introceptive and extroceptive systems and to direct and shift attention. He sees these

¹⁴ Melanie Klein, "Notes on Some Schizoid Mechanisms", International Journal of Psycho-analysis, Vol. 27 Part 3, 1946, p. 111-110.

¹⁵ Harold A. Rashkis, "A General Theory of Treatment in Psychiatry", quoted by Robert E. Singer, "Organization as a Unifying Concept", Archives of General Psychiatry, Vol. 2, January-June 1950, p. 60.

functions as disturbed in schizophrenic thinking. In the present study it was found that the schizophrenic children were incapable of coordinating their assimilative and accommodative efforts, and failed to focus their attention on the most relevant aspects of the task at hand.

Rosenzweig¹⁶ also considers schizophrenic thought pathology as due to a failure in organization but sees the problem as resulting from neurodynamic defects. On the basis of the experimental work of Penfield³, Jaspers and Magoun, he denotes the non-specific reticular formation system of the brain as the mechanism which maintains homeostasis and organization. He ascribes two main organizational functions to the reticular formation which are parallel to Ashby's psychodynamic organizational principles. These functions are: relating idea and affect in a harmonious manner, and the ability to focus attention. As these functions are disturbed in schizophrenic thought, he concludes that the reticular formation is the main site of impairment.

Recently schizophrenic thought pathology in children has been ascribed to defective reticular formation functioning by Rimland, Bender and others. Rimland,¹⁷ who

¹⁶ Norman Rosenzweig, "A Mechanism in Schizophrenia", Archives of Neurology and Psychiatry, Vol. 74, No. 6, 1955, p. 544-555.

¹⁷ Rimland, Op. Cit., p. 72-73.

maintains a distinction between autism and schizophrenia, believes that the former is due to a hypo-arousal and the latter to a hyper-arousal functioning of reticular activating systems. According to him reduced and augmented arousal functions impair the ability to relate sensations to memories or previous experiences. These children are thus seen as incapable of modifying sensory data in terms of subjective experiences.

Fish¹⁰ provided experimental support of disorganized neurodynamic patterns and disturbed reticular formation functioning in schizophrenic children. Following Zander who claims that childhood schizophrenia is a biological, integrative disorder with its roots in infancy, she devised criteria for developmental abnormality on the basis of Zander and Gesell's work. In a ten-year follow-up study she found that infants with the most marked deviations became child schizophrenics. In these children a disorder in the timing and organization of neurological development was found reflected in a disturbance of alertness, activity, muscle tone, autonomic stability and sequences of postural development. They tended to function at extremes of continuums and showed a dissociation between

10 Barbara Fish and Murray Alpert, "Patterns of Neurological Development in Infants Born to Schizophrenic Mothers", Recent Advances of Biological Psychiatry, Vol. 5, New York, Plenum, 1963, p. 22-48.

the sensory and motor aspects of their arousal functions. She interpreted her findings as indicative of defective integration.

The results of the present study support interpretation in terms of defective reticular formation functioning. The schizophrenic children were handicapped in their ability to integrate external sensory data with their own subjective experiences. They could not relate idea and affect harmoniously. This was evident in their poor ability to form personalized and physiognomic beliefs about reality and causality. They were also incapable of focusing attention on relevant aspects of the task presented. Instead they tended to over- and under-associate. The former was manifested in their syncretism and autism reflected in distorted, subjective thought. The latter was expressed in juxtaposition and dissociative thought tendencies where the embeddedness in their organismic substratum was lost leading to meaningless concepts.

In spite of the lack of agreement as to what constitutes the syndrome of childhood schizophrenia the results and interpretation offered brought certain trends in the schizophrenic children's causal thought patterns to light. In this study, however, only a small area of their thought was studied. Furthermore, experimental procedures could be criticized in terms of validity and

reliability. Piaget elaborated the theory of pre-causality and devised clinical-experimental methods for its investigation but researchers are still debating its significance and are puzzled by the methodological difficulties encountered. The validity of the theoretical interpretation of the results obtained can also be questioned as many of the theoretical principles are still unsubstantiated by empirical research. In spite of these limitations new insights and perspectives were gained by means of the present study. Moreover, it is suggestive of possibilities of future inquiries in the developmental aspects of schizophrenic thought.

SUMMARY AND CONCLUSIONS

In the present dissertation a theoretical-experimental study of causal thought in schizophrenic children was conducted. Their level of development of causal thought was tested through the application of experimental questionnaires constructed on the basis of Piaget's theoretical postulates and his clinical experiments on pre-causal and causal thought in children. The performance of the schizophrenic children was compared to normal controls of similar and younger age levels.

In the review of the literature theoretical and clinical views on childhood schizophrenia, as well as experimental contributions on their cognitive disorders, was first presented. This was followed by introducing the main principles of Piaget's theory relevant to the development of causal thought and experimental verification in this domain. A rationale was offered for applying his theory to a possible further understanding of thought pathology in schizophrenic children. The next chapter described the sample populations, the nature of the various questionnaires, the procedures and the techniques of analysis employed.

A comparison between the schizophrenic and normal children of similar and younger ages in terms of the stage-levels reached in causal thought development was then investigated testing the null hypothesis:

There is no significant difference between the scores of schizophrenic versus normal children of similar and younger ages as derived from the mean stage-levels of functioning measured through:

- a. a total battery of Piaget tests of causal thought;
- b. the different tests of causal thought considered separately.

The null hypothesis was partially rejected. Significant differences between the scores of schizophrenic and similar age normals in terms of a lower mean stage-level functioning for the schizophrenics were found when the total battery of tests was considered. In terms of the separate tests their performance was significantly lower in four of the five tests administered. No significant differences between the mean stage-levels of the schizophrenics in comparison to the younger normals were found.

The second hypothesis concerning possible differences amongst the experimental and control groups in the degree of variability encountered across stage-levels was verified in the form of the following null hypothesis:

There is no significant difference between the scores of schizophrenic versus normal children of similar and younger ages as derived from the scatter across stage-levels measured through:

- a. a total battery of Piaget tests of causal thought;
- b. the different tests of causal thought considered separately.

This null hypothesis was also partially rejected. In view of the total battery no significant differences in variability between the experimental and control groups were

found. However, the schizophrenic children performed more unevenly than similar age normals. They demonstrated high variability in three and low variability in two subtests while the normals performed heterogeneously in all the tests. In comparison to the younger normals the schizophrenics differed on one subtest in which they performed more heterogeneously.

The final hypothesis, which reflected an interest in a comparison between schizophrenic and younger normal children in terms of the frequency of occurrence of the various modes of pre-causal thinking, was tested in the form of the following null hypothesis:

There is no significant difference between the scores of schizophrenics as compared to normal six year olds in:

- a. the sum-total of occurrence of modes of pre-causality;
- b. the profiles of the different modes of pre-causal thought.

The null hypothesis was rejected. Pre-causality occurred significantly less amongst the schizophrenic children. Their profiles in terms of the different modes of pre-causal thought could also be distinguished from the younger normals. The schizophrenic children's protocols further differed qualitatively from the normals in their expression of pathological thought indicators in the form of autistic, chain and contaminated responses.

The results were in agreement with those of previous investigators who found child schizophrenic thought subjective, concrete, illogical and uneven. They were interpreted chiefly within Piaget's theoretical frame of reference. Interpretation in view of structural characteristics revealed that the schizophrenic children as a group fell in the pre-operational stage of cognitive development although their developmental patterns differed from normals at all levels investigated. They manifested simultaneously regressions to the most primitive levels, fixations at transitional stages, retardation and prematurity. Structural integration was not achieved at any stage and dualistic thought tendencies consequently prevailed. Interpretation of dynamic features brought to light the schizophrenic children's impaired ability to create personalized, physiognomic beliefs about reality and causality. Causal thought as expressed by the schizophrenic children was finally viewed as an integrative disorder. Possible psychodynamic and neurodynamic interpretations were offered.

In terms of future research, multiple suggestions can be given as the field investigated in this thesis is still relatively unexplored. A few suggestions regarded as important will be made.

First, research should aim at verification of the validity and reliability of the experimental questionnaires employed in the present study. Some of these questionnaires are in need of a theoretical re-evaluation in terms of the criteria employed for classification into stages.

In the domain of pre-causality, Piaget's theoretical postulates should be validated in view of other developmental theories of cognition. Additional experimental methods for the study of primitive thought should be devised. Insufficient attention has been directed to the effect of variables such as personality factors, experience, language and the wording of questions on the ability to form pre-causal beliefs.

It is recommended that more aspects of thought in schizophrenic children are studied within an organismic-developmental frame of reference. Parallel to the development of causality, for instance, the growth of the concepts of time and space as well as the formation of elemental, logical relations and groupings could be investigated. A study of the interactional patterns will be illuminating.

Administration of a battery of developmental-cognitive tests may contribute to elucidate differential patterns in a group of schizophrenic children. This is especially important in view of the lack of agreement as

to what constitute the syndrome of childhood schizophrenia and may help to foster differential diagnosis.

More future studies on cognitive disorders in schizophrenic children should focus on the study of individual cases where a large battery of developmental-cognitive tests can be administered. This may lead to a fruitful study of interrelationships of part-functions within the organismic whole.

Research in the directions mentioned is still fraught with difficulties but will contribute to the understanding of the genesis of schizophrenic thought pathology.

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Bender, Lauretta, "Twenty Years of Clinical Research on Schizophrenic Children with Special Reference to Those under Six Years of Age", Gerald Caplan, (ed.), Emotional Problems of Early Childhood, New York, Basic Books, 1955, p. 503-515.

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APPENDIX 1

PROFILES OF SYMPTOMS OF INDIVIDUAL CHILDREN

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PROFILES OF SYMPTOMS OF INDIVIDUAL CHILDREN

Case 1: Boy, 7.6 years old

A small blue-eyed boy who was the only child in the family. He appeared immature for his age. When assessed psychiatrically at the age of four, he demonstrated bizarre motor behaviour in the form of toe-walking, hand-flapping and posturing. Most of the time he kept himself occupied with a few objects. His speech development was slow, perseverative and echolalic. Sentences were simple and many words unrelated. He revealed a good memory but a lack of imagination. He related only superficially to adults and played parallel with children. Emotionally, he was apathetic or overreactive in the form of excessive fears and rages.

He received treatment and was reassessed at the age of six. He had made progress although still manneristic, obsessive, preoccupied and withdrawn socially.

Case 2: Boy, 7.9 years old

A good-looking, very sensitive boy who was first diagnosed at the age of five. He was then restless and distractable. Object relations were superficial in character. He verbalized little and suffered poor articulation and echolalia. His flow of ideas was difficult to follow. Small stresses gave rise to panic states. Socially, he was demanding on adults and fearful of children.

Therapy was provided and reassessment at seven showed progress. He was still restless, anxious and impulsive. Speech was more appropriate although many associations were loose and irrelevant. Interest-span had increased. He started to relate to other children.

Case 3: Boy, 7.11 years old

This child had one older normal sister. When assessed at the age of four, he revealed a history of hyperactivity and destructiveness. He was not interested in his environment but rather preoccupied with mechanical things. Speech development was delayed and echolalia

occurred frequently. He was aloof and ignored others. Needs could not be delayed and gave rise to aggressive outbursts. He was phobic and insisted on sameness.

Assessment at seven highlighted that he was intellectually bright but unimaginative. Emotionally he was uncontrolled, hypersensitive, very irritable and impulsive. Socially he remained a loner. Interests were narrowed and centered around his preoccupations with space.

Case 4: Boy, 8.0 years old

A short attractive brown-eyed boy. He had one younger sibling who was considered normal. Around the age of four, he was hyperactive with some manifestations of bizarre motor behaviour. He resisted changes and was very systematic and mechanical in his handling of objects, with some capacity for constructive, imaginative play when left on his own terms. His memory was very good. Vocabulary, however, was limited to a few words and echolalia was often expressed. He did not relate to adults nor to children but persisted in solitary play. Emotionally he was sensitive, moody and aggressive.

Follow-up diagnosis at seven revealed that he was still very restless, distractable and impulsive with phobic and obsessive-compulsive behaviour. Associations were loose and often irrelevant. He did not play with others but paralleled them.

Case 5: Boy, 8.1 years old

A sensitive little boy who was the only child in the family. During his first years, his behaviour was disorganized in the form of unregulated eating and sleeping patterns, hyperactivity with some bizarre motor responses, self-destructiveness and a clinging, symbiotic relationship to his mother. His object relations were superficial, perseverative and he insisted on sameness. Language development was delayed and echolalia persisted. Emotionally, he was overinhibited or overreactive in the form of fears and panic-states. He was negativistic, obsessional and withdrawn socially.

Therapeutic intervention led to improvement. At seven years of age, he still manifested some echolalia and irrelevant associations but was less impulsive. He could play in the presence of others although interaction was minimal.

Case 6: Boy, 3.2 years old

This appealing child was the first-born of two siblings. As a toddler he was perceptually sensitive but distractable, hyperactive and aimless in play. When assessed at four his bizarre speech was the most outstanding symptom. Associations were irrelevant and comprehension very poor. Emotionally he was hypersensitive but completely uncontrolled. On the one hand, he was anxious, phobic and clinging-dependent; on the other hostile and destructive. Relationships with adults were superficial and with children he was helpless.

He responded slowly to therapy but did improve. Intellectually he was considered potentially bright but very subjective with loose associations. He remained highly sensitive, anxious, irritable, socially withdrawn and preoccupied.

Case 7: Girl, 6.2 years old

This tall, attractive, blue-eyed girl was the younger of two siblings. When she was young her hypersensitivity and hyperactivity, evidenced in an aimless restlessness, made her difficult to handle. She was very alert but anxious and helpless, threatened by the world to which she tried to adjust by insisting on sameness and by passive withdrawal. Motor and affective dissociative tendencies were present. Language development was slow and perseverative.

At the age of eight she had improved. Her hypersensitivity and tendency to panic states, coupled with a social passivity and a complete lack of empathy, still reduced capacity for socialization. Although potentially bright she was obsessional with narrow interests and tendencies to regressive fantasy.

Case 8: Boy, 3.7 years old

Case 8 was a shy, sensitive, brown-eyed boy with some younger normal siblings. As a toddler he was hyperactive, destructive, fearful and avoided contact and new experiences. When assessed at the age of four his behaviour was stereotyped and bizarre. His speech was poor and confused. Emotionally he was caught in an extreme ambivalence, torn between anxiety and aggressive, destructive impulses.

After a year of therapy, he showed some improvement. Follow-up at the age of eight revealed that his capacity to draw upon his potential emotional and intellectual resources had increased although adjustment was still tenuous. Obsessive-compulsive behaviour and phobias were manifested. Socially he was still a loner although attempts at interaction were made.

Case 9: Boy, 6.10 years old

A sturdy, serious boy who had one older well-adjusted sister. When assessed at four, mannerisms, destructiveness, perseverations, and preoccupations with flying objects characterized his behaviour. He was stubborn, resisted changes, and ignored others. Language development was delayed.

He received therapy which resulted in some improvement. Reassessment at seven showed that his intellectual potential was high but subjective logic and irrelevant associations prevailed. He tended less to bizarre fantasies. Socially he was passive but could play parallel to others. Emotionally he was flat with a depressive tone and occasional aggressive outbursts. Mannerisms and preoccupations were still operant.

Case 10: Boy, 7.1 years old

A heavily built boy who was the only child of foster parents. In his early years he was aggressive, destructive, negativistic, demanding, and very insecure. He clung to a few objects in a perseverative way. Bizarre behaviour was manifested, sentences were inappropriately used with expressions of echolalia. Socially he was an isolate as he feared other children and did not relate to adults, although he tried to manipulate them.

At eight years of age, slight motor dissociative tendencies prevailed. He was very demanding, persistent and talked continuously in a mechanical, subjective and perseverative way. He was often preoccupied and completely ignored the needs of others which made socialization impossible.

Case 11: Boy, 7.1 years old

A sensitive boy with younger and older normal siblings. He manifested disturbed behaviour from a very early age. Around three he showed bizarre behaviour in the form of primitive head-rubbing. He was withdrawn, preoccupied with mechanical things and his emotional responses were inappropriate. Vocabulary consisted of only a few words and echolalia was often expressed.

Under influence of treatment he related first superficially and later in a dependent way. Emotional behaviour was more relevant but extreme in the form of anxiety or anger outbursts. He was phobic and preoccupied with airplanes.

At nine years of age he had improved but remained anxious, restless and distractable. His logic was subjective and associations often irrelevant with a strong tendency towards confusion and autistic fantasy. Interests were narrow and preoccupations strong. Obsessive and phobic defenses were used. Socially he played alone most of the time.

Case 12: Boy, 9.4 years old

As a young child he was very sensitive, restless, and aggressive with poor sensory-motor coordination. He could not relate to others but attempted to dominate situations. Language development was delayed and at first characterized by irrelevancy and bizarreness.

He benefited from therapy. At nine he was reassessed revealing that he was potentially bright. However, his thought was highly subjective and confused. He was still distractable, irritable, and impulsive. His talkativeness was obsessive but he did not communicate due to an inability to perceive others socially. He tried to manipulate adults through aggressive outbursts and threatened younger children.

Case 13: Boy, 9.7 years old

A frail blue-eyed foster child. He came under psychiatric attention at the age of four when destructiveness, temper tantrums and aimless hyperactivity characterized his behaviour. He related poorly to objects and could not communicate with others.

Assessment at eight years of age showed that his thought was confused, bizarre and autistic. He was very anxious and incapable of controlling his impulsivity. However, therapy gradually helped him to form an affective, dependent relationship. Although still hypersensitive, subjective and easily disoriented, he became more capable of purposeful activity when guided externally.

Case 14: Boy, 9.0 years old

A fair-haired attractive boy who was the youngest child in the family. During early years of development strong autistic features were present. He was withdrawn, insisted on sameness, clung to a few toys and could not relate to people. Language started to develop only at four and was at first echolalic with an inappropriate use of words. Around the age of six he was preoccupied with mechanical things, asked questions constantly, and was fearful of new situations.

At nine he was still a loner with many fears and obsessions. Although hypersensitive and easily hurt he was less withdrawn and started to relate superficially in a submissive, dependent way but was still incapable of group participation.

Case 15: Boy, 9.9 years old

The boy, younger of two siblings, was attractive and very sensitive. During the early years of development, he displayed auto-aggressive behaviour and did not relate to anyone. Eating problems, hyperactivity and frequent temper tantrums made him difficult to handle. Around the age of four, speech was still echolalic and comprehension very poor. He was excessively preoccupied with blocks and lights and did not play with others. Emotionally, he was hypersensitive, irritable, anxious and impulsive.

His capacity to relate to other children improved somewhat following therapy. At nine years of age he was distractable, impulsive and aggressive with highly subjective thoughts and obsessive preoccupations.

Case 16: Girl, 9.0 years old

This brown-eyed girl was hypersensitive and afraid of new situations. She was very excitable which led to disorganization of behaviour expressed in motor mannerisms and irrelevant speech. Her language development was delayed, perseverative and echolalic features were still present at nine years of age. Her emotional reactions to internal or external stimuli were extreme in the form of anxiety, which led to inhibition and withdrawal, or occasional anger outbursts.

She improved under influence of therapy and started to relate to others in a more meaningful way.

Case 17: Boy, 10.2 years old

Physically an attractive, blue-eyed boy who had lost both his parents. As a young child, he manifested strong autistic features. He was not interested in toys and did not relate to people. Many fears and obsessional preoccupations soon appeared. Language development was delayed till five years of age.

When reassessed psychiatrically at the age of nine, he revealed highly fluctuating and inconsistent patterns of behaviour. Fears, anxiety, impulsivity and inappropriate verbalizations were most striking. His thought was over-inclusive and autistic. He was preoccupied with space and the possibility of physical hurt.

After a year of therapy he started to relate to others in an affective, dependent way and succeeded better in impulse control.

Case 18: Boy, 10.4 years old

A good-looking boy with glasses who had younger and older siblings. When assessed at the age of four he was withdrawn and inhibited with perseverative patterns of behaviour. Language development was delayed; he was very tense and fearful and could not relate to others.

This hypersensitive boy received two years of therapy. He needed to verbalize all his thoughts in order to cope with his fears. He remained tense, preoccupied and perfectionistic. Intellectually he was superior, very factual and mechanical but easily confused and disorganized.

Emotional extremes were apparent in his anxiety and impulsiveness. He made excessive demands on others for absolute security. Socially he was aloof and lonely.

Case 17: Girl, 10.5 years old

This red-haired girl had one younger brother who suffered from the same illness. She was first assessed at two years of age when she displayed motor mannerisms, hypersensitivity to noises and a fascination for mirrors, lights and shadows. Emotional responses were inappropriate and she was indifferent to others. Speech development was delayed until four.

Therapy helped her in her emotional ambivalences. Basically, she remained insecure, impulsive and prone to anxiety especially in any new situation. Her thought was highly subjective with tendencies to regressive fantasies. Interests were narrow and preoccupations prevailed. Attempts at social interactions were made but were unrewarding and often resulted in projections because of an inability to perceive herself or others.

Case 20: Boy, 11.5 years old

As a young child he was a poor and irregular sleeper, very tense, highly irritable, hyperactive and destructive. Cathexis with others was not established and emotional responses were often inappropriate. He lacked curiosity, was unhappy, restless and aimless in his behaviour. Language development was slow and was not used as a means of communication. Spatial was impaired and comprehension very poor.

A traumatic event at nine further loosened his ties with reality. His thought became more confused and paranoid. He suffered from anxiety, phobias and could not control his aggressive impulses which he projected on others.

APPENDIX 2

RATING SCALE FOR THE EVALUATION OF CHILDHOOD
SCHIZOPHRENIA

APPENDIX 2

RATING SCALE FOR THE EVALUATION OF CHILDHOOD SCHIZOPHRENIA

<u>Psychological Processes</u>		<u>Rating Scale</u>				
		<u>low</u>		<u>medium</u>		<u>high</u>
		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
I.	<u>Intellectual Functioning</u>					
	Distractibility	_____	_____	_____	_____	_____
	Associational processes					
	irrelevant associations	_____	_____	_____	_____	_____
	loose associations	_____	_____	_____	_____	_____
	Thinking					
	concrete	_____	_____	_____	_____	_____
	over-inclusive	_____	_____	_____	_____	_____
	symbolizations	_____	_____	_____	_____	_____
	condensations	_____	_____	_____	_____	_____
	subjective logic	_____	_____	_____	_____	_____
	monotopical thought content	_____	_____	_____	_____	_____
	confusions	_____	_____	_____	_____	_____
II.	<u>Emotional Control</u>					
	Restlessness	_____	_____	_____	_____	_____
	Hypersensitivity	_____	_____	_____	_____	_____
	Irritability	_____	_____	_____	_____	_____
	Impulsivity	_____	_____	_____	_____	_____
	Aggressivity	_____	_____	_____	_____	_____
	Anxiety	_____	_____	_____	_____	_____
	Moodiness	_____	_____	_____	_____	_____
III.	<u>Contents of Fantasy</u>					
	External Events	_____	_____	_____	_____	_____
	Regressive	_____	_____	_____	_____	_____
	Confusion between fantasy and reality	_____	_____	_____	_____	_____
IV.	<u>Defenses</u>					
	Inhibition of thought	_____	_____	_____	_____	_____
	Reduction of interests	_____	_____	_____	_____	_____
	Obsessions	_____	_____	_____	_____	_____
	Compulsions	_____	_____	_____	_____	_____
	Phobias	_____	_____	_____	_____	_____
V.	<u>Social Behaviour</u>					
	Withdrawal	_____	_____	_____	_____	_____
	Aloneness	_____	_____	_____	_____	_____
	Lack of empathy	_____	_____	_____	_____	_____
	Passivity	_____	_____	_____	_____	_____

APPENDIX 3

PIAGET QUESTIONNAIRES AND ILLUSTRATION OF THE
QUANTIFICATION OF THE QUALITATIVE DATA

APPENDIX 3

PIAGET QUESTIONNAIRES

I. THE CONCEPT OF DREAM

A. General Questions

"Do you know what a dream is. Do you dream sometimes at night?"

B. Specific Questions

Origin of Dreams

"Tell me, where does a dream come from?"

"Where are dreams made, where do they come from?"

"Do they come from inside of you, or from outside of you?"

"Who makes the dreams come?"

"Is it you, or someone else? Who?"

Location of Dreams

"While you are dreaming, where is your dream. Where does it go on, in what place is it?"

"Is it inside of you, or in your room?"

1. If the dream is internal (in the head, in the thought, etc.), say:

"If we could open your head while you are dreaming, if we could look into your head, could we see your dream?"

"Why do you say that we could (not) see your dream?"

"Then, where is it, in your head, your dream?"

2. If the dream is external (in the room, on the wall, under the bed, close to the eyes, etc.), say:

"Is it in your room (on the wall, etc.) for real, or is it only as if it were there? Or does it only seem to be there?"

THE CONCEPT OF DREAM (Cont.d.)

"While you are dreaming, are your eyes closed or open?"

"Then, where is the dream?"

"When you dream that you are playing in the street, where is your dream? In the street, or in your room?"

3. In both cases, go on with:

"Is there something in front of you while you are dreaming?"

"Your mother, when she is in your room, can she also see your dream?"

"And I, if I were in your room, could I see your dream?"

"Why do you say that I could (not) see your dream?"

Organ of Dreams

"Then, tell me, what do we dream with. Is it with our hands? With what?"

Cause of Dreams

"What did you dream about last time?"

"Why did you dream about that?"

If the child says he did not dream, ask him:

"Let's make believe you dreamed you had fallen and hurt yourself . . . Why did you dream about that?"

"Then, do you know why we dream. Why there are dreams?"

Substance of Dreams

"What is a dream made of? . . . Is it made of paper? Then, what is it made of?"

"Can we touch our dreams? . . . Why do you say that we can (cannot) touch our dreams?"

"Is a dream a thought, or is it a thing?"

THE CONCEPT OF DREAM (Cont'd.)Reality of Dreams

"During the night, when you dream you are playing, are you playing for real?"

"Is it the same as when you are playing during the day?"

"Then, are our dreams true?"

II. THE CONCEPT OF LIFEA. General Questions

"Do you know what it is to be alive, to be living? What does it mean?"

"Give me the names of some things which are alive."

B. Specific Questions

"Is a mountain alive?"

"Why do you say it is (not) alive?"

"Is the sun alive?"

"Why do you say it is (not) alive?"

"Is the table alive?"

"Why do you say it is (not) alive?"

"Is an automobile alive?"

"Why do you say it is (not) alive?"

"Is a cat alive?"

"Why do you say it is (not) alive?"

"Is a cloud alive?"

"Why do you say it is (not) alive?"

"Is a lamp alive?"

"Why do you say it is (not) alive?"

"Is a watch alive?"

"Why do you say it is (not) alive?"

"Is a bird alive?"

"Why do you say it is (not) alive?"

THE CONCEPT OF LIFE (Cont'd.)

"Is a bell alive?"

"Why do you say it is (not) alive?"

"Is the wind alive?"

"Why do you say it is (not) alive?"

"Is an airplane alive?"

"Why do you say it is (not) alive?"

"Is a fly alive?"

"Why do you say it is (not) alive?"

"Is a tree alive?"

"Why do you say it is (not) alive?"

"Is a snake alive?"

"Why do you say it is (not) alive?"

"Is a bicycle alive?"

"Why do you say it is (not) alive?"

"Is a fish alive?"

"Why do you say it is (not) alive?"

"Is a pencil alive?"

"Why do you say it is (not) alive?"

"Is the fire alive?"

"Why do you say it is (not) alive?"

"Is a flower alive?"

"Why do you say it is (not) alive?"

"Is the rain alive?"

"Why do you say it is (not) alive?"

"Take the rain and the fire: is one of them more alive than the other?" "Why do you say that it is the . . . which is more alive?"

"Take the wind and a bicycle: is one of them more alive than the other?" "Why do you say that it is the . . . which is more alive?"

"Take a fly and a cloud: is one of them more alive than the other?" "Why do you say that it is the . . . which is more alive?"

THE CONCEPT OF LIFE (Cont'd.)

"Take a child and a cat: is one of them more alive than the other?" "Why do you say that it is the . . . which is more alive?"

"Take a flower and an airplane: is one of them more alive than the other?" "Why do you say that it is the . . . which is more alive?"

III. THE ORIGIN OF NIGHTA. General questions

"Do you know what the night is? Tell me, what is night?"

"Why is it dark at night?"

"Where does the dark come from at night? What makes it night?"

B. Alternate Sections

Proceed with one of the three sections depending on what the child regards as the origin of night.

Section 1: Sleep

"Do you sleep, sometimes during the day? Can we sleep during the day?"

"Is it dark when we sleep in the daytime?"

"Then, why is it dark at night?"

"Why is it dark only at night?"

"Are there times when it is night and you do not sleep?"

"When you stay up late at night, is it dark outside?"

"Then, how is it that it is dark when you do not sleep?"

(Continue with concluding questions to be asked of all children.)

THE ORIGIN OF NIGHT (Cont'd.)Section 2: Clouds (or black "air")

"Where do these clouds come from? What makes these clouds?"

"How does . . . (the child's answer) make the clouds? What does he make them with?"

"Why do these clouds come only at night?"

"The clouds at night, are they white or black?"

"Can white clouds make it night?"

"Why do you say that. . . (the child's answer)?"

"During the day, are there clouds sometimes?"

"Then why, when there are clouds in the daytime, is it not dark like at night?"

"At night, is it black clouds which take the place of white ones, or white clouds which turn black?"

"Where do the white clouds go at night?"

(Continue with concluding questions to be asked of all children.)

Section 3: Disappearance of the Sun

"Can you explain how it becomes dark when the sun is gone?"

"Where does the sun go at night?"

"Why does the sky become dark at night?"

"Is it because of dark clouds in the sky at night?"

"Is the sun always there during the day? When it rains, do we see the sun?"

"Then, why is it not dark like at night, when it rains?"

"Then, why is it dark only at night?"

(Continue with concluding questions to be asked of all children.)

THE ORIGIN OF NIGHT (Cont'd.)Concluding questions to be asked of all children

"Can we make the night in this room? If I pull the blinds down, is it going to be dark?"

"Then, how is it? Where does the dark in the room come from?"

"And the dark outside, what is it?"

"When it is light, why is it light?"

"What makes it day."

IV. THE MOVEMENT OF CLOUDSA. General Questions

"Have you ever seen clouds moving forward?"

"What makes them move?"

B. Alternate Sections

Proceed with one of the three sections, depending on what the child regards as the cause of movement of clouds.

Section 1: Man (as he walks)

"Can you make them move?"

"When I walk and you stand still, do the clouds move?"

"And at night, when everybody is asleep, do the clouds move?"

If yes: "But you just told me it's people who make the clouds move when they are walking."

If no: "Why don't the clouds move?"

"Have you ever seen if the clouds move when you stand still?"

"Do they move when you stand still?"

If yes: "Then, what makes them move?"

If no: "Why don't they move?"

THE MOVEMENT OF CLOUDS (Cont'd.)

"Why do the clouds sometimes move fast and sometimes slowly?"

"Can the clouds go where they want?"

"Why can (can't) they go where they want?"

"Do the clouds know they are moving?"

"Why don't they know they are moving?"

"Do the clouds know it's we who make them move, when we are walking?"

"Can the wind make the clouds move?"

If yes: "How does the wind go about making the clouds move?"

"Where does the wind come from?"

(Then continue with section 3)

If no: "Why can't the wind make the clouds move?"

Section 2: God, celestial bodies, etc.

"How does it (he, she, they) go about making the clouds move?" (or, "How do the clouds go about moving by themselves, all alone.")

"Do the clouds move by themselves alone, or is there something to make them move?"

"Do the clouds know they are moving?"

"Do they know it's ... (the child's answer) who makes them move?"

"Why do they say that they (do not) know it?"

"And . . . (the child's answer) does it (he, she, they) now it makes the clouds move?"

"Can the clouds go where they want?"

"Why can (can't) they go where they want?"

THE MOVEMENT OF CLOUDS (CONT'D.)

"But why do the clouds move?"

"Why do the clouds move fast sometimes, and sometimes move slowly?"

"Can the wind make the clouds move?"

If yes: "How does the wind go about making the clouds move?"

"Where does the wind come from?" (Then continue with section 3.)

If no: "Why can't the wind make the clouds move?"

Section 3: The Wind

"Where does the wind come from?"

"Can the clouds make wind?"

"By moving, can the clouds make wind?"

"When there is no wind, can the clouds move by themselves?"

"Where does the wind come from?"

"How is the wind made?"

"Give me the name of something which can make wind."

"Why do the clouds move fast sometimes, and sometimes move slowly?"

"Can the clouds go where they want? Why do you say they can (can't) go where they want?"

"Do the clouds know they are moving?"

"Do the clouds know it's the wind that moves them?"

"And does the wind know it makes the clouds move?"

V. THE FLOATING AND SINKING OF OBJECTS

Material:

- 1 rectangular plastic receptacle
- 2 cylindrical plastic receptacles
- 1 wood cylinder to fit neatly into the cylindrical receptacle
- 1 pair of tongs
- 1 plasticine ball

6 objects: a miniature boat, a large glass marble, a small glass marble, a wooden bead, a nail, a wooden peg.

Problem 1 (Floating and sinking of various objects)

A. Miniature boat

"If I put this small boat in the water, will it remain on the water or will it sink, go to the bottom."

"Explain to me why you think it will. . . (the child's answer)."

Place the boat in the water and, if the child has predicted it would sink, ask:

"Why does it remain on the water, why doesn't it go to the bottom."

B. Large marble

"And this marble, will it go to the bottom, or will it remain on top."

"Why do you think it will . . . (the child's answer)."

Drop the marble in the water, and if the child has predicted it would float ask:

"Why does it go to the bottom, do you think."

C. wooden bead

"If I put this wooden bead in the water, will it remain on the water or will it sink, go to the bottom."

"Explain to me why you think it will . . . (the child's answer)."

Place the bead in the water and, if the child has predicted it would sink, ask:

"Why does it remain on the water, why doesn't it go to the bottom."

D. Small marble

"And this marble, will it go to the bottom, or will it remain on the top?"

"Why do you think it will . . . (the child's answer)?"

Drop the marble in the water, and if the child has predicted it would float, ask:

"Why does it go to the bottom, do you think?"

E. Nail

"And this nail, will it go to the bottom, or will it remain on top?"

"Why do you think it will . . . (the child's answer)?"

Drop the nail in the water, and if the child has predicted it would float, ask:

"Why does it go to the bottom, do you think?"

F. Wooden peg

"If I put this wooden peg in the water, will it remain on the water or will it sink, go to the bottom?"

"Explain to me why you think it will . . . (the child's answer)?"

Place the wooden peg in the water, and if the child has predicted it would sink, ask:

"Why does it remain on the water, why doesn't it go to the bottom?"

Problem 2 (Floating and sinking of similar objects)**A. Nail and wooden peg**

"How is it that the small nail went to the bottom and that the stick remains on top of the water?"

B. Small marble and wooden peg

"The small marble went to the bottom and the wooden bead remained on top of the water. How's that? Explain it to me."

Problem 3 (Sinking of a small marble in comparison with the floating of a large boat)

"Have you ever seen a large boat? Then, tell me, why do large boats remain on the water?"

If the explanation is based on the movement of the boats (they move, they have a motor, sails, oars, etc.):

"If the large boats didn't move, if they were standing still (if they didn't have a motor, oars, etc.), would they go to the bottom?"

"Explain to me, why they. . . (the child's answer)."

"Which is heavier: a boat or a marble like this (hand the child the small marble)?"

"Does a marble go to the bottom?"

"And does a large boat stay on top of the water?"

"Then, why does a large boat stay on top of the water, and a marble goes to the bottom?"

"Which is heavier if you take them in your hands, the large boat or the marble?"

"Then, why does the boat remain on the water?"

"In a large lake, would the marble still go to the bottom?"

"Explain to me why you say that. . . (the child's answer)."

Problem 4 (Difference in weight between water and wood)

"You see, it's the same quantity (the same thing) of wood and water. The two small glasses are full so it's the same quantity in both. Which is heavier, so you think, this one or that one, the one filled with water or the one filled with wood?"

"Why do you think it is the one filled with . . . (the child's answer)?"

Problem 6 (Floating and sinking of plasticine)

"If I put this in the water, will it remain on top of the water or will it go to the bottom?"

"Explain to me, why you think that it will (the child's answer)."

Put the ball in the water. If the child's prediction was correct, make him realize he was right. If his prediction was wrong, ask him:
"Why did the plasticine ball go down to the bottom, do you think?"

"Try to fix it so that it will remain on top of the water, so that it will float. Make something with the plasticine so that it will remain on top of the water. Can you do something to it so that it will remain on top of the water, so that it will not go down to the bottom?"

If the child does not succeed in making the plasticine float: Model the plasticine in the shape of a crucible (about 2" in diameter and 2" deep) and set it down in the water.

"You see, it floats now. Why does it float, do you think, when it's made like that? What makes it float, now?"

"Why does a ball go down to the bottom, and this now remains on top of the water?"

If the child succeeds by himself in making the plasticine float:

"Explain to me, why it floats when it's like this. What makes it float?"

"Why has the ball gone to the bottom a moment ago and this, now, remains on top of the water?"

ILLUSTRATION OF THE QUANTIFICATION OF THE QUALITATIVE DATA

Scales		Values																											
Numerical		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Age		4	4.6	5	5.6	6	6.6	7	7.6	8	8.6	9	9.6	10	10.6	11													
Stage	Test	I	0	1	2A	2B	2C	3A										3B											
II		0				1						2					3												
III		0	1A	1B						2					3A										3B				
IV		0	1						2					3A										3B					
V		0	1	2A						2B										3A									

- I - Concept of Dream
- II - Concept of Life
- III - Origin of Night
- IV - Movement of Clouds
- V - Floating and Sinking of Objects

APPENDIX 4

ABSTRACT OF

Causal Thought in Schizophrenic Children

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Causal Thought in Schizophrenic Children¹

This study attempted to throw light on organismic-developmental aspects of schizophrenic thought. Causal thought as outlined by Piaget's developmental, stage-specific theory, was investigated through the application of five questionnaires standardized by Laurendeau and Pinard. The experimental group consisted of twenty 8-10 year old schizophrenic children and the control groups of forty-five 8-10 and twenty 8 year old normal children. Qualitative results were quantified to render them statistically accessible.

The null hypotheses were: there is no significant difference between the scores of schizophrenic and normal control groups in terms of (1) mean stage-level functioning and (2) variability across stages encountered in the sum-total and separate tests, (3) between schizophrenic and younger normals in the frequency of occurrence of different modes of pre-causal thought. The first and second hypotheses were rejected partially. The third hypothesis was rejected in full.

¹ Bertha Hook, doctoral thesis presented to the Faculty of Psychology of the University of Ottawa, Ontario, December 1967, ix-136 p.

The quantitative and qualitative results were first interpreted in view of Piaget's theory of cognitive development. Structural, dynamic and integrative patterns could be discerned. Additional psycho- and neuro-dynamic approaches were mentioned in order to enrich the possible meaning of the results obtained.

