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ERTEL, DAVID

A SENSORIMOTOR ANALYSIS OF EARLY ONSET CHILDHOOD
PSYCHOSIS

City University of New York

PH.D.

1981

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A SENSORIMOTOR ANALYSIS OF EARLY ONSET CHILDHOOD PSYCHOSIS

by

David Ertel

A dissertation submitted to the Graduate Faculty in Psychology
in partial fulfillment of the requirements for
the degree of Doctor of Philosophy,
The City University of New York

1981

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This manuscript has been read and accepted for the Graduate Faculty in Psychology in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

1/27/81
date

Gilbert Voyat PhD
Chairman of Examining Committee

February 11, 1981
date

Martin L. Hoffman
Executive Officer

Prof. Gilbert Voyat

Prof. Louis Gerstman

Prof. Larry Gould

Supervisory Committee

The City University of New York

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Some forty years ago, Albert Camus mused that "two years is not too long a time to spend thinking about one single point. As this dissertation, from its inception to the form it now holds, has consumed at least twice that span, I would hope that some of the problems and ideas presented within its text give the reader a moment's pause from time to time. A moment, perhaps, to question, to reflect, to critique, to argue, or--simply to muse, as did Camus. For this particular moment and in this limited space, I too would like to pause and reflect, not about the research, but about those whose teaching, friendship, support, and company have made it possible.

Some years back, in a class befuddled with the complexities of Piaget's "epistemic psychology," Professor Gilbert Voyat leaned back in his chair with a bemused grin creasing his face and offered his students the counsel that there could be neither learning nor creativity without conflict. I was surprised, at the time, to find myself nodding vigorously in agreement. Vague images flashed by my mind's eye, but their movement was too rapid to allow accurate focus. Since that day, those shadowy images have slowed their pace and hastened my own. Their mystical and sometimes haunting outlines gradually gave way to the mental flesh of memories and desires. They were my parents. To my mother and father, then, I now can give my gratitude, paradoxically for many of the same reasons I once offered scorn. To the extent that this work is a creative one, and with the

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D.E.

P.S.: To Scrumples, who always listened--Bow Wow!

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Chapter I

INTRODUCTION

Every heavy
Turning back of the earth
Has such disinherited ones
Who possess
Neither earlier things
Nor what's to come.

- Rilke (Duino Elegies)

If one may infer experience from metaphor, the "disinherited" of whom Rilke speaks pose a number of interesting, provocative, and even necessary questions concerning the nature of reality and our adaptation to it. To begin with, we may ask what, if anything, "such disinherited ones" may claim as their own, in a reality where the past, present, and future exist as strands of experience which are separate from each other, devoid of the thread of continuity which gives meaning to any moment in time. We might wonder, as well, to whom "they" might turn for comfort and pleasure, for hope and relief, and for security and stability. But, most importantly, we must ask where "they" might look for coherence and predictability in a world where the stimuli of both inner and outer reality are always changing.

Goethe reminded us that "nothing is inside [and] nothing is outside. What is within is also without." And so, the questions which we asked of Rilke's dispossessed become matters of significance for each of us as well. In essence, we may speculate as to how this

effective reciprocity between the internal and external, and the present and past become established, while exploring further how we organize and structure our environment in such a manner as to insure adaptation while precluding the experiences of chaos and emptiness which loom as possibilities.

Prior to entertaining these questions, let us consider the following vignettes: the first, a situation familiar to most of us; the second, to none of us.

On a sunny spring day, you decide to take the afternoon off from work and go to an amusement park which holds many pleasant memories for you. First, you ride the roller coaster, then the ferris wheel; a few tries at the numbers of fortune; some hot dogs, Cokes and popcorn; and you're ready to leave. But wait! You spot the fun house and decide to give it a shot before returning home. As you look at the mirrors around you, your body seems to literally transform itself from tall and thin to short and squat; and, before you've realized what's happened, the floor beneath you has collapsed and you're carried, via conveyor belt, into a room where the walls, floor, and ceiling are tilted at an impossible angle (or so it seems). Like everyone around you, you fall from side to side, helplessly tumbling backward while grabbing at the guardrails which hold the promise of security. But you miss and fall once again, this time closing your eyes and holding your ears in a desperate attempt to shut out the stimuli of a house which isn't so much fun after all. Suddenly, almost inexplicably, you regain your balance and the chaos around you ceases as quickly as it began. The illusion of the Ames's room has run its course and you leave upright and intact.

Jesse is a 7-year-old light-skinned black child with sandy brown hair, piercing eyes, and a metallic-like voice. He is enrolled in a special day treatment center for psychotic children where he sees his therapist four afternoons a week in conjoint, tripartite treatment with his mother. Jesse's day at the treatment center is carefully planned by his teacher, therapist, and companion and typically follows a preset routine each morning and afternoon. On Tuesday, however, an unexpected change in schedule altered the usual routine at the center and Jesse had to attend therapy before going to class. Unaware of the change, Jesse entered the building calmly and walked down the corridor to the classroom where he expected to begin the day. Instead of finding his teachers and classmates, however, Jesse met his therapist, who gently told him that school would begin a little later than usual. Jesse's initial look of surprise quickly turned to one of dismay as he began to mutter under his breath while straining to avoid the outstretched arms of his therapist. Reassurances that school would begin shortly and that he would again see his friends and teachers met with increased crying and the beginnings of a physical struggle to enter the locked classroom. This struggle quickly escalated, and, in a few short moments, Jesse flailed wildly at his therapist and mother-- much as a cornered prisoner strikes at his captor. Incessant cries of "Help me! Help me!" "Gotta get killed!" and "One way!" resounded through the hallway as Jesse hit, kicked, and clawed at anyone crossing his path. To the audience who had gathered nearby, it appeared as if Jesse's world was literally collapsing under the weight of his duress, as words seemed unheard, gestures unnoticed, and caring unfelt. AND THE TANTRUM CONTINUED.

While these two vignettes may be examined and understood from many perspectives, the focus of our attention here will be the understanding of the respective protagonists' adaptation to environmental unpredictability. In the first situation, we considered the plight of a person catapulted into the midst of chaos by virtue of the Ame's illusion. The transition from environmental stability and predictability to disorder and confusion was immediate and unrelenting. And the magnitude and tenor of the alteration of the perception of reality were both frightening and sensorially overwhelming. Nevertheless, a simple closing of the eyes sufficed to retransform the chaos to order and replace the unbelievable with the security of a real and known surround. With the dissolution of the illusion came the return of reality and its natural consequence--successful adaptation.

The second situation presented an event in the life of a psychotic child; and while the parameter of environmental change was indeed analogous to the first case, the actual alterations of the child's environs were rather mild and insignificant in comparison to the chaos of the Ame's room. Dimensions remained consistent and intact, people who knew and worked with the child were present, and reality (from the perspective of the observer) remained, in essence, unchanged. The only noticeable change was one of scheduling--an alteration of routine, an intrusion into the expected. An objectively minor change by the standards of most (our schedules, in fact, surprise us when they remain stable) had resulted in the virtual dissolution of a child's character. In essence, the relatively minor change in the outer reality of the boy's world had, quite literally, wreaked havoc

with his inner reality. And in contradistinction to our first subject, this child's adaptation was both inadequate and unsuccessful.

How might we understand these events? Why does a major, albeit momentary, change in the perception of reality result in a rather minor disruption of our functioning, when even minimal alterations in the world of the psychotic child yield such torment and adaptational collapse? How can we understand the seemingly fluid and reciprocal relationship of inner and outer space in our successful solutions to an ever-changing real world? And, conversely, why does this reciprocity between the inner and outer realities of the psychotic child's psyche remain so detached from and inaccessible to each other? Perhaps the more germane question here asks just how reality becomes constructed and represented in the minds of psychotic children? Maybe the answer, an answer, lies in the manner in which the respective cosmos of each develops in life's earliest years. For the purpose of this work, such an hypothesis is essential; and the proposition that the adaptational strategies of the psychotic child (and all children, for that matter) are influenced, if not determined, by the processes indigenous to reality's construction will be examined in detail from the perspective of developmental structural psychology.

Rapoport (1958) suggested that the ego's capacity to adapt in different ways to reality or to postpone its reactions to external stimuli is dependent on its internal structure. It should be clear that at least one difference in the respective success and failure of adaptation in our two demonstration subjects was related to this basic function. And in the body of this paper it will be argued that it is

precisely these internal structures which failed the psychotic child while ensuring the successful adaptation of our Ame's room participant.

The questions of what exactly these structures are, how they are formed, and the extent and nature of their role in the construction of reality are extremely difficult and complex ones (and in this case even more so, given the stated goal of examining structure formation in psychotic children), and will be examined in the ensuing chapters. For the moment, however, I will quickly review some of the basic (and for this work, necessary) precepts about the construction of reality which have been formulated by perhaps the most influential developmental psychologist of our time, Jean Piaget. These concepts will serve as the most basic theoretical underpinnings of the current work.

In one of his earliest and most important contributions to the study of cognition in early childhood, The Construction of Reality in the Child, Piaget (1937/1954) suggested that "the elaboration of the universe by sensorimotor intelligence constitutes the transition from a state in which objects are centered about a self which believes it directs them, although completely unaware of itself as a subject, to a state in which the self is placed, at least practically, in a stable world conceived as independent of personal activity" (p. 395). Paradoxically, Piaget notes that "it is precisely when the subject is most self-centered that he knows himself the least, and it is to the extent that he discovers himself that he places himself in the universe and constructs it by virtue of that fact" (p. x).

Relying heavily on his meticulously documented observations, Piaget (1937/1954) adds:

During the first months of life . . . the universe presents neither permanent objects, nor objective space, nor time interconnecting events as such [re: Rilke], nor causality external to the personal actions . . . at the moment when sensorimotor intelligence has sufficiently elaborated understanding to make language and reflective thought possible, the universe is, on the contrary, formed into a structure at once substantial and spatial, causal and temporal. This organization of reality occurs . . . to the extent that the self is freed from itself by finding itself and so assigns itself a place as a thing among things, an event among events. The transition from chaos to cosmos . . . in the perception and representation of the world in the first two years of life, is brought about through an elimination of egocentrism. (p. xi)

The similarity between Piaget's description of the cognitive processes which mark the infant's intellectual functioning and the psychotic child's reaction to an environment which he could not control is striking. For the infant, however, the inability to relate disparate events to one another, the absence of functional causality, and the lack of self-awareness are part and parcel of the natural developmental process. And by 2 years of age the universe is, indeed, organized on a plateau of personal action. There is a logic to the universe, a new predictability and certainty about reality, a "logic of actions." "Between the ages of about one and one-half years and the age of seven or eight . . . the practical logic of sensorimotor intelligence goes through a period of being internalized, of taking shape in thought at the level of representation rather than taking place only in the actual carrying out of actions" (Piaget, 1970a, p. 45).

For the psychotic child presented at this paper's inception, it appears at least superficially that the "coordination of actions" of which Piaget writes had failed to be internalized. The logic of Jesse's reality, in fact, seemed stuck, almost ossified, at the level

of action, and action alone. What could not be undone physically ("in a world where he directs all events"), i.e., entering the classroom, certainly lay well beyond the borders of internal representation, where the greater continuity and flexibility of disparate events could present a greater range of opportunities for the successful solution of the problem which confronted him. Nevertheless, one would be hard pressed to argue that Jesse had no representational system at all. He does, after all, have some language and possesses considerable skills in certain art activities. Even more importantly, however, is the obvious fact that Jesse is not an "empty" child without any inner feeling for what surrounds him. He is, however, a "different" being than other children; and, his representation of the world as static and unyielding may be said to have earmarked the kind of behavior which led to the previously described tantrum.

How then do we understand internal representation? Piaget suggests that representational processes evolve naturally and necessarily out of structures that are available at 16 months of age. How then do these structures develop? What is the mechanism of their operation in normal development? And how might they go askew in the childhood psychoses? The body of this dissertation will explore these questions in some detail and will hopefully contribute to the understanding of an area of human experience which has stood for so long as an enigma to developmental psychologists. In so doing, it is hoped that we will, at the least, begin to render Rilke's "disinherited ones" members of our own heritability.

Chapter II

SENSORIMOTOR DEVELOPMENT AND THE STRUCTURE OF REALITY

As Mahler, Pine, and Bergman (1975) have written, "the biological birth of the human infant and the psychological birth of the individual are not coincident in time. The former is a dramatic, observable, and well-circumscribed event; the latter a slowly unfolding intrapsychic process" (p. 3).

Born into a world where the stimuli of "reality" threaten to overwhelm a sensorium ill equipped to receive its messages, while a cauldron of instinctual demands and impulses cries out for fulfillment and gratification, the primitive ego, as the psyche's agent of adaptation, is clearly a poorly equipped and inadequate vehicle for survival. As Mahler et al. (1975) suggest:

In the human species the function of and the equipment for self-preservation are atrophied. The rudimentary [not yet functional] ego in the newborn baby and the young infant has to be complemented by the emotional rapport of the mother's nursing case, a kind of social symbiosis. It is within this matrix of physiological and sociobiological dependency on the mother than the structural differentiation takes place which leads to the individual's organization for adaptation: the functioning ego. (p. 45)

While it is beyond the scope of the present work to examine the intricacies of the object-relationships which give rise to the particular character, defenses, and adaptive styles of the individual, it should prove useful to briefly note the historical context within which "ego" and "adaptation" have traditionally been understood as handmaidens of their collective goal--the testing of reality.

Freud's (1911/1975) metaphor of a bird's egg as the prototype of a closed psychological system may be regarded as the point of departure for all subsequent developments in the psychoanalytic theory of reality. He writes: "A neat example of a physical system shut off from the stimuli of the external world, and able to satisfy even its nutritional requirements autistically . . . is afforded by a bird's egg with its food supply enclosed in its shell; for it, the care provided by its mother is limited to the provision of warmth" (p. 224). This bird's egg view of reality is not unlike the "autistic" reality of the infant, who attempts to satisfy his instinctual needs (not to mention his biological requirements of food, water, contact, etc.) by conjuring up images, hallucinations of the wish for nutriment. In his efforts to reduce his frustration, to satiate his desires, and to induce the pleasure which in early life may for a limited time be regarded as the sine qua non of existence, the infant's hallucinated products can only serve to frustrate and disappoint him further. Hunger is not sated with pictures of food but with food itself; water and only water satisfies his thirst; and warmth may be found in the crook of a mother's arm or in the fold of a blanket but not in even the warmest images of a burning star. "The psychical apparatus," in Freud's words, "had to decide to form a conception of the real circumstances in the external world and to endeavor to make a real alteration in them. A new principle of mental functioning was thus introduced; what was presented in the mind was no longer what was agreeable but what was real even if it happened to be disagreeable" (1911/1975, p. 219). Simply put, "if the infant finds himself in a

situation of need, and if attempts toward hallucinatory gratification have proved disappointing, he will turn toward reality; and the repetition of such situations will gradually teach him better to know reality and to strive for these real changes that make gratification possible" (Hartmann, 1956, p. 32).

Although Freud (1923/1975) in his paper on the two principles of mental functioning spoke of these processes as occurring in the "ego instincts," his gradual elaboration of the mental apparatus (in structural terms) delimited the ego as "that part of the id which has been modified by the direct influence of the external world. . . . The ego seeks to bring the influence of the external world to bear upon the id and its tendencies, and endeavors to substitute the reality principle for the pleasure principle which remains unrestrictedly in the id" (p. 23). This notion of the ego, then, suggests that, at one and the same time, the ego defends against internal id impulses and adapts to the external world. The implicit distinction between the defensive and adaptive functions of the ego, however, strikes one as an analytic or logical one rather than a real or observable one. Defense and adaptation are clearly two sides of the same process; one does not exist without the other, and both serve the function of relating to the external world. However, for Freud, the power of the id remained so influential in the day-to-day, and even moment-to-moment, activities of the individual, that the domain of the ego always remained, at least in part, responsive to the demands of the id.

In 1939, with the publication of Ego Psychology and the Problem of Adaptation, Heinz Hartmann changed the face of psychoanalytic

theory in both the scope of its vision and the focus of its concern. Asserting that "not every adaptation to the environment or every learning process is a conflict," Hartmann specifically referred to "the development outside of conflict of perception, intention, object comprehension, thinking, language, recall and phenomena, productivity, to the well-known phases of motor development, grasping, crawling, walking, and to the maturation and learning processes implicit in all of these and many others" (p. 8).

Though Hartmann clearly recognized the need for an expanded conception of the ego, one which could account for the "adapted achievements outside of conflicts" (p. 6) through the deployment of its "apparatus," the investigation of these functions in an integrated and comprehensive fashion was left, for the most part, to the domain of developmental psychology. Within this domain, the work of Jean Piaget stands as the outstanding contribution to a theory of the structure of reality.

For Piaget, intelligence is a central aspect of the general biological adaptation to the environment and consists of the functional invariants of organization and adaptation. These are two complementary processes of a single mechanism, according to Piaget (1936/1952), "the first being the internal aspect of the cycle of which adaptation constitutes the external aspect. . . . It is by adapting to things that thought organizes itself and it is by organizing itself that it structures things" (p. 7). The goal of adaptation is a state of balance, an equilibrium, in which the infant's developing cognitive structures gradually come to construct a world which agrees with the

laws of the physical universe. By trial and error, the infant becomes familiar with an initially undifferentiated environment as he begins to construct well-defined sequences of physical (and later of mental) actions. These sequences develop out of a progressive organization of what Piaget has termed schemata; and the process of adaptation, by which these schemata become organized, is conceived of as a continual interaction between the two basic modes of action--assimilation and accommodation. Assimilation is the incorporating of new objects and experience into existing schema; and its complementary process, accommodation, modifies existing schemata as a result of new objects and experience. As Piaget (1937/1954) has written, one can never exist without the other: "Accommodation of mental structures to reality implies the existence of assimilatory schemata apart from which any structure would be impossible. Inversely, the formation of schemata through assimilation entails the utilization of external realities to which the former must accommodate, however crudely" (pp. 352-353). In other words, assimilation can never be pure because by incorporating new elements into its earlier schemata the intelligence constantly modifies the latter in order to adjust them to new elements. Conversely, things are never known by themselves, since this work of accommodation is only possible as a function of the inverse process of assimilation (Piaget, 1936/1952, pp. 6-7).

The infant enters the world equipped with, among other things, two basic kinds of reflexes: (1) fixed stimulus patterns which are not altered by experience, but may be modified by neurological maturation; and (2) relatively automatic stimulus-response patterns

which require stimulation for stabilization and may be modified by experience. These latter reflexes are regarded by Piaget as the basic behavioral units of primitive intelligence, as they require exercise for their sustenance, and grow by virtue of that exercise. During the first weeks of life, there is relatively little change in these reflexes; however, in keeping with the organism's basic tendency to exercise or practice existing behavioral patterns, the reflexes tend to consolidate themselves, and in so doing may begin the most rudimentary forms of differentiation.

During the second stage of sensorimotor development, which lasts through the fourth month of life, the infant's actions are focused almost exclusively on his own body. In the course of randomly moving about, the infant may discover, through some chance action, that a behavior provides a special sense of gratification. The basic tendency of the child to repeat behaviors now becomes associated with the experience of a particular kind of "pleasure" and contributes to the development of the first organized schemes--the primary circular reaction. During the infant's exercise of these circular reactions he begins to encounter new stimuli which did not activate the reflex initially and toward which the accommodation was consequently not directed. At this point, however, if a stimulus possesses similar characteristics to the original one, the infant begins to adapt to it as well. The primitive schema begins to differentiate and, in so doing, encounters other patterns of behavior. Schemes that had been separate begin to coordinate; and, as a result, the infant establishes a relationship between what he sees and hears.

By the third substage of the sensorimotor period, the infant's mental apparatus has increased in complexity and his world has grown correspondingly. Events in the external environment (i.e., not his own body) have become interesting, and procedures are instigated in attempts to reproduce them. These secondary circular reactions, while not fully intentional, nevertheless provide the child with the facility to anticipate events (albeit primitively), imitate familiar patterns of behavior, and begin to appreciate the constancy of physical objects in the world. The spatial field has enlarged dramatically; and the concept of time is no longer restricted to the duration of an event but begins to be differentiated into before and after. The infant has begun to recognize himself as a causal agent in the world and goes about exploring and affecting it.

By the tenth month, Stage 4 of the sensorimotor period, the infant has a goal in mind and devises schemes of behavior for obtaining it. Behavior is more purposeful than before, and the delays encountered in achieving desired events may be tolerated more readily than previously. Plans can be kept in mind, so to speak; events which are independent of actions can be anticipated; imitation is expanded to new and complex sounds and gestures; and objects have attained a degree of substance and permanence which are autonomous and independent of his own actions.

The fifth stage of this period (approximately 12-18 months) corresponds to the advent of walking and represents the climax of the sensorimotor epoch. With the acquisition of tertiary circular reactions the child now invents new means to obtain goals, as a result

of active experimentation. "During the fifth stage, the child is primarily engaged in the exploration of the object and its properties. The effort to discover the unknown by accommodating the action and then studying the changes provided implies that the object has been fully divested of its action context and now has an independent existence, while action has become the means of studying the object" (Wolff, 1960, p. 128). Displacements of objects are explored for their own sake, perspective of topological relationships have become internalized, and space has been objectified via a "group of displacements" which are predictable and stable. As a consequence of all of these achievements, the child begins to look for centers of causality not readily accessible or visible. He becomes less concerned with himself and studies, in a directed way, the laws of the environment around him. He is ready for action in thought and stands on the threshold of symbolic representation.

By 18 months of age, the child has reached the sixth and final stage of the sensorimotor period. The invention of new means through mental combinations signifies that a new epoch in the life of the child has begun. The child now attempts to develop solutions to the problems which confront him on a mental rather than physical level. He can imitate a model which is not physically present as a result of a mental representation of that object (deferred imitation) and can reconstruct a series of invisible displacements without exhausting the physical possibilities which presented themselves just a few months ago. He knows, he understands, he can think! The coordination of actions established during his forays into and explorations of his environment

has resulted in a construction of reality that has an implicit logic and cohesion. In the years that follow, his capacity to think will undergo progressive differentiation, elaboration, and integration (I will not discuss the other stages of cognitive development, as to do so would lead the reader astray from the central goal of this thesis) as he comes to symbolize the world in subjective ways, while studying its objective physical laws, ultimately developing the capacity in the stage of formal operations to reflect on his own thoughts. But the structure provided by the events of the sensorimotor period of development, and its closure via the appearance of symbolic representation, will remain the cornerstone of his cognitive apparatus. Spinoza's dictum that "The order and connection of ideas is the same as the order and connection of things" remains as cogent today as it was prophetic three centuries ago.

Chapter III

REVIEW OF THE LITERATURE

Diagnostic Issues

A survey of the literature on childhood psychopathology and its most extreme variant, the childhood psychoses, quickly reveals the profusion of diagnostic categories and labels which has inundated this area of psychiatric nosology. While clinicians and researchers of diverse theoretical orientations (e.g., psychoanalytic, social learning, psychophysiological) tend to agree that psychotic children are grossly impaired in all areas of functioning (e.g., emotional, cognitive, social), efforts to delineate specific diagnostic subgroups have generally met with considerable controversy and disagreement. To begin with, many researchers and clinicians often fail to specify the behaviors they use as diagnostic criteria. However, even when actual behaviors are agreed upon, the meaning attributed to them varies greatly from one observer to another, and it often appears as if a researcher's theoretical bias takes precedence over the child's behaviors per se when a diagnosis is ultimately determined. As a result, communication between the various schools of thought is necessarily hampered, and a multiplicity of labels exists where a common language would certainly prove more useful. For example, while one group of observers speaks of "infantile autism," another writes of "encapsulated autism" or "symbiotic psychosis." Some researchers and

many clinicians regard "autism" and "psychosis" as interchangeable, and references to childhood psychosis and childhood schizophrenia abound without clear reference to specific features which would distinguish the two.

In response to this state of diagnostic confusion, there have been a number of attempts to clarify and objectify the criteria for a more sophisticated nosology of the childhood psychoses. These efforts will be reviewed historically, beginning with De Sanctis's original work and culminating with the most current contribution to the diagnostic literature--the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (3rd ed.) (hereafter DSM-III).

While the psychiatric literature at the turn of the century was dotted with case histories of severely disturbed children, they were largely regarded as oddities of nature--peculiar beings for whom no adequate explanation or understanding existed. These children were not viewed as similar to the schizophrenics of adolescence and adulthood and, as such, were simply considered to have a mental deficiency which defied conventional wisdom. In 1896, Earnst Kraepelin departed from the prevailing mood of the psychiatric community when he suggested that the schizophrenia of some of its adult patients could indeed be traced back to their early lives. Childhood schizophrenia is a discrete entity, however, was not recognized until a decade later, when S. De Sanctis grouped the chronic brain syndromes and mental deficiencies of childhood, as well as schizophrenia-like pathology, under the heading "dementia precocissima"--literally, precocious

insanity. Having been accorded an official title, a "new" disease was thus marked as an entity and entered the clinical nomenclature of psychiatry. Years would pass, however, before any serious attempt to specify the symptoms and underlying processes which were peculiar to it would appear. In 1933, a quarter of a century after De Sanctis had formally introduced the psychiatric community to "precocious insanity," H. Potter began such an undertaking. Utilizing Eugene Bleuler's pioneering work in the demarcation of symptoms indigenous to adult forms of the disease, Potter introduced a "diagnostic checklist" for childhood schizophrenia. This list emphasized the primary withdrawal behaviors of the children he studied and included: generalized retraction of interest in the environment and defects in emotional rapport; disturbances of thought; occasional mutism; rigidity; and peculiar patterns of motility. Childhood schizophrenia thus became a subject for serious study. Its symptoms had been isolated and its relationship to adult forms was obvious.

In 1943, with the publication of his classic article "The Autistic Disturbance of Affective Contact," Leo Kanner revolutionized the study of childhood psychosis. With the specification of a new and very different form of schizophrenia--"early infantile autism"--Kanner differentiated the autistic child, for whom the world has never existed, as a recognizable entity from the schizophrenic child, who "steps out of a world of which he has been a part and with which he has been in touch" (p. 249). Kanner noted that the outstanding pathognomonic feature of this disorder was the inability of the afflicted child to relate normally to either people or situations from the beginning of

life. This suggested that a fundamental disturbance in early object relations could be observed in a variety of situations which required interpersonal interaction. For example, the behavior of the children Kanner studied was governed by an obsessive insistence on sameness which forcibly precluded the intrusion of external objects into the child's sphere of isolation. Extreme rage reactions to disruptions of order and routine were common occurrences, and eye-to-eye contact, as well as communicative speech, were conspicuously absent. As Kanner's original sample of 14 autistic children demonstrated neither physical stigmata nor neurological abnormalities, he concluded that these children "have come into the world with innate inability to form the usual, biologically provided affective contact with people, just as other children have come into the world with innate physical or intellectual handicaps" (Kanner, 1943, p. 250).

Kanner's specification of early infantile autism as a subcategory of childhood schizophrenia heralded a proliferation of clinical and theoretical attempts to both explain and further subdivide the psychoses of childhood. Bender (1947), for example, suggested that virtually all of the behavioral disturbances (i.e., motor, perceptual, intellectual, emotional) of schizophrenic children (including autistic children) resulted from an underlying deficit in the integration of central nervous system functions. This basic integrative disorder, writes Bender (1947), results in "the disturbance [which] appears at different points in the developmental curve, interfering with the normal developmental pattern of the biological unit [my italics] and the social personality in a characteristic way, and because of frustration, causes

anxiety to which the individual must react accordingly to his own capacities" (p. 22).

While acknowledging a "constitutional anlage" for autism, Margaret Mahler (1955) argued that:

Autism is the basic defense [my italics] attitude for infants for whom the beacon of emotional orientation in the outer world, the mother as primary love object, is non-existent. Early infantile autism develops . . . because the infantile personality, devoid of emotional ties to the mother, is unable to cope with external stimuli and inner excitations, which threaten from both sides his very existence as an entity. Autism is therefore the mechanism by which such patients try to shut out, to hallucinate away [negative hallucination] the potential sources of sensory perception, particularly those which demand affective response [my italics]. . . . In short, it seems that these patients experience reality as an intolerable source of irritation without specific or further qualification. (p. 294)

Thus, while Bender regarded all the schizophrenias as part and parcel of CNS deficits, Mahler understood the particular "sub-schizophrenia" of infantile autism as reflecting a disturbance in early mother-child relations. Having thus described the earliest and most severe form of childhood psychosis, Mahler went on to further distinguish "symbiotic psychosis" as a related but clinically distinct disorder. Mahler suggests that children who suffer symbiotic psychoses develop normally until the second year of life (in contradistinction to autistic children, who appear "abnormal" in the very beginning of life), at which point the natural developmental process results in a gradual physical and psychological separation from the mother. This latter separation (i.e., intrapsychic), suggests Mahler, results in intolerable anxiety for the symbiotic psychotic child and culminates in behavior that is at once clinging and aloof, desirous and rejecting.

As in her understanding of the genesis of autism, Mahler argues that symbiotic psychosis represents a primary affective disorder (in children with constitutional predisposition) whereby the afflicted child struggles to deny the encroachment of psychological separation through fantasies of merger and fusion.

By the mid-1950s it was clear to researchers and clinicians alike that childhood schizophrenia could no longer be regarded as the single psychosis of childhood. Symptoms varied in both number and severity from child to child, and the age of onset appeared to be particularly relevant to the symptom cluster appearing in any one patient. In light of the foregoing, researchers began to fit the various psychoses into a developmental context, thus providing a continuum within which different groups could be composed and evaluated. In 1956, Bender delineated three basic subtypes of childhood schizophrenia, using the age of onset as a primary differentiating variable. Pseudodefensive schizophrenia was denoted as the most primitive variant of the syndrome, appearing within the first two to three years of life and marked by the "symptoms" of autism and retardation. Pseudoneurotic schizophrenia, Bender suggested, appeared in early or middle childhood and was characterized by pervasive anxiety and neurotic-type symptoms, most notably phobias and obsessions. And pseudopsychopathic schizophrenia appeared in late childhood (ages 10-11) and most closely resembled adult forms of the disorder, as it was earmarked by paranoia, hallucinations, and aimless, antisocial behavior. Utilizing this system of classification, it became clear (or should have) that childhood schizophrenia was indeed a nonspecific and gross amalgam of

the most severe psychological disturbances of childhood, failing to differentiate the afflicted child with respect to either symptoms or etiology. Nevertheless, the generic title persisted as an all-inclusive diagnostic category.

For example, in 1961, Mildred Creak and the British Working Party formulated a diagnostic checklist of nine dysfunctional behaviors which were unique to schizophrenic children and critical to their diagnosis. This checklist included:

- a) gross and sustained impairment of emotional relationships with people;
- b) apparent unawareness of personal identity;
- c) pathological preoccupation with particular objects;
- d) sustained resistance to change in the environment;
- e) abnormal perceptual experience;
- f) acute, excessive, and seemingly illogical anxiety;
- g) absence of age-appropriate speech;
- h) distortion in motility patterns; and
- i) a background of serious retardation in which islets of normal, near normal, or exceptional intellectual function may appear.

Creak and her colleagues suggested that while all of these symptoms need not be present, a cluster of several added up to a composite clinical picture--the schizophrenia syndrome.

Given the previous discussion of the pioneering efforts of Mahler; Kanner; and Bender to differentiate the schizophrenias of childhood, Creak's group's effort at systematizing its diagnosis via the inclusion of such a diverse array of symptoms may be regarded as hindering rather than abetting the demarcation of specific psychotic disorders.

In 1964, Bernard Rimland presented a powerful thesis which differentiated early infantile autism from childhood schizophrenia on the basis of both symptomatology and etiology. Drawing heavily on the experimental and physiological studies of comparative psychology, Rimland argued that autism was a primary cognitive dysfunction that resulted from severe physiological impairment. This dysfunction, according to Rimland, involved a skill that is basic to all cognition: "the ability to relate new stimuli to remembered experience" (p. 74). As a result of this critical deficit in cognitive organization,

the vital connections between sensation and memory can be made only with great difficulty. New sensation can be related only to sharply limited fragments of memory. The child is thus virtually divested of the means for deriving meaning from his experience. This impairment has two readily observable and interdependent consequences: 1) The child cannot understand relationships nor think in terms of concepts, symbols, analogies, or abstractions, and 2) he cannot integrate his sensations into a comprehensible whole--his perception of the world is vague and obscure. (p. 74)

Rimland thus differentiates the autistic child, for whom "neurological associations are made with extreme difficulty [allowing] only the strongest and most relevant impulses to traverse the pathways" from the schizophrenic child, for whom "associations are made too freely, sometimes almost randomly" (p. 164). He goes on: "Stated differently, in autism it seems that the mental associations made by the afflicted child are exceedingly limited, that he has access to only highly specific fragments of memory. The schizophrenic child, in contrast, appears to be pathologically unrestrained by relevance in making associations" (p. 165).

As mentioned above, many of the experimental studies which Rimland cites in support of his theory were derived from comparative psychology and research on animal neurophysiology. Empirical investigations on the cognitive apparatuses of psychotic children were still in their infancy; and so, while Rimland's hypotheses concerning the respective etiologies of infantile autism and childhood schizophrenia were quite interesting and thought-provoking, they must be regarded as extremely speculative as well. In his fastidious review of the clinical literature, however, Rimland presented a most powerful and convincing argument that the two disorders are clearly distinguishable with respect to the symptoms present in the afflicted child. Rimland's review of this literature represented a most significant contribution to the differential diagnosis of the childhood psychoses and is presented in condensed form in Table 1.

In 1966, the Committee on Child Psychiatry of the Group for the Advancement of Psychiatry (GAP) recognized "the need for a more adequate and useful classification dealing with disorders of mental and emotional nature in children and adolescents" (p. 173) and addressed itself specifically to the task of developing a "workable if not ideal" (p. 174) nosological system.

In its categorization of the childhood psychoses, the GAP (1966) suggested that "psychotic disorder in childhood is . . . a basic disorder in ego functioning in which the emerging process of ego development shows extreme distortion. This distortion is revealed in those disturbances of ego functions subserving thought, affect, perception, motility, speech, and individuation" (p. 252). Behaviors

Table 1

Comparison of Autism and Childhood Schizophrenia

Symptom	Autism	Schizophrenia
1. Onset and course	1. Present from the beginning of life	1. Follows initial period of normal development
2. Health and appearance	2. Excellent health; beautiful and well-formed; dark complexion	2. Generally in poor health; thin, pale, present on the physiological symptoms
3. Electroencephalography	3. Normal	3. 80% normal
4. Physical responsiveness	4. Do not adapt when held; stiff; physical lack of accommodation	4. Tendency to mold to adults like plastic
5. Autistic aloneness	5. Cardinal sign	5. Often affective; captures empathy of adult
6. Preservation of sameness	6. Cardinal sign	6. Not common
7. Hallucinations	7. None	7. Common
8. Motor performance	8. Excellent	8. Poor coordination, locomotion, and balance
9. Language	9. Types mentioned	9. Rimland claims there is no I-You confusion
10. Idiot savant performance	10. Common	10. Not common
11. Personal orientation	11. Unoriented, detached, disinterested in environment; aloof	11. Disoriented, confused; anxious; often expresses concern
12. Conditionability	12. Hard to establish, easy to extinguish	12. Condition easily

similar to those such as the ones noted in Creak's checklist are presented as the manifestations of primitive ego pathology, and it is suggested that they are common to all forms of psychosis. In contradistinction to Creak and the British Working Party's effort, however, GAP places these behaviors into a developmental framework which distinguishes the psychoses of infancy and early childhood, primarily "early infantile autism" and "interactional psychotic disorders," from the psychoses of later childhood, which most notably include "schizophreniform psychotic disorders." (This category indicates a parallel with the adult form of schizophrenia but emphasizes the developmental differences and the clinical impression that children with this disorder do not necessarily develop the later form.) As GAP's description of the different subgroups does not differ markedly from those presented severally by Kanner, Mahler, and Bender, they will not be further elaborated in this section. However, it is important to note that the GAP includes a category of "other psychoses" for both the early and later forms of the disorder, thus indicating a flexibility to their enterprise which both appreciates the complexity of human behavior and avoids the pitfalls of pigeonholing divergent phenomena for the purpose of diagnostic clarity.

In light of the GAP report's sophisticated and informed approach to the diagnosis of childhood psychosis, the publication of the Diagnostic and Statistical Manual of Mental Disorders (2nd ed.) (DSM-II) in 1968 showed remarkable recalcitrance to a quarter century of clinical observation and diagnostic refinement. Only two years after the GAP report revolutionized the classification of the psychotic disorders of

childhood, DSM-II, the official diagnostic manual of the American Psychiatric Association, recognized "childhood schizophrenia" as the only category of severe childhood psychopathology. "Diagnosis 295.8: Schizophrenia, childhood type," write the authors of DSM-II, is the category "for cases in which schizophrenia symptoms appear before puberty. The condition may be manifested by autistic, atypical, and withdrawn behavior; failure to develop identity separate from the mother's; and general unevenness, gross immaturity, and inadequacy in development" (p. 35).

This rather indiscriminate grouping of autistic pathology, developmental immaturity, and prepubescent schizophrenia might be likened to a grab-bag into which anything might be put, but from which little can be drawn. For the moment, the shades of ignorance had been drawn over the dawning of diagnostic enlightenment. However, the GAP report had indeed provided the psychiatric community with a new vista on the psychoses of early childhood, and clinicians and researchers alike quickly recognized the limitations of the DSM-II as a diagnostic tool or as an instrument of research. Interest in severe childhood psychopathology continued unabated, and the 1970s ushered in a new era of clinical and empirical investigations on the psychopathological disorders of early development.

Following the lead of the GAP's developmental classification (and the pioneering work of Bender, Kanner, Mahler, etc.), Kolvin (1971) studied psychotic children from four basic perspectives-- clinical presentation, family background, cerebral dysfunction, and intellectual functioning. Dividing his subjects into early and late

onset groups, Kolvin found that psychotic children who were younger than 3 were primarily characterized by symptoms such as self-isolation, speech anomalies, unusual responses to noises, indifference to pain, stereotyped movements, compulsive acts, and extremely poor interpersonal relationships. Children whose psychosis was diagnosed between the ages of 5 and 15, on the other hand, were characterized by disorders of thought, hallucinations, and perplexity or attitudes of suffering. Interestingly, the differences between the groups were not limited to behavioral phenomena alone, but were generalized to other areas as well. For example, the parents of the early onset group were mainly from the upper and upper-middle socioeconomic classes, while the parents of the late onset group were predominantly lower and lower-middle class. In his analysis of the family background of psychotic children, Kolvin also found a much higher incidence of schizophrenia in the late onset group, as well as significantly more isolated and introverted mothers. Cerebral dysfunction, as measured by low-voltage EEG, was present in one-fourth of the early onset group and in approximately one-third of the late onset children. And while 87% of psychotic children with onset during middle and late childhood scored above 70 on tests of intellectual functioning, only 21% of the early onset group reached this level of performance. Kolvin thus differentiated psychotic children with late onset from those with early onset on the basis of epidemiological surveys, with the aforementioned categories (i.e., clinical behaviors, family background, cerebral dysfunction, intellectual functioning) serving as the criteria for his demarcation of schizophrenic-type and autistic-type children.

Michael Rutter, who in recent years has become acknowledged as one of the world's foremost authorities on infantile autism, has also used epidemiological techniques to describe the psychoses which are indigenous to different age groups. Arguing that childhood schizophrenia has become a meaningless term with respect to behavior, etiology, or prognosis, Rutter (1974) has suggested that there are three primary forms of childhood psychosis: infantile autism, with onset before the age of 3; regressive or disintegrative psychoses, which appears at the ages of 3 and 4 and follow a period of relatively normal development; and childhood schizophrenia, which develops in late childhood and early adolescence and bears striking resemblance to adult forms of the syndrome. In appreciating the complexity of factors which determine the configuration of a person's character, Rutter (1974) has introduced a multi-axial approach to the diagnosis of all forms of childhood psychosis. These axes include: (1) the clinical psychiatric syndrome, (2) intellectual level, (3) associated or etiological biological factors, and (4) associated or etiological psychosocial factors. This method of assessing children with psychotic disorders clearly goes beyond the mere attribution of a label to pathology because of its goodness of fit with a particular parameter of a psychotic subsyndrome (e.g., age and onset) and recognizes instead the unique qualities of an individual's makeup while appreciating the similarities which render him a member of a group as well. Rutter's multi-axial approach integrated much of the clinical and empirical findings of a generation of researchers and provided a comprehensive system for the classification of the psychoses of early,

middle, and late childhood. In addition, however, Rutter's acknowledgement of and appreciation for the different classes of information which contribute to a comprehensive understanding of the individual within the group heralded yet a new generation of clinical and empirical enterprises.

In the mid-1970s, a special task force of the American Psychiatric Association undertook a systematic reevaluation of its diagnostic procedures, with the intention of providing a classification system which would take into account the classes of information necessary for comprehensive and effective diagnostic evaluation. The product of this task force, the DSM-III (Diagnostic and Screening Manual, 3rd ed.), made its appearance in 1980 and has already significantly influenced the diagnosis of mental disorders by the various members of the psychiatric community. The DSM-III "recommends the use of a multi-axial system for evaluation to insure that certain information that may be of value in planning treatment and predicting outcome for each individual is recorded" (p. 8). The authors of DSM-III have delineated five such axes. Axes I and II include all of the mental disorders: Axis I includes clinical syndromes and conditions not attributable to a mental disorder that are a focus of attention or treatment; Axis II includes personality disorders and specific developmental disorders. Axis III is for physical disorders and conditions. "The separation of this axis [Axis III] from the mental disorders axes is based on the tradition of separating those disorders whose manifestations are primarily behavioral or psychological . . . from those whose manifestations are not" (p. 8). Assessment on these three axes constitutes

the official psychiatric diagnosis; and in appreciating the complex and multifaceted presentation of pathological behaviors, the authors of DSM-III encourage the use of multiple diagnosis when a single classification would belie the actual condition of a patient.

Axes IV and V are primarily research oriented and refer to "psychosocial stressors" and the "highest level of adaptive functioning" (p. 8) in the year prior to the data of psychiatric diagnosis.

In their evaluation of children suffering from the various forms of pathology discussed in this chapter, the DSM-III argues that the terms "Atypical Children, Symbiotic Psychotic Children, Childhood Schizophrenia, and others . . . bear little relationship to the psychotic disorders of adult life" (p. 86). As a result, the authors of this manual suggest that the term "psychosis" be stricken from the clinical nomenclature of childhood psychopathology and suggest that the term Pervasive Developmental Disorders be used in its place. This term, it is noted, has been selected because "it describes most accurately the core clinical disturbance . . . distortions in the development of multiple basic psychological functions that are involved in the development of social skills and language, such as attention, perception, reality testing, and motor movement" (p. 86). The DSM-III differentiates the Pervasive Developmental Disorders from specific developmental disorders in two basic ways:

First, only a single specific function is affected in each Specific Developmental Disorder whereas in Pervasive Developmental Disorders multiple functions are always affected. Second, in Specific Developmental Disorders the children behave as if they are passing through an earlier normal developmental stage, because the disturbance is a delay in development, whereas children with Pervasive Developmental

disorders display qualitative abnormalities that are not normal for any stage in development, because the disturbance is a distortion in development. (p. 86)

The DSM-III denotes Infantile Autism and Childhood Onset Pervasive Developmental Disorders as the two syndromes within this general category and suggests that each may be present in either "full-form" or "residual state" (for conditions where the current clinical picture no longer meets the full criteria for disorder, but critical signs of the illness have persisted to the present). As low IQs and physical disorders are often associated with both conditions, the authors of DSM-III suggest that they be diagnosed as separate disorders as well.

In contradistinction to its predecessor, DSM-II, this manual delineates specific criteria for the diagnosis of each psychiatric disorder and provides information about predisposing factors (when known), prevalence, sex ratio, familial patterns, prognosis, etc., as well as information about differential diagnosis.

The diagnostic criteria for Infantile Autism are as follows:

- A. Onset before 30 months of age.
- B. Pervasive lack of responsiveness to other people.
- C. Gross deficits in language development.
- D. If speech is present, peculiar speech patterns such as immediate and delayed echolalia, metaphorical language, pronomial reversal.
- E. Bizarre responses to various aspects of the environment, e.g., resistance to change, peculiar interest in or attachments to animate or inanimate objects.
- F. Absence of delusions, hallucinations, loosening of associations, and incoherence as in schizophrenia. (DSM-III, 1980, pp. 89-89)

Recognizing that some of these characteristics are common to other psychopathological disorders of childhood, the authors of DSM-III

take cognizance of the difficulties inherent to differential diagnosis and offer useful markers to avoid arbitrary and misleading classification. The authors write:

In Mental Retardation there are often behavioral abnormalities similar to those seen in Infantile Autism. However, the full syndrome of Infantile Autism is rarely present. When both disorders are present, both diagnoses should be made. In Schizophrenia Occurring in Childhood there are oddities of behavior; but typically there are hallucinations, delusions, and loosening of associations or incoherence, which are not present in Infantile Autism. In Childhood Onset Pervasive Developmental Disorder, the age of onset is later than in Infantile Autism and the full syndrome of Infantile Autism is not present. In children with hearing impairments there will be a history of responding consistently only to very loud sounds, whereas in Infantile Autism the response to sound is inconsistent. . . . In Developmental Language Disorder, Receptive Type, the children generally make eye contact and will often try to communicate appropriately by means of gestures, whereas in Infantile Autism there is a pervasive lack of responsiveness. (p. 89)

As the syndromes of Infantile Autism and Childhood Onset Pervasive Developmental Disorders are the most similar to each other with respect to clinical presentation, the DSM-III specifies the diagnostic criteria for each. Having previously delineated the diagnostic criteria for Infantile Autism, the criteria for diagnosis of the Childhood Onset Pervasive Developmental Disorder are listed below:

- A. Gross and sustained impairment in social relationships, e.g., lack of appropriate affective responsivity, inappropriate clinging, asociality, lack of empathy.
- B. At least three of the following:
 - (1) sudden excessive anxiety manifested by such symptoms as free-floating anxiety, catastrophic reactions to everyday occurrences, inability to be consoled when upset, unexplained panic attacks.
 - (2) constricted or inappropriate affect, including lack of appropriate fear reactions, unexplained rage reactions, and extreme mood lability
 - (3) resistance to change in the environment (e.g., upset if dinner time is changed), or insistence on doing things in the same manner every time (e.g., putting on clothes in same order)

- (4) oddities of motor movement, such as peculiar posturing, peculiar hand or finger movements, or walking on tip-toe
 - (5) abnormalities of speech, such as questionlike melody, monotonous voice
 - (6) hyper- or hypo-sensitivity to sensory stimuli
 - (7) self-mutilation, e.g., hitting or biting self, head banging
- C. Onset of full syndrome after 30 months of age and before 12 years of age.
- D. Absence of delusions, hallucinations, incoherence, or marked loosening of associations. (DSM-III, 1980, p. 91)

From De Sanctis's "dementia praecocissima" to DSM-III's Pervasive Developmental Disorder, the evolution of the diagnosis of severe childhood psychopathology has been as encouraging as it is revealing. Society's vision and attendant confusion, avoidance, and fear of the "precociously insane" have slowly given way to an ethos of curiosity and concern. Our diagnoses, while not always clear, are at the least attempts to clarify. And our children, who a century ago were outcasts before their entry, are more clearly than ever still our children.

The remainder of this chapter will be concerned with reviewing the empirical research on the various ego functions which most typically fail the psychotic child. As this thesis is primarily concerned with the structure of cognition in childhood psychosis, particular emphasis will be placed on those studies which have investigated what are typically regarded as conflict-free spheres of functioning.

Intellectual Functioning

Since the inception of the systematic and formal study of autistic and psychotic children, clinicians have commented on the intelligence of their young patients. In the 1940s and 1950s, consensus had it that autistic children were often quite physically attractive, with physiognomies which struck the observer as "intelligent" --sometimes strikingly so. Though autistic children typically did not engage in communicative speech, the clinical wisdom of the times suggested that this was a result of their emotional aloofness rather than the sequelae of any cognitive or neurological deficits. And the occasional appearance of extraordinary abilities in circumscribed areas of performance (e.g., music, memory for times, dates, etc.) was most typically viewed as the sine qua non of the genius in idiot's clothing. Speculative as these notions were, they were difficult to disprove, and maintained their vanguard in the mainstream of clinical psychiatry for years. Autistic children were indeed aloof and withdrawn, and by definition avoided interactions with other people. As a result of their "refusal" to talk or listen, to engage or embrace, psychometric measures could hardly be considered reliable indices of intelligence, and psychotic children were consequently regarded as untestable.

In his review of the methods most typically used (in the 1950s and 1960s) to evaluate the intelligence of psychotic children, Alpern (1967) noted that two techniques were commonly employed. In the first approach, the highest item that a child passed was taken as evidence

of his estimated intellectual potential, while in the second approach, a child was given selected items from a number of different tests. The composite of this item pool was then used as an "individualized" test, against which subsequent performances might be evaluated. Although these methods are likely to produce "results," their utility can be questioned on both empirical and theoretical grounds. For example, as accretional theories of knowledge are the basis of most intelligence tests, the score a child ultimately receives is a function of the number of items he answers correctly. The test items themselves tend to be unrelated to one another, and, as a result, good performance on some says little, if anything, about a child's ability to answer other questions correctly. The assumption that single scores merit greater validity for autistic children than for normal children is clearly a non sequitur destined to promulgate whatever a priori notions the tester had about his subject. The second approach, i.e., the "individualized" test containing a potpourri of items from a number of different tests, presents a different set of difficulties. Though more sophisticated in its presentation than the previously discussed method, its greatest asset ultimately becomes its greatest weakness as well. It should be clear that the composite items do indeed measure something and in so doing it may even measure it reliably. However, the specificity of the item pool used for each child is so delimited that it becomes difficult to know exactly what is being measured. To compound matters, it becomes virtually impossible to compare the performance of one child to another since they are, in fact, taking different tests. In the absence of uniform

item pools, and concurrent sources of information about the construct in question (in this case "intelligence"), "reliability" may serve to confuse rather than clarify an already problem filled arena. Given these difficulties in testing psychotic children, one thing should nevertheless be quite clear. Psychotic children were not, in fact, untestable; they did perform quite reliably when examined on tests tailored to meet their needs, and often answered questions on standardized tests of intelligence as well. The problem of testability, it seems, was in the tests being used rather than in the children being tested.

In his own efforts to evaluate the intelligence of autistic children, Alpern (1967) tested the notion that valid psychometric evaluations of autistic children were indeed possible if measures with appropriately low developmental levels were used. In other words, Alpern hypothesized that poor performance by autistic children on standard intelligence tests was related to the difficulty of the task rather than a result of distanced interpersonal relationships. Using a combination of test items from the Cattell and Binet infant scales, Alpern tested inpatients (diagnoses included autism, symbiotic psychosis, and childhood schizophrenia) of the Research Center for Early Childhood Schizophrenia of the Indiana University Department of Psychiatry. The children ranged in age from 3 years, 7 months to 7 years, 4 months, with a median age of 5 years, 0 months, and were tested on two separate occasions with an intervening period of three days. Test-retest reliability was .93 and demonstrated that children who had been regarded as untestable were, in fact, quite testable

(and reliably so) when given tasks which were within the domain of their cognitive skills. Alpern observed that even the most withdrawn autistic children did things that infants typically engage in (e.g., scribble with crayons, hurl a ball at random); however, when presented with items that required greater skill and cognitive sophistication, these youngsters began to withdraw and have temper tantrums, and generally refused to continue their participation. Alpern concluded that autistic children suffered from severe cognitive impairments and differed from mentally retarded children only by view of their relative freedom from motor abnormalities and physical stigmata.

Though Alpern did not use mentally retarded children as controls in his assessment of psychotic children, other researchers in the field have tried to ferret out specific differences between those groups with respect to cognitive disability, neurological dysfunctions, behavioral abnormalities, etc. DeMyer, Barton, Alpern, Kimberlin, Allen, Yang, and Steele (1974) measured the intelligence of mentally subnormal and autistic children on a number of scales (e.g., Stanford-Binet, Vineland Social Maturity Index, Merrill-Palmer, Cattell Infant Scale) and analyzed their results for both repeatability and relationships to other parameters, such as severity of illness and prognostic utility. Of the 115 children studied, 94% had general IQs in the retarded range of functioning (67 or less); 75% had full-scale IQs below 50. The average verbal IQ for the psychotic group was 35, while the performance average was 54. These scores were considerably lower than the intelligence scores of the control group (mentally retarded children with Down's Syndrome), who had median scores of 55 and 70 for

verbal and performance skills. Initial IQ measurements were highly correlated (full-scale, .70; verbal, .63; performance, .577) with those obtained five years later and were significantly related to the severity of behavioral symptoms and response to treatment. Children who had IQs over 50 showed a greater increase in IQ when treated than did patients who had IQs less than 50. In the higher IQ groups, performance scores were better predictors than the verbal scores; also, greater gains were noted in performance scores than in verbal scores.

In a similar study designed to evaluate the relationship of intelligence to symptom patterns and treatment outcome, Bartak and Rutter (1976) compared autistic children with an IQ below 70 (performance average = 45.7) with those whose performance IQ, as measured by the WISC performance scale, was greater than 70 (average = 92.6). While the two groups were quite similar with respect to the main phenomena specifically associated with autism, they differed substantially from one another when secondary symptoms were included as part of a behavioral assessment. Incidences of self-injury and stereotypic behavior (e.g., smelling adults, rituals, resistance to change, etc.) were significantly more prevalent in the low IQ group, and treatment outcomes were similarly found to be positively correlated with the level of measured intelligence.

These studies clearly support the contention that autistic children generally function within the moderately to severely retarded range of intelligence and suggest, as well, that symptom patterns and treatment outcomes are significantly related to measured IQ. In

subsequent studies, researchers have attempted to refine the global assessment of intelligence in psychotic children by evaluating the specific patterns of cognitive strengths and weaknesses which typically emerge on the verbal and performance scales of most standardized intelligence tests. DeMyer (1975), for example, tested 29 mentally retarded and 66 autistic children (median age, 5 years) on a series of verbal and performance tasks which were culled from a general pool of psychometric instruments. The test data were reviewed to determine which, if any, subtests differentiated the two groups. The results of this analysis suggested that while autistic children performed at somewhat lower levels than the subnormal controls on verbal tasks, their general patterns of functioning were quite similar. (It should be noted that this result held up only for high functioning autistic children, i.e., those showing a mixture of communicative and uncommunicative speech with some islets of emotional relatedness in a general background of withdrawal, as lower functioning autistic children could not be tested on verbal measures.) Performance tasks, on the other hand, especially those requiring either complex visual-motor integrations or gestural imitations, posed considerably greater difficulties for all autistic children than for the control group. These results corroborated DeMyer's group's earlier work on the imitative skills of autistic children (DeMyer, Alpern, Barton, DeMyer, Hingtgen, Bryson, Pontius, & Kimberlin, 1972), which suggested, rather convincingly, that autistic children's imitations of body motion was more deficient than object imitation, which was, in turn, more deficient than their ability to assemble objects which suggested their

own solution. Taking these results together, DeMyer and her colleagues contend that autistic children differ from retarded children by virtue of the fact that the former's channels for both verbal and nonverbal communication are so markedly impaired. DeMyer's group argues that, in the absence of the intellectual skills required to interact with his environment, the autistic child's only alternative is to wear the garb of emotional detachment.

The body of empirical research (most notably of the DeMyer group) on the intelligence of psychotic children thus argues powerfully against the clinical maxims which once proclaimed their untestability. It would seem, given the nature of the findings discussed in this section, that the reliable and valid assessment of the intellectual functioning of psychotic children are no longer ideas for the future, but tools for the present. Their yield has already been substantial. The differences in the overall patterning of the intellectual functioning of autistic and mentally retarded youngsters provides invaluable information for the differential diagnosis of the two disorders. And, in general, a body of knowledge has replaced an arena of speculation. On the other hand, what we have learned about the intelligence of psychotic children through formal testing is still rather limited in scope. Psychometric measures provide information about intellectual functions in a most abridged manner. They are, for the most part, concerned with products and in their haste often neglect process. They produce scores rather than strategies and numbers in place of nuances. We must turn our attention to a different style of research, a more refined approach, to the study of how

information is received, stored, and ultimately utilized, if we wish to understand the cognitive processes and apparatuses which culminate in intelligence quotients. In the service of this effort, the remaining sections of this chapter will briefly review some of the major investigations of the language, cognition, and perception of psychotic children.

Language

Of the clinical phenomena most typically associated with infantile autism and the childhood psychoses, language has historically held a unique and central position. Disturbances of language are generally regarded as hallmark symptoms of these disorders (Creak & the British Working Party, 1961; DSM-III, 1980; Kanner, 1943; Rimland, 1964) and the quality of speech, as well as its presence or absence, is often considered to have singular prognostic power (Kanner & Eisenberg, 1956; Rutter, 1974; Shapiro, Roberts, & Fish, 1970). Many writers have used particular features of psychotic speech as evidence of the internal experience of the child (Bettelheim, 1967; Tustin, 1972); and still others have regarded the study of language as the royal road to understanding the basic nature of the disorder (Goldfarb, Goldfarb, & Scholl, 1966, 1972).

While it is clearly beyond the scope of this work to comprehensively review the research of the past 20 years, it should prove useful to highlight some of the efforts in this area and to understand, as well, why the field of linguistic analysis may be so central to the study of children who so often lack communicative skills.

To begin with, I will review, briefly, what we know about the speech of psychotic children as they appear clinically. In 1943, Kanner offered a rich and comprehensive, albeit impressionistic, account of autistic language. Kanner observed that while many of his young patients possessed no language at all, those who did speak demonstrated an abundance of peculiar and idiosyncratic features. For example, Kanner noted that the language of autistic children was typified by an echoing (echolalia), either immediate or delayed, of words and phrases which the child either did not understand or which held meaning for him in only the most bizarre and metaphorical ways. Reversals of the personal pronouns "you" and "I" were particularly common, and comprehension appeared either absent or muted, while neologisms and noncommunicative utterances comprised much of the working vocabulary of his clients. In addition, tenses were often used incorrectly, words were poorly articulated, and marked deviations in pitch, rhythm, and inflection typically marked the speech of the afflicted child.

While many clinicians have corroborated Kanner's observations (Hingtgen & Bryson, 1972; Savage, 1968), research efforts have produced inconsistent and contradictory findings. For example, where Weiland and Legg (1964) found few personal pronouns in the speech of autistic children, Cunningham (1968) found no differences in the use of first and second person pronouns between autistic children and a group of normal controls. Goldfarb et al. (1972) and others have suggested that autistic children demonstrate a particular avoidance of first person pronouns; yet Bartak and Rutter (1974) argue that when the

sentence position of pronouns is controlled, autistic children show absolutely no tendency to avoid repetition of these words. They suggest that the greater observed frequency of the use of "you" than "I" in autistic children is a function of their tendency to echo the latter parts of the utterances they hear, and, unlike "you," "I" generally occurs at the beginning of a sentence. Lastly, in studying deictic (tense) categories in autistic, mentally retarded, and normal children, Bartolucci and Albers (1970) found that the percentage of correct responses in normal children was 80%. This compared to a 60% correct response rate in retarded children, and a striking 8% for their autistic subjects. The authors thus concluded that the area of language deixis was particularly deviant in autistic children. Goldfarb et al. (1972), on the other hand, compared language samples from 25 autistic and 25 normal children, and while finding significantly more language and speech faults in autistic children than in normals, there was considerable variation among the psychotics and no specific clustering of faults could be determined.

In the face of such a heterogeneous array of findings, how can we even begin to speak of speech patterns which are peculiar to psychotic children? Furthermore, and perhaps more importantly, how can we understand the lack of agreement which exists in the research literature? If we think back to the section on diagnosis which began this chapter, an unfortunate clue forces itself upon us as a possible explanation. The absence of uniform diagnostic criteria suggests that the group which one research studies may differ substantially from the subject pools of other researchers. Secondly, children of

different ages and IQs are often lumped together, and in the process language differences which may depend on age or intelligence may be obscured. And, finally, the methods of data collection are so varied and unsystematized that the analysis of the results of any one study simply may not be suited for comparison with the results of other investigations.

Given the difficulties in the systematic evaluation of the language of psychotic children, as well as the obvious disagreements which exist in the accumulated body of results, we may well wonder why this area of research continues to hold such interest for so many investigators. Shapiro and Fish (1969) have written:

Language holds a unique position among the functions of the ego because its development and operation depend upon the synthesis of mental schematization, motor control, affective responses, and environmental stimulation. Moreover, language is a structural organization like the ego itself, and may be studied effectively through the vehicle of speech. Thus it may be said that speech offers a window to ego organization [my italics] and higher integrative functions subsumed under the central nervous system. (p. 36)

If the research cited to this point suggests a window in need of cleaning, the work of Shapiro and his co-workers during the past decade stands as a beacon of clarity in its efforts to shed light on the underlying structure of language in psychotic children. Noting the prevalence of echoing in the speech of psychotic children, Shapiro et al. (1970) have suggested that the degree of flexibility in imitative speech might be isomorphic to both the flexibility and adaptive capacity of the disturbed child's ego structure. In examining this hypothesis, Shapiro et al. (1970) constructed a scale,

of imitation which ranged from stereotyped and unmodified echoing to imitation used in a manner so as to expand a child's means of expression. Shapiro and his colleagues found after studying 10-minute speech samples of 8 autistic children and 18 normal children that their psychotic subjects had a significantly greater percentage of rigidly congruent echoes (i.e., echoes where the child repeats fully, or in part, one or more words of the examiner without any alteration) than the control group (90% vs. 15%). In addition, it was observed that while the number of congruent echoes decreased dramatically with age in normal children, the percentage of rigid echoes in psychotic children either remained constant or disappeared altogether. In fact, Shapiro and his colleagues have argued that the appearance of rigidly congruent echoes in psychotic children does not represent a fixation at a normal developmental phase in the acquisition of language, but instead suggests a deviant pattern of linguistic coding (Shapiro, 1975; Shapiro & Fish, 1969; Shapiro et al., 1970). Shapiro (1975) writes that

the major disturbances [of language in psychotic children] may be categorized in terms of the appeal function of language. While these children maintain an expressive mode, at times verbal and at other times non-verbal, the evocative appeal function of language is, more often than not, elusive. . . . They use the conventional code available to them within the language with which they were taught to mimic and point--but they do not employ the code for the many flexible possibilities of pointing in the past and future or describing action in progress. . . . The children are able very early on to learn phonemic norms, which are presented to them very largely via echoing. Then once storage is completed echoing falls off only to be replaced by rigid productions out of context, as though the children are trying to fit their ideas into words, which they have some dim awareness are used for communicative purposes. (p. 316)

As psychotic children are unable to structure their world with the aid of language, Shapiro (1975) concludes that the central disturbance exists in "integrative aspects of cognitive organization" (p. 317).

While the research cited in this section points to an assortment of deviations in the language of psychotic children, a uniform profile of "autistic" or "psychotic" speech clearly does not exist. If we regard language as a conglomerate of skills rather than a global and unitary function, this state of affairs may hardly be considered surprising. The ability to conceptualize divergent phenomena, the skills required to organize, store, and retrieve information, the integration of sensory modalities such as vision and audition, and the capacity to transform environmental inputs into meaningful messages are all part of the cognitive apparatus which underlies the emergent product of language. That any or all of these skills may be impaired in psychotic children seems obvious; that their particular organization may vary from child to child should be equally clear. The failure to find agreement in different studies of language should be no more surprising than the discovery of divergent cognitive skills in different children. And while the failure to reach agreement on the language of psychotic children may be disappointing to some, its de facto encouragement of research into the specific apparatuses of cognition should be rewarding in and of itself.

Cognition

Pruyser (1979) defines cognition as:

all the processes of knowing. . . . These processes involve abstraction, conceptualization, symbolization, and the

forming of associative relations . . . [and], paradoxically, [may] seem to work in two opposite directions at once. By a principle of reduction they may seem to simplify the chaotic manifold of immensely diverse sensory impressions, making it manageable; by a principle of proliferation they establish rich networks of associations, making for a complexity that adds many new dimensions to sensory reality. . . . Both principles must act in the service of adaptation . . . and it follows that cognition can err in both directions. It may fail to establish order in perceptual chaos . . . or it may fail to maintain contact with the sensory world. (p. 54)

In their efforts to specify the cognitive processes which underlie the obvious adaptational deficits in psychotic children, researchers have studied a variety of these cognitive part-functions. The remainder of this section will highlight some of the more interesting and significant contributions to this most important area of research and, in so doing, should begin to clarify the manner in which psychotic children receive, process, and ultimately utilize the data which surround them.

In the course of observing psychotic children, one can't help notice that something just seems "off." They may avoid eye contact, yet stare intently at spinning objects; they may be oblivious to blaring noise yet be startled by barely audible whispers; they gnaw at their hands and bang their heads, seemingly impervious to pain, until they shriek agonizingly, responding to stimuli only they can feel--the list goes on. Simply put, it often seems that while psychotic children may look, it is not clear what is being seen; though they may listen, we are unsure of what they hear.

In a series of ingenious experiments designed to study the various aspects of cognition in psychotic children, Hermelin and

O'Connor (1963, 1964, 1965, 1967a, 1967b) and O'Connor and Hermelin (1963, 1965a, 1965b, 1967a, 1967b) analyzed three basic components of perception: (1) visual attention and discrimination, (2) the hierarchy of sensory dominance, and (3) the integration of different sensory systems.

In their study of selective visual attention in psychotic children, O'Connor and Hermelin (1967b) proposed that autistic children could perceive differences between various kinds of visual stimuli; that is, they possessed the capacity to discriminate between visual inputs. Using the duration of visual inspection time as their index of a child's capacity to attend to a stimulus, the authors presented two displays at a time, in a viewing box through which a child could look. As the child observed each pattern, an experimenter (located at the other end of the box) recorded the length of viewing time per card. To control for actual discrimination, O'Connor and Hermelin first presented their subjects with pairs of stimuli that were identical. Upon determining that these identical stimuli were fixated on for an equal amount of time, irrespective of their position in the display, each child was subsequently presented with a series of patterns matched for size, color, brightness, pattern, complexity, and meaningfulness. The subjects in this study (and in all of the O'Connor and Hermelin experiments) were three groups of 20 children: normals, mental subnormals, and autistic children whose diagnosis was determined by fulfilling four of the nine diagnostic criteria delineated by Creak and the British Working Party (1961). (These "autistic" children might just as well be termed "psychotic.") The

three groups were matched for performance on the Seguin Formboard (6.0, 6.0, and 5.3 respectively) and the \bar{X} ages of the children were 5.4 (normals), 14.4 (subnormals), and 10.9 (autistic).

The only variable in this study in which the autistic children differed from normals and subnormals was that they spent less time examining the stimuli and more time in gazing around the viewing box. When they did look at the display cards, the relative distribution of time spent looking was the same as that of the other children in the study. In addition, no significant differences in inspection time for the different types of stimuli were discerned.

In a related study, Jennings (1973) analyzed the preference for affective cues in autistic children by presenting his subjects with a series of photographs of human faces depicting various emotions, and other photographs of more neutral objects. The task required each child to point to the two of the three cards which were similar in make-up; and the results suggested that when given a choice between operating with affective or nonaffective stimuli, autistic children chose nonaffective stimuli, while normal and retarded subjects had no preference.

Though these experiments suggest that psychotic children have relatively little difficulty in the general discrimination of visual stimuli, other research has indicated that when they are required to attend to particular aspects of a stimulus their performance drops dramatically. Hermelin and O'Connor (1965) found, for instance, that speaking autistic children had difficulty in discriminating shape and size, while nonverbal autistic children could do no better than respond

at chance level when required to discriminate the dimensions of shape, directionality, size, or brightness. Similarly, Kovattana and Kraemer (1974) found that nonspeaking autistic children had considerable difficulty in coordinating multiple visual cues of color, form, and size, in problem solving tasks.

As all of these studies dealt primarily with visual perception, and our clinical wisdom suggests that psychotic children often appear to prefer other modalities of interaction, it should prove useful to review the studies of sensory dominance and integration in utilizing the perceptual inputs of the environment.

Hermelin and O'Connor (1964) in a study of the sensory input and sensory dominance of psychotic children, compared 10 autistic children and 10 mentally subnormal children who were matched for age ($\bar{X} = 11-8$), perceptual motor ability on the Seguin Formboard ($\bar{X} = 7-6$), and verbal mental age (209). They presented these children with three kinds of stimuli--visual (light), auditory (buzzer), and tactual (string pulled around ankles)--and paired two at a time to determine the preferred input. All choices were rewarded. Both groups responded primarily to light whenever a visual stimulus was a component in the combination of signals. While autistic children responded more frequently to the tactual stimuli than auditory ones, the reverse was true for the subnormals.

In studying sensory dominance while controlling the intensities of the competing stimuli relative to each other, O'Connor and Hermelin (1965) presented three display combinations to 14 autistic children (\bar{X} age = 12-11). As in all their studies, the children were matched

for performance on the Seguin Formboard. In the first display, a light from one side and a simultaneous sound, or the words "come here" from the other side were presented at equal and medium levels of intensity. In the second display a bright light and low density light were presented. For all subjects, an increase in the intensity of the noise or the words relative to the light increased the number of responses towards sounds and words, and decreased those towards light. Subnormals gave significantly more responses to light than sound, while the responses of autistic children were more determined by the positioning of the stimulus source (left or right) than by either differential intensity or stimulus modalities. These results suggest that though visual inputs may be more available to autistic children than auditory inputs, position is an even greater determinant in the evocation of behavior. Hermelin and O'Connor (1967a) suggest that position discrimination is essentially the learning of a motor habit and may be thought of as the organization of movement. In a study designed to assess the relative importance of movement in tasks requiring information from distance receptors (i.e., vision), Frith (1969), with Hermelin and O'Connor, presented autistic and normal children (matched for age and performance on the Frostig Visual-Motor Test) with a task requiring them to guide a metal stylus inside a groove. As one would expect, all children worked faster when looking at the tracks than when not looking; and, in fact, no statistical differences were found. Interestingly, however, the difference in performance between the two conditions (i.e., looking and not looking) was greater for normal children than autistic children; and the

autistic children actually worked significantly faster than their normal counterparts in the absence of visual input. In a related experiment (Frith, 1969), where autistic and normal children had to put together puzzles with differing quantities of visual cues, autistic children worked significantly faster and more successfully than normals, although both groups used visual strategies when they were available.

What, one might (and should) ask, does all of this mean? In reviewing their many experiments, Hermelin and O'Connor (1970) suggest the following:

While the perception of differences seems relatively unimpaired in autistic children, attention towards visual stimuli is not sustained, few comparisons are made, and perhaps consequently the processing and utilization of visually presented data is deficient. On the other hand, it seems . . . that feedback information from response movements is more readily analyzed. Put more simply, doing something different to different things provides more information than perceptual input alone. This is probably so for everybody, but the normal or relatively mature organism can readily adapt other strategies to analyze input when this should become appropriate. But purely visual and possibly also auditory input, in the absence of coordinated response activity is not sufficient for (perceptual) performance in autistic children. (p. 59)

The results of the studies cited thus far clearly suggest that the individual modalities of perception are, at least to some extent, impaired in psychotic children. They also indicate, however, that when the child is given an opportunity to coordinate perceptual systems, most notably through the development of motor activity, their performance improves dramatically, and, at times, even surpasses that of normal children. We might assume, therefore, that given the

opportunity to manipulate objects, the psychotic child could adapt rather well. But what happens when these manipulations must take place internally, as is required in the understanding of language, the development of concepts, etc.? Much of what occurs in the lives of all of us taps our ability to essentially make order out of noise. For this we use not only our perceptual apparatus, but our memories, our capacity to order, and the panoply of skills that go beyond the perceptual and allow us to derive meaning from the environment. How, then, do these functions appear in psychotic children?

In a study of ordering and immediate memory in autistic children, Hermelin and O'Connor (1967b) investigated the relationship between immediate verbal recall with word frequency, sequential probability, and conceptual organization in 12 mentally retarded and 12 speaking autistic children (matched for chronological age, $\bar{X} = 10-8$; Peabody M.A., $\bar{X} = 4-3$; WISC Digit Span, $\bar{X} = 4-5$). Four-word sentences were presented four times to each child, in each of three conditions: (a) a simple English sentence with four words of common frequency (4x); (b) frequent random words of the above sentences (4x); and (c) infrequent word sentences (4x). Results were scored in terms of the number of correct responses, with the criteria being the accurate repetition of a sentence. When sentences containing infrequent words were compared with random arrangements of frequent words, the recall scores did not differ significantly for the two groups. In general, however, the group total recall was significantly higher for autistic children than retarded youngsters. When frequent-word sentences were compared with random arrangements of random words, the performance of

the subnormal group improved significantly (that is, they did better when given sentences), whereas the autistic group showed no improvement.

In studying the effects of recency on the recall of random and meaningful word presentations, O'Connor and Hermelin (1967b) found that while both groups demonstrated the influence of recency on recall, its impact was far greater in autistic children. In addition, though sentences were recalled better than random arrangements by all children, this effect was much more marked in the normal group than in the autistic group. These findings are strikingly similar to those obtained by Bartak and Rutter (1974) (cited in Language section). Interestingly, when presented with pictures having a predetermined order, autistic children demonstrated significantly better recall than when given randomly arranged pictures.

Taken together with other related research (Frith, 1969; Prior & Chen, 1976), these results suggest that autistic children have immediate rote memories which are better than those of subnormal children, and at least as good as normal children with similar mental ages. The recall capacity of the control groups (retarded and normal children), however, improved significantly more when syntactical and meaningfully related material was presented than did that of the autistic children. There was little difference in recall of sense or nonsense in these children, and the effect of recency was quite marked. When data are presented in the form of pictures rather than verbally, these effects diminish significantly.

Hermelin and O'Connor (1970) conclude that:

The strong tendency to impose stimulus-independent, simple, rigid, and repetitive patterns on random as well as on structured meaningful input, would lead to an impaired and limited ability for appreciation and reflection of order, pattern structure, and meaning in the environment. This tendency . . . would be particularly limiting for the extraction of features from structures governed by complex and flexible rules, as, for instance, those determining play, social interaction or language, the more limited and inappropriate the resulting behavior would be. It seems . . . that an impairment of this nature is more marked in the younger and cognitively more backward autistic children than in the older and more intelligent. It also appears that the deficit is to some extent modality dependent, and affects the auditory-vocal channels more than visual and particularly motor activity. Despite these qualifications we regard the inability of autistic children to encode stimuli meaningfully as their basic cognitive deficit. (p. 129)

Piagetian-Inspired Research

In reviewing the research on the cognitive "part-processes" of psychotic children, we came to at least a partial understanding of the mechanisms which affect their overall adaptation to reality: their deficits in perceptual analysis, their pronounced difficulties in organizing random inputs while discounting organized and sensible ones --all of these cognitive dysfunctions point to an organization of reality which is quite different from our own. Yet none of these findings provide us with an understanding of what their realities are like, nor do they tell us about the characteristics of their thought process. To understand what "psychotic thought" is, we need a different approach, one which transcends the analysis of isolated "parts" and looks instead at their organization within a whole. Such an approach to the study of cognition has been offered by Piaget, and although his own work has been confined to studying the development

of cognition in normal children, others, influenced by his theory, have tried to apply it to the analysis of psychotic children as well.

Perhaps the first clinician to administer Piagetian tasks to a psychotic child was Esther Halpern (1966). Her subject, a schizophrenic boy, had been given four traditional tests of intelligence over a span of 10 years (ages 5-15). These tests, which indicated a marked discrepancy in his verbal and performance skills (\bar{X} VIQ = 113; \bar{X} PIQ = 74; \bar{X} full-scale = 90), were, nonetheless, quite reliable measures over the decade and suggested a child of average intellectual ability. When he was 14 years old, well within the age range characterized by formal operations, Halpern administered a series of Piagetian tasks assessing the development of physical causality. These tasks, standardized by Laurendeau and Pinard (1962), specified the concepts of the Dream, Life, and the Origin of Night as central to the overall development of physical causality. In her analysis of her patient's responses, Halpern observed that while he achieved the concrete operational level of thought for the concepts of Dream and Night, he exhibited precausal, animistic thinking on the Concept of Life task. For this schizophrenic boy, the concept of Life presented such severe problems as to render his thought equivalent to a child 10 years his junior. What could we make of this? Why does a child with average intelligence function at an overall cognitive level well below what his chronological age would predict, and why is there such a glaring deficit in the development of a particular concept? While Halpern avoids a theoretical analysis of these results, she does suggest that the Piagetian approach demonstrates the ongoing process of cognitive development without relying on cross-age comparisons.

Anthony (1958), using a quasi-Piagetian framework, investigated the object concept of the psychotic child. Based on Piaget's detailed analysis of the development of object permanence, Anthony constructed a scale which historically accounted for absent, incomplete and complete object concepts. Differentiating primary psychotic children (i.e., the child who never or only very slowly develops from the normal autistic phase) from the secondary psychotic child (who had experienced a seemingly normal period of development, but then regresses to a state of autistic withdrawal), Anthony assigned each subject in his study an "organismic age" (which was derived from chronological age, mental age, social age, and bone age) prior to administering the object concept scale. Correlating the child's organismic age with his task performance, Anthony found that while the primary cases seemed to follow a path in the construction of the object which was similar to normal infants ($r = .64$), the secondary psychotic children seemed to deviate from normal development ($r = .19$) in a manner which he regarded as qualitatively different from normal repertoire of human behavior.

In a second study of the cognition of psychotic children, Anthony (1958) administered Piaget's Test of Three Mountains to 15 psychotic children between the ages of 8 and 12 with IQs ranging from 70 to 90, and 15 neurotic children matched for age and IQ. His results indicated that 65% of the psychotic children gave egocentric responses, suggesting that they could not imagine the perspective that a child in positions other than their own would have (i.e., they were still egocentric), while only 13% of the neurotic children responded in a similar fashion. Taken together, Anthony's results suggest that

psychotic children, regardless of their age or IQ, maintain more primitive organizations of cognitive development than are observed in normal children and in fact may still possess sensorimotor deficits long after the supposed closure of that stage.

In her analysis of the development of causal thought in psychotic children, Mook (1972) studied 20 schizophrenic children between the ages of 8 and 10, 45 normal children of the same age, and 20 normal 6-year-olds. All of her subjects were of average intelligence. Using five questionnaires based on Piaget's theory and standardized by Laurendau and Pinard (1962) (the same scales used by Halpern), Mook analyzed her subjects' concept of the Dream, concept of Life, understanding of the Origin of Night, the Movement of Clouds, and the Floating and Sinking of Objects. Each of these concepts taps an underlying structural characteristic of the child's overall understanding of causality, and Mook's results suggest that schizophrenic children typically fall into the preoperational stage of cognitive development. More important from a structural perspective, however, was Mook's finding that schizophrenic children show a heterogeneity of stage levels atypical of children of any age. She interprets these results as the result of an organizational disorder which stems from an imbalance of the processes of assimilation and accommodation. Mook concludes that:

From a structural point of view . . . schizophrenic children showed an atypical development pattern as they did not progress normally through the ontogenetic stages. Their development can be conceived of simultaneously reflecting regression to the lowest levels, fixation at some transitional stages, retardation in terms of lower mean stage-level functioning, and pre-maturity in the sense that they

proceeded to higher levels while previous stages had not been adequately mastered. . . . The schizophrenic children failed to achieve structural integration at any stage-level of causal thought development. (p. 58)

In related studies, McLaughlin (1976) and Shackelford (1976), under the aegis of Voyat, presented a series of Piagetian tasks assessing the development of concrete operations (e.g., class inclusion; 1:1 correspondence; conservation of matter, weight, and volume, etc.) to various groups of schizophrenic children. Both researchers found that the commonly observed invariant hierarchy of stages indigenous to normal development was not appreciated in their schizophrenic subjects. For example, some children had attained the most advanced levels of conservation yet were incapable of correctly performing the simplest task of 1:1 correspondence. Other children could solve certain tasks only when the nature of the test material was affectively neutral. Taken together, these investigators determined that psychotic children manifested both intra-test and inter-test heterogeneity. In all cases it appeared as if children who should be concrete operational (given their age, and in many cases their IQ) still performed at preoperational levels on many tasks. In other words, a cognitive disequilibrium had resulted in the preoperational logic of possibilities precluding the logic of necessities which becomes manifest during concrete operations.

In all of these studies, it appears as if a cognitive disequilibrium resulted in a disorganization of thought which was demonstrable at the preoperational and concrete-operational levels of development. But when did this disequilibrium first appear? Did the organization of cognition in these children suddenly lose its

integrity after years of normal development? I would argue that the bulk of the evidence presented in this chapter suggests that there are very basic mechanisms of cognition which are impaired from early on in the life of psychotic children and, consequently, disequilibrium in the organization of their thought processes which is observed in their later lives has its roots in the sensorimotor period itself.

Hypotheses

The review of the literature presented in the body of this work has approached the organization of cognition in psychotic children from two perspectives: a structural-developmental model of cognitive development in childhood, which relies heavily on Piaget's notions of early sensorimotor development and its influence on the subsequent development of symbolic representation, and an empirical-research orientation, which focuses on particular cognitive functions in normal development and their dysfunctions in psychotic children. Taken together, these approaches will serve as the general framework within which the organization of cognition in childhood psychosis will be studied. The analysis of this framework, with particular framework to the structure of thought in psychotic children as representing a primitive disequilibrium of sensorimotor constructs, has led me to the specific hypotheses that will be examined in this research.

Hypothesis I. The Uzgiris and Hunt Scales of Cognitive Development in Infancy will provide a reliable and useful means of assessing cognitive processes in psychotic children who have been considered "untestable" by traditional psychometric measures.

Hypothesis II. Five- to eight-year-old psychotic children, who age-wise should be at transitional or concrete operational levels of thought, will demonstrate severe deficits in sensorimotor functioning. Age will not be a significant determinant in a child's ability to perform these sensorimotor tasks.

Hypothesis III. All five children of the borderline group will reach the top level of all six Uzgiris and Hunt scales. As such they will be clearly distinguished from the ten psychotic children on the basis of cognitive performance.

Hypothesis IV. Within the group of 10 children who have received a DSM-III equivalent diagnosis of Pervasive Developmental Disorder, Childhood Onset, there will be no significant differences between the four subgroups as determined by DSM-II diagnosis. In other words, there will be no clear relationship between DSM-II diagnosis and performance on the Uzgiris and Hunt scales.

Hypothesis V. In the course of sensorimotor development in normal children, the six developmental tasks of the Uzgiris and Hunt scales coalesce in a tightly woven and highly interconnected network of cognitive skills. This network represents the final structure of sensorimotor development and provides the foundation for the development of symbolic representational thought. In the present group of 10 psychotic children, there will be a striking absence of such a closed structure. In other words, the six developmental constructs of the Uzgiris and Hunt scales will appear as independent lines of development in psychotic children, and the network of intercorrelations will consequently appear unrelated and insignificant.

Hypothesis VI. Of the six Uzgiris and Hunt scales, those requiring the most direct contact with the examiner will prove the most difficult for psychotic children. As a result, we expect the scales measuring vocal imitation and gestural imitation to yield the lowest performance scores.

Hypothesis VII. In a qualitative assessment of the Uzgiris and Hunt performances of each child, a unique pattern of cognitive skills will be demonstrated. This qualitative assessment will highlight the heterogeneous structure, or lack of closure, for the entire series of sensorimotor tasks (Hypothesis V); however, while Hypothesis VI predicts that the entire group will do poorly on tasks of imitation, this hypothesis allows for individual differences.

Hypothesis VIII. The Uzgiris and Hunt scales will be highly correlated with the child's performance on the Behavior Rating Instrument for Autistic and other Atypical Children (BRIAAC).

Chapter IV

EXPERIMENTAL DESIGN

Subjects

The subjects in this study were 15 children enrolled in a comprehensive day treatment program at the Philadelphia Developmental Center for Childhood Autism. The total sample consisted of 11 boys and 4 girls with ages ranging from 4 years, 8 months to 8 years, 1 month, with a mean age of 6 years, 8 months.

Upon admission to the treatment program, each child undergoes a comprehensive evaluation by the psychiatric staff of the Developmental Center. Developmental histories are taken, speech and hearing evaluations are administered, and, as a unique feature of this clinic's screening procedure, each child is evaluated on the Behavior Rating Instrument for Autistic and Other Atypical Children (BRIAAC), a measure constructed at the Developmental Center itself. (The BRIAAC will be described in detail in the next section.)

Upon completion of this intensive assessment procedure, each child is diagnosed by a senior staff member according to the criteria delineated in the Diagnostic and Statistical Manual of Mental Disorders (2nd ed.) (DSM-II) (1968) of the American Psychiatric Association. Since all of the children had such severe ego deficits in both the cognitive and affective domains as to render them untestable by traditional psychiatric measures, the diagnoses were based largely upon

clinical impressions rather than any clear-cut demonstration of a cluster of symptoms characteristic of a particular syndrome. Three children in our sample received diagnoses of childhood schizophrenia, two were considered autistic, three were diagnosed as suffering from various forms of mental retardation with prominent symptoms of childhood autism, two had organic brain syndromes, and five children received any of a number of diagnoses characteristic of the severe behavior disturbances of childhood (e.g., Personality Disorder of Childhood, Withdrawing Reaction of Childhood) and were considered as representative of the borderline range of pathology in childhood. These last five children were enrolled in the day school of the Developmental Center and were used in the study as a control group.

Each child was assigned to one of five diagnostic categories which were isomorphic to the initial DSM-II diagnoses. However, given this instrument's shortcomings with respect to the specification of early childhood psychopathology (as discussed in the previous section on Diagnosis, the DSM-II recognizes Childhood Schizophrenia as the only psychosis of childhood, grouping autistic, symbiotic, and psychotic disorders together and noting most psychotic behaviors as addendums to the more clear-cut diagnoses of Mental Retardation, Organic Brain Syndrome, etc.), the development and recent publication of the DSM-III (1980) provided a useful addition to the classification of the children in our study. As outlined in the previous section on Diagnosis, the DSM-III obviates many of the difficulties inherent to the attribution of the label "psychotic" to young children by utilizing the more descriptive category of Pervasive Developmental

Disorders with Childhood Onset. The multi-axial approach to psychiatric diagnosis which is a hallmark of the DSM-III's nosological system allows for the simultaneous designation of Pervasive Developmental Disorders with other diagnoses such as OBS, mental retardation, etc., in children who suffer from both.

After reviewing the clinic records and developmental histories of the children in our study, each subject was assigned a DSM-III equivalent diagnosis as well as their original DSM-II classification. The demographic data of the sample are presented in Table 2. All of the names have been changed for purposes of confidentiality.

Instruments

Behavior Rating Instrument for Autistic and Other Atypical Children

The Behavior Rating Instrument for Autistic and Other Atypical Children (BRIAAC) was designed at the Developmental Center for Childhood Autism in Philadelphia to evaluate children who are traditionally considered untestable because of either withdrawal; uncooperative or resistive behavior; disinclination or inability to relate, communicate, or respond; or severe anxiety generated by a testing procedure. As opposed to the traditional testing environment, "the child is observed in his usual setting, responding to the stimulation and presence of the familiar human and nonhuman elements in the home, classroom, or institutional setting" (Ruttenberg, Kalish, Wenar, & Wolf, 1976, p. 11), and behavior in eight key areas is assessed. These include: Relationship to Adults, Communication,

Table 2
 Characteristics of Subjects

Name	Sex	Age	DSM-II Diagnosis	Category	DSM-III Equivalent
1. Jerry	M	6-8	295.8 Childhood Schiz.	1	299.9 Childhood Onset PDD
2. Phillip	M	5-4	295.8 Childhood Schiz.	1	Childhood Onset PDD
3. Fred	M	5-4	295.8 Childhood Schiz.	1	Childhood Onset PDD
4. Mike	M	8-0	---- Autism w/Ment. Ret.	2	Childhood Onset PDD +
5. Henry	M	7-2	---- Autism w/Ment. Ret.	2	Childhood Onset PDD +
6. Mark	M	6-7	310.8 M.R. w/Brn. Dep. *autistic features	3	Childhood Onset PDD + Axis (1/1)
7. Dwight	M	6-8	315.8 Unspec. M.R. w/Dep. *autistic features	3	Childhood Onset PDD + (1/1)
8. Jose	M	7-0	---- M.R. w/unknown prenatal int.	3	Childhood Onset PDD Both Diag. (1/1)
9. David	M	7-6	309.93 Organic Brain Syn.	4	Childhood Onset PDD Behavior on Axis I OBS on Axis III
10. Karen	F	5-8	309.5 Organic Brain Syn.	4	Childhood Onset PDD Behavior on Axis I OBS on Axis III
11. Mary	F	7-2	308.1 Withdrawing React. of childhood	5	Schizoid Disorder of Childhood

Table 2 (continued)

Name	Sex	Age	DSM-II Diagnosis	Category	DSM-III Equivalent
12. Jill	F	4-8	301.89 Personality Dis. of childhood	5	---
13. Jack	M	6-8	308.9 Behavior Dis. of childhood	5	---
14. Lisa	F	8-1	301.81 Pass.-Aggr. Pers.	5	301.81 same
15. Joe	M	7-5	308.9 Behavior Dis. of childhood	5	---

Drive for Mastery, Vocalization and Expressive Speech, Sound and Speech Reception, Social Responsiveness, Body Movement, and Psychobiological Development.

Each of the eight scales begins with the most severe autistic behavior and progresses to behavior roughly comparable to that of a normal $3\frac{1}{2}$ - to $4\frac{1}{2}$ -year-old. Each scale has 10 levels; in scoring a given level an observer has 10 points which he distributes among the levels of the scale according to the relative frequency of the observed behavior. The score for a scale is obtained by multiplying the number of points allotted to a level by the number of that level and summing the resulting product. Scores can range from 10 to 100, the lower score indicating the most severe disturbance, the higher score indicating the least disturbance, or reasonably adequate functioning. Scores from all eight scales can be summed to obtain an overall measure of the severity of disturbance. (Ruttenberg et al., 1976, p. 2)

A brief description of each scale follows.

1. Relationship to Adults

The Relationship to Adults scale is designed to rate the child's relationship to significant adults with whom he may come into contact. Inability to relate in age-appropriate ways to persons in the environment is characteristic of all autistic and severely disturbed children. Lack of appropriate affect, withdrawal into unapproachable states, and resistive behaviors are major contributors to the child's disturbance.

On Level One the child's behaviors are characterized by imperviousness or obliviousness to people; there is almost a total

lack of response and the child behaves as if no other being exists. Subsequent levels show intermittent signs of withdrawal to imperiousness and resistiveness where the child must actively defend himself against an awareness of meaningful involvement with others. The child then progresses from a stage of paying fleeting attention to others at a safe distance, to that of making regularly recurring responses to a significant person. At the highest levels, the child anticipates approval and disapproval and can control his behavior accordingly. He can be observed sharing his experiences, identifying with and showing empathic behavior toward significant people in his environment.

2. Communication

On Level One the child shows no sign of directing any behavior toward or reacting to another person. This is followed by crude manifestations of purely primitive affect and need. Higher levels detail a trend towards specificity of direction and more regularity, clarity, variety, and complexity of expression. The child begins to direct his requests for help or attention toward a specific person and then to develop regular, sustained, and varied patterns of approach and rejection. At the highest levels he begins to communicate ideas and feelings, derives pleasure from communication, and is able to communicate about the future.

3. Drive for Mastery

Refers to the child's interest in exploring and mastering his physical environment. This scale does not measure ability, but the

motivation to explore and perform well which underlies all acquisition of skills. On Level One of the Drive for Mastery Scale, the child's behavior is stereotyped and repetitive, with little or no response to the introduction of new objects. Subsequent low levels of the scale trace the shift from the use of objects in a sensory manner to gain autoerotic gratification, through resistance, then tentative activity with low manifest interest. As the scale progresses, the child's behavior becomes increasingly spontaneous. At the highest levels, he is goal oriented, is aware of his achievements, and can examine what he is doing critically and constructively.

4. Vocalization and Expressive Speech

This scale measures only how well the child has mastered the mechanics of speech and verbal language. The degree of the child's ability and intent to communicate is considered in the Communication Scale. Level One of the Vocalization and Expressive Speech Scale presents a generally nonvocal child. The lower levels include vocalization which is primarily reflexive and involuntary, apparently related to a need to discharge inner tension and distress. The child progresses through more spontaneous but indistinct sounds to a greater variety of clarity of individual sounds and sound combinations, to highly developed babbling intermingled with single word vocalizations such as "mama" and "dada." Higher levels include imitative mirroring of single words or short phrases, the development of jargon, spontaneous or cooperative naming of objects, and, finally, to the combination of words into simple and then complex sentences including use of the first person pronoun.

5. Sound and Speech Reception

This scale represents a systematic attempt to classify and measure a child's awareness of, interest in, and reactions to sounds and speech of various types in his environment. Level One of this scale describes a state where the child, as far as the observer can perceive, is completely oblivious to sound. He shows no overt signs of awareness of noises, voices, etc. At an intermediate level there are observable signs of awareness of sounds, words, and attempts to localize and/or repeat sounds. At the higher levels, the child understands sentences involving the identification of objects by use, follow directions, etc.

6. Social Responsiveness

This scale measures the level of the child's responsiveness to environmental demands and rules for socially acceptable behaviors in regard to self-help functions such as eating, toileting, and dressing. In other words, this scale is concerned with the variety of actions and reactions to social requirements.

At the lowest levels of the Social Responsiveness Scale the child is oblivious to social demands or passively allows himself to be manipulated so as to go through the motions of acceptable behavior. As he becomes more actively involved he resists or complies mechanically only as long as a motivating or helping adult is present. Gradually, he becomes interested, cooperative, and intrinsically motivated, so that dressing, feeding, toileting, and other self-help functions become second nature.

7. Body Movement

This scale recognizes two distinct patterns of movement behavior found in disturbed children to an extreme degree, and in all persons to some lesser degree. These two patterns are Passive and Active. On Level One, the body of the Passive child is like a dead weight or a "blob," the child being impervious to painful stimuli and/or bodily functioning, while sitting motionless for long periods with a fixed gaze. In the Active child, on Level One the body is rigid, the child has no ability to relax, locomotion has a driven quality, movements are abrupt and disjointed, there is no change in facial expression or visual following and little orientation to space. Both the Passive and Active child progress to the point where they appropriately utilize either the whole or part of the body to do the task at hand, have the normal repertoire of movements, can recognize themselves and parts of their body in the mirror, and can incorporate fantasy into action (e.g., acts out "moving like an elephant" or "flying like an airplane").

8. Psychobiological Development

This scale is designed to trace the behavioral manifestations of the shift from the states of direct expression of drives to the development of character and personality traits which are appropriate and socially oriented.

This scale begins with the Infantile Sensory Stage of Development which is marked by undirected discharge of rage; rhythmic, proprioceptive and kinesthetic self-stimulation; cutaneous excitation; and perseverative looking, listening, or manipulation. Next come behaviors

characteristic of the oral, anal, and phallic stages. Their expression is open, direct, and persistent; and there is little of the ego modulation, modification, and defense of normal development. Lower drive stages tend to be joined rather than displaced by the appearance of higher stages, e.g., the child may indiscriminately mouth or suck objects, bite himself and others, smear feces, withhold stool for days, and masturbate openly. Following the drive stages, some behaviors representing personality traits, defenses, and ego modifications appear, culminating at the highest level in such phallic trait behaviors as seductiveness, modesty, exhibitionism, challenging assertiveness, and specific fears.

For a more detailed description of each BRIAAC scale see Appendix 1.

Uzgiris and Hunt Ordinal Scales of Psychological Development

The Uzgiris and Hunt Ordinal Scales of Psychological Development are six Piagetian-inspired scales of cognitive development in infancy. These measures provide data concerning the child's relative progress along the six most critical constructs of the sensorimotor period of development. These include:

1. The Development of Visual Pursuit and the Permanence of Objects
2. The Development of Means for Obtaining Desired Environmental Events
3. The Development of Vocal and Gestural Imitation
4. The Development of Operational Causality
5. The Development of Object Relations in Space
6. The Development of Schemes for Relating to Objects

While traditional tests of mental development rest on an assumption of incremental progress, without much consideration of the interrelationships at one level and those of the next, ordinal scales imply a hierarchical relationship between achievements at different levels, so that in principle the achievements of the higher level do not incidentally follow but are intrinsically derived from those at the preceding level and encompass them within the higher level. For example, the computation of the Developmental Age (DA) for any individual infant involves two assumptions. The first is related to what Coombs has called a compensatory model of the theory of data. The DA consists of the sum of items successfully performed by an infant regardless of the nature of the items. Thus, in this summation, success on any given item can substitute or compensate for any other. Second, the summation procedure implies an additive view of developmental progress. The successful performance on each item is given equal weight, thus overlooking the possibility of interaction between performances on separate items. Since the test items have no special significance in themselves, the summation of credits for any individual gets meaning chiefly from comparison with the summations for other individuals. Thus, the measurement of development becomes a matter of rank or status of the individual's performance among the performances of those constituting the standardization group. (Uzgiris & Hunt, 1975)

On the other hand, the sequence of behavioral landmarks which Piaget has described in sensorimotor development implies change in the organization of competencies--not only in their number, but change

which culminates in a fairly well defined structure which gives rise to the various forms of symbolic representation at the highest sensorimotor levels. While Piaget has posited the existence of six sensorimotor substages, each of which is characterized by a confluence of developmental landmarks (e.g., the emergence of primitive notions of time, space, causality, object permanence, etc.), Uzgiris and Hunt have argued that the notion of stage might be more appropriately applied to the sensorimotor period as a whole rather than to particular levels within it. As a result, rather than strictly adhering to Piaget's notion of sensorimotor substages, these investigators have studied the genesis of the six aforementioned areas of intellectual functioning in infant development. To this end, actions which are taken to be critical indicators of internal structures are evoked in a variety of eliciting situations which in their totality comprise this set of scales.

A brief description of each scale follows.

1. The Development of Visual Pursuit
and the Permanence of Objects

Simply stated, this sequence concerns the developing "awareness" that an object continues to exist in the absence of any direct activity (i.e., motoric manipulation, perception by the subject). Development along this continuum may be said to imply the increasing persistence of internal representation processes which allow for the memory of an object in spite of its absence. The increasing differentiation and integration of these processes allows for the construction of objects as they become differentiated from the actions and spatial contexts

which initially define them. And the increasing mobility and flexibility of these central processes eventually culminate in the representational thought which is characteristic of the end of the sensorimotor period of development.

2. The Development of Means for Obtaining Desired Environmental Events

The eliciting situations in this series are directed mainly at what infants do to cause events or obtain objects which they have come to desire. Increasing differentiation of actions-as-means by the envisioned end leading to subordination of means to ends, and increasing anticipation regarding the appropriateness of particular means for achieving specific ends, characterize progress along this sequence.

3. The Development of Imitation

The situations utilized to elicit imitative behaviors are subdivided into a series pertaining to vocal imitation and a series pertaining to gestural imitation. Infants begin by imitating both vocalizations and simple gestures which are well within their behavioral repertoires, i.e., simple vocalizations (nondistress) and the earliest of motor schemes. Later, they imitate more complex vocalizations and actions which utilize familiar schemes but which include some demands for accommodative modification. With the development of interest in novelty the infant progressively begins to imitate not only familiar vocalizations and gestures which he can observe himself doing, but unfamiliar vocalizations and "invisible" gestures as well.

4. The Development of Operational Causality

This series constitutes a series of landmarks in the construction of one of the most critical categories of reality. A primitive appreciation of causality appears early as infants actively begin to anticipate events. With the appearance of hand-watching and the grasping of interesting objects, infants demonstrate the beginnings of the voluntary control of their visual field. Later, infants make active attempts to prolong, maintain, and recreate interesting perceptual events via a series of self-initiated actions. These actions that anticipate an outcome have been termed "procedures" by Piaget and appear to be generalizations of the particular repetitive actions which are already known to the infant, to circumstances other than the ones in which they originated. At beginning levels along this sequence, sources of causality appear to lie entirely within the infant. Gradually, infants begin to show an appreciation of centers of causality outside themselves as they attempt to act directly upon the source of the interesting event. Eventually, infants further objectify causality by searching for the mechanical or external causes of interesting spectacles. In general, then, this developmental construct reflects the gradual diminution of the child's primitive narcissism with the concomitantly increasing objectification of a "causal" world.

5. The Construction of Object Relations in Space

This sequence concerns the developmental transformations in an infant's appreciation and construction of object relations in space.

Object relations, as it is used in this context, implies neither interpersonal relationships nor the quality of relatedness in the psychoanalytic sense. Instead it refers to the growth in understanding of the physical properties of objects, the space in which they are contained, and the relationships which are enacted therein. Implicit behavioral recognition that objects differ in their position in space is manifest very early in the slow alternate glancing at two objects. Later, as infants coordinate the schemes of looking and listening, they begin to localize sounds and sources; thus, things heard become things to search for with the eyes and to look at. Gradually, the infant develops the ability to extrapolate the trajectory of a falling object, recognizes the reverse sides of objects, appreciates the relationship of the container and the contained, and shows a primitive understanding of gravity.

6. The Development of Schemes for Relating to Objects

This series concerns the ways through which infants interact with objects, mainly toys with which the infant is familiar. The development of these activities may be described as a series of peaks in the tendencies for certain ways of interaction. Given behavior patterns make their appearance, become characteristic of an infant's relating to objects, and then these behavior patterns are replaced by others which often incorporate the earlier ones.

For a more detail description of each Uzgiris and Hunt scale see Appendix 2.

Method

In the initial phase of this study, the New York metropolitan area was scoured in a search for children who might participate as subjects. Fifteen mental health agencies were contacted (see Appendix 5), but no working alliances were established. As the search was directed elsewhere, the cooperation of the Philadelphia Developmental Center for Childhood Autism, Bertram Rутtenberg, M.D., Director, was enlisted.

The Developmental Center has both a clinic and a day school program. The clinic houses the most severely impaired children in a 3-hour-per-day, 5-day-per-week program which stresses the importance of constant adult companionship vis-à-vis a comprehensive treatment plan which includes psychotherapy, movement therapy, and speech therapy. The day school is populated by less severely emotionally handicapped children who have demonstrated some capacity for social interaction and thus need less one-to-one treatment than the children at the clinic.

In this study, the clinic's population of 10 variously diagnosed psychotic children was designated as the experimental group for purposes of comparison with a control group of 5 borderline children from the day school. In order to minimize experimenter bias, the BRIAAC records as well as the DSM-II and DSM-III equivalent diagnosis of each child were withheld until the Uzgis and Hunt cognitive evaluations were completed.

While it is extremely difficult to accurately detail a clinical testing procedure such as the one employed in this study, it may be

said that a very careful appreciation of each child's needs was a basic cornerstone of the current enterprise. To begin with, each child met the examiner prior to testing in a nonstressful situation where both were able to talk and play as they wished. Subsequently, each child was brought to the testing room (an 8- by 10-foot enclosure without decoration) by a familiar adult who remained with the child during the entire battery. The scales were administered in the prescribed order (i.e., Permanence, Means, Vocal Imitation, Gestural Imitation, Operational Causality, and Object Relations in Space), with the exception of the final scale in the battery, which concerns the child's use of inanimate objects. This was not administered as a separate series of tasks; instead, each child's use of objects was closely observed throughout the testing procedure to provide a general indicator of the scope and tactics employed in examining, using, and relating to objects.

Given the widely held observation that severely emotionally disturbed children often have fleeting attention spans which prevent them from attending and concentrating on a task, a number of measures were taken to minimize the attendant testing difficulties. To begin with, the simplest tasks in some of the scales were eliminated (e.g., Step 1 in the Development of Means, the Development of Gestural Imitation, the Development of Operational Causality; and Steps 1 and 2 in the Object Relations scale); repetitive situations were combined or omitted (i.e., in Development of Visual Pursuit and the Permanence of Objects, Steps 5 and 6 were combined, Steps 11 and 12 were combined, and Step 14 was omitted; in Vocal Imitation, Step 5 was omitted); and

the items used in the eliciting situations were made as attractive as possible to heighten the children's interest and subsequent participation in the test (e.g., large, brightly colored toys such as police cars, fire engines, plastic animals, beach balls, and punching bags, and soft toys such as dolls and stuffed animals). The advanced locomotion of all of the children in this study dictated that Steps 6 and 7 in the Development of Means Scale be eliminated because of the facility with which a child could simply reach for an object without requiring the support on which it rested. The revised scoring forms may be seen in Appendix 3.

In order to insure that the Uzgiris and Hunt cognitive evaluation tapped the most advanced levels at which each child could perform, the administration of the various sequences was tailored to meet the specific needs of each subject. In some cases it was necessary to work very quickly, substituting one task for another so that the child would remain engrossed in the situation, while in other cases considerable time was allotted for each task. When the examiner felt that a child was overly anxious or tired, testing was discontinued until the child displayed renewed interest (for some children this necessitated a second session later in the week). Each administration of the scales was videotaped by an experienced technician who was also fluent with the test itself.

Upon completion of the testing procedure, the performances were independently scored by two trained raters who had no knowledge of the children's diagnosis or BRIAAC performances. The raters could not consult with each other, as they performed their tasks in separate rooms.

Raters

The two raters in this study were graduate students in psychology at the City University of New York. Their primary responsibility was rating the performance on each child on the Uzgis and Hunt Scales of Psychological Development. As this task requires considerable practice and clinical acumen, both raters underwent a week-long training program in both the administration and rating of the scales. This entailed observation of the Uzgis and Hunt Training Films of Cognitive Development in Infancy and subsequent scoring of normal infant behaviors under the supervision of the author of this study. Upon successful completion of this task and the acquisition of adequate reliability (over 80% of the items scored the same by both raters), the raters were given a sample tape of a severely emotionally handicapped child to score, again under close supervision by the author, and again demonstrating reliability. Once this was completed, the raters were equipped with the revised scoring forms (see Appendix 4) and instructed to independently rate the behavior of each child.

Chapter V

RESULTS

Hypothesis I states that the Uzgiris and Hunt Scales of Cognitive Development in Infancy will provide a useful and reliable means of assessing cognitive processes in children who have been considered untestable by traditional psychometric measures.

To evaluate this hypothesis, inter-rater reliability was measured by assessing the percentage of agreement between the two raters on all of the items comprising the Uzgiris and Hunt scales.

There was perfect agreement (i.e., 100%) on 91.8% of the items on the six scales. When single step discrepancies (between the raters) are included, this figure is raised to 96.3%. The perfect hit and one-step discrepancy figures were similar for all of the measures, with the bulk of any discrepancies occurring on the lower levels of each scale. The reliability scores for each scale are listed below:

	<u>Perfect Hit</u>	<u>One-Step Discrepancy</u>
The Development of Visual Pursuit and the Permanence of Objects	93.9%	96.4%
The Development of Means for Obtaining Desired Environmental Events	91.7%	95.8%
The Development of Vocal Imitation	85.0%	90.7%
The Development of Gestural Imitation	93.3%	100.0%
The Development of Operational Causality	91.1%	95.6%
The Development of Object Relations in Space	95.8%	100.0%

These scores obviously reflect an extremely high percentage of agreement between raters on all six Uzgiris and Hunt scales; this supports the hypothesis that the Uzgiris and Hunt instruments will be a reliable measure of cognitive processes in psychotic children.

Hypothesis II states that 5- to 8-year-old psychotic children, who age-wise should be at transitional or concrete organizational levels of thought, will demonstrate severe deficits in sensorimotor functioning. Age will thus not be a significant determinant in a child's ability to perform these sensorimotor tasks.

To evaluate this hypothesis, each task was first assigned a sensorimotor substage level based on the agreement of the two raters. Table 3 presents the assigned level of achievement for each subject for each task. A quick scan of this table reveals the numerous deficits in virtually all of the children in the "psychotic" group (#1-10). In addition, the mean stage acquired for each developmental construct fell below the ceiling of six. Taken together, these findings support the hypothesis that sensorimotor deficits exist in psychotic children who age-wise should have long ago developed these capacities.

Hypothesis II also suggests that age will not be correlated with sensorimotor performance. A Spearman rank correlation between age and performance was calculated to test this hypothesis; the results are shown in Table 4. While Gestural Imitation does appear to be significantly correlated with age, the absence of any significant cluster of correlations among any of the other scales clearly supports this hypothesis as well.

Table 3
Level of Achievement for Each Task

Subject	Object Permanence	Means/Events	Vocal Imitation	Gestural Imitation	Operational Causality	Object Relation in Space
#1	6	6	6	4	4	6
#2	4	3	3	3	3	4
#3	6	6	5	6	6	5
#4	6	6	6	6	6	5
#5	6	6	3	2	6	5
#6	6	6	4	2	6	5
#7	6	6	1	6	6	6
#8	6	6	5	6	3	5
#9	6	6	6	6	6	6
#10	4	6	6	6	3	5
\bar{X}	5.6	5.7	4.5	4.6	5.0	5.1
#11	6	6	6	6	6	6
#12	6	6	6	6	6	6
#13	6	6	6	6	6	6
#14	6	6	6	6	6	6
#15	6	6	6	6	6	6
\bar{X}	6.0	6.0	6.0	6.0	6.0	6.0

Table 4
Age Correlations

Scale	Entire Sample	Minus Group 5
U&H 1: Object Permanence	.101	.232
U&H 2: Development of Means	.206	.111
U&H 3: Vocal Imitation	.135	.220
U&H 4: Gestural Imitation	.582**	.682*
U&H 5: Operational Causality	.424	.631*
U&H 6: Object Relations in Space	.489*	.428

* $p < .05$

** $p < .01$

Hypotheses III and IV are both concerned with the differentiation of diagnostic subgroups within the total sample of 15, and the validity of DSM-II subcategorization of children who clinically present as psychotic. Specifically, Hypothesis III states that all five children of the borderline group will reach the top level of all six Uzgiris and Hunt scales. As such they will be clearly distinguishable from the 10 psychotic children on the basis of cognitive performance. Hypothesis IV further specifies that within the group of 10 children who received a DSM-III equivalent diagnosis of Pervasive Developmental Disorder, Childhood Onset, there will be no significant differences between the four DSM-II diagnostic subgroups. In other words, there will be no clear relationship between DSM-II diagnosis and performance on the Uzgiris and Hunt scales.

In formally evaluating these hypotheses, we initially worked under the assumption that the categories delineated in our sample constituted an ordinal scale of pathology. After assigning sum scores for each Uzgiris and Hunt scale, Spearman rank correlations between the scales and diagnostic categories were computed.

Performance on tasks assessing Vocal and Gestural Imitation, Operational Causality, and Object Relations in Space was significantly correlated with diagnosis at the .01 criterion level. As this finding seemed at odds with a gross overview of the raw data and was discordant with Hypothesis IV, a Fisher's Exact Test for small sample sizes was performed to discern exactly where the differences between diagnostic subgroups existed. Using this measure, no significant differences between the four subcategories of psychosis were found for any of the

cognitive scales. However, each subgroup was significantly different from the control group of children with severe behavior disorders. Given these results, the four subgroups were combined into the DSM-III equivalent category of Pervasive Developmental Disorder, Childhood Onset for purposes of comparison with the control group. A Fisher's Exact Test yielded significant differences between these two groups at the .01 level for the following scales: Vocal Imitation, Operational Causality, and Object Relations in Space. Gestural Imitation reached significance (in differentiating the two groups) at the .05 criterion level.

With these results in hand, as well as the obvious fact that all of the children in the control group successfully performed the most difficult items of the Uzgiris and Hunt scales (see Table 3, #11-15), we redid the previous correlations (i.e., Uzgiris and Hunt performance with diagnostic group), this time excluding Group 5. The new set of results clearly demonstrated that within the four subgroups there were no significant correlations with any of the Uzgiris and Hunt scales, thus providing a verification of the Fisher's Exact Test's results. Both sets of correlations are presented in Table 5.

These results clearly support both Hypotheses III and IV and suggest that borderline children may be distinguished from psychotic children on the basis of Uzgiris and Hunt performance. In addition, the absence of any significant correlations between categories based on DSM-II diagnosis and Uzgiris and Hunt performance suggests that the DSM-III equivalent category of Pervasive Developmental Disorder avoids the pitfalls of subcategorizing children who often perform and behave in similar ways.

Table 5
Diagnosis Correlations

Scale	Entire Sample	Minus Group 5
U&H 1: Object Permanence	.052	- .280
U&H 2: Development of Means	.265	.464
U&H 3: Vocal Imitation	.612**	- .072
U&H 4: Gestural Imitation	.647**	.498
U&H 5: Operational Causality	.709**	.220
U&H 6: Object Relations in Space	.617**	.275

* $p < .05$

** $p < .01$

Hypothesis V states that in the course of sensorimotor development in normal children, the six developmental tasks of the Uzgiris and Hunt scales coalesce in a tightly woven and highly interconnected network of cognitive skills. This network represents the final structure of sensorimotor development and provides the foundation for the development of symbolic-representational thought (see Table 6). In the present group of 10 psychotic children, there will be a striking absence of such a closed structure. In other words, the six developmental constructs of the Uzgiris and Hunt scales will appear as independent lines of disturbances in psychotic children and the network of intercorrelations will consequently appear unrelated and insignificant.

To evaluate this hypothesis the six scales of the Uzgiris and Hunt series were correlated with each other. This procedure yielded an unusual pattern of correlations for our entire sample (Table 7). In fact, it appeared as if the scales of Object Permanence and Means for Obtaining Desired Environmental Events were completely independent of the four other scales. Closer examination of these raw data, however, suggests that this result might have been affected by the powerful ceiling effect exerted by the Performance and Means Scales. Interestingly, when Group 5 was eliminated from the matrix, the heterogeneity of performance on the remaining scales increased dramatically, rendering all of the scales relatively independent of each other. This matrix is presented in Table 8 and clearly support Hypothesis V.

Table 6
Intercorrelations Between Uzgiris and Hunt Scale Scores
for Normals

	U&H 1	U&H 2	U&H 3	U&H 4	U&H 5	U&H 6
U&H 1: Object Permanence	---	.92	.82	.91	.84	.92
U&H 2: Development of Means		---	.83	.89	.85	.93
U&H 3: Vocal Imitation			---	.81	.80	.84
U&H 4: Gestural Imitation				---	.81	.88
U&H 5: Operational Causality					---	.89
U&H 6: Object Relations in Space						---

SOURCE: I. C. Uzgiris and J. McV. Hunt, Assessment in Infancy: Ordinal Development (Chicago: University of Illinois Press, 1975), p. 133.

Table 7
Intercorrelations Between Uzgiris and Hunt Scale Scores
for Entire Sample

	U&H 1	U&H 2	U&H 3	U&H 4	U&H 5	U&H 6
U&H 1: Object Permanence	---	.095	.364	.403	.520*	.380
U&H 2: Development of Means		---	.239	.298	.264	.477*
U&H 3: Vocal Imitation			---	.577**	.652**	.559*
U&H 4: Gestural Imitation				---	.810**	.678**
U&H 5: Operational Causality					---	.849**
U&H 6: Object Relations in Space						---

* $p < .05$

** $p < .01$

Table 8
Intercorrelations Between Uzgiris and Hunt Scale Scores
for "Psychotic" Group

	U&H 1	U&H 2	U&H 3	U&H 4	U&H 5	U&H 6
U&H 1: Object Permanence	---	.088	.226	.228	.648*	.433
U&H 2: Development of Means		---	.368	.383	.290	.465
U&H 3: Vocal Imitation			---	.314	.144	.193
U&H 4: Gestural Imitation				---	.675*	.423
U&H 5: Operational Causality					---	.805**
U&H 6: Object Relations in Space						---

* p < .05

** p < .01

Hypotheses VI and VII are concerned with the performance of psychotic children on the various developmental tasks measured by the Uzgiris and Hunt scales. Hypothesis VI states that psychotic children, as a group, will have the greatest difficulty with the scales assessing vocal and gestural imitation. Hypothesis VII suggests that while psychotic children will typically present a heterogeneous sensorimotor structure (i.e., a lack of closure), the organization of the various constructs will vary from child to child. Taken together, these hypotheses allow for individual differences within a more general pattern of sensorimotor functioning.

To evaluate these hypotheses, the Uzgiris and Hunt performance of each child was evaluated in the following manner. Each subject's performance on the six Uzgiris and Hunt scales was assigned a sensorimotor substage level based on the agreement of the two raters (this was the same procedure used in evaluating Hypothesis II). The substage scores for each scale were then averaged, yielding a mean substage for each scale (for the entire group). The scales measuring Vocal and Gestural Imitation received the lowest substage scores, with respective \bar{X} s of 4-5 and 4-6. These scores were significantly ($p < .05$) lower than the \bar{X} scores for the four other scales and thus support Hypothesis VI. (The \bar{X} scores for all of the scales are presented in Table 3.)

Given this result, the body of Table 3 was examined (in evaluating Hypothesis VII) to determine if children with similar scores on the Imitation scales would have similar profiles across the entire sensorimotor series. The results of this qualitative

analysis suggest that children with similar scores on any one scale do not necessarily share a similar pattern of sensorimotor functioning. For example, Figure 1 presents the sensorimotor profile of two children who are at substage 3 in the development of vocal imitation. This figure clearly demonstrates that while both children share a similar stage with respect to this skill, they differ on all other dimensions of sensorimotor functioning. This, of course, is just an example of what might be done with any two profiles overlapping at one point.

The qualitative analysis (also demonstrated in the body of Table 3) also indicates a striking heterogeneity of performance on the six scales for any one child. In fact, only one of the 10 children in the psychotic group had the same score on all of the scales.

These findings support Hypothesis VII and suggest that a disorganization in sensorimotor functioning exists in a manner that is often peculiar or idiosyncratic to each child.

Hypothesis VIII states that the Uzgiris and Hunt scales will be highly correlated with the child's performance on the BRIAAC.

To evaluate this hypothesis each scale of the Uzgiris and Hunt series was correlated with each scale of the BRIAAC. The resulting matrix appears in Table 9 and demonstrates the highly significant relationship between many of the items in the two instruments.

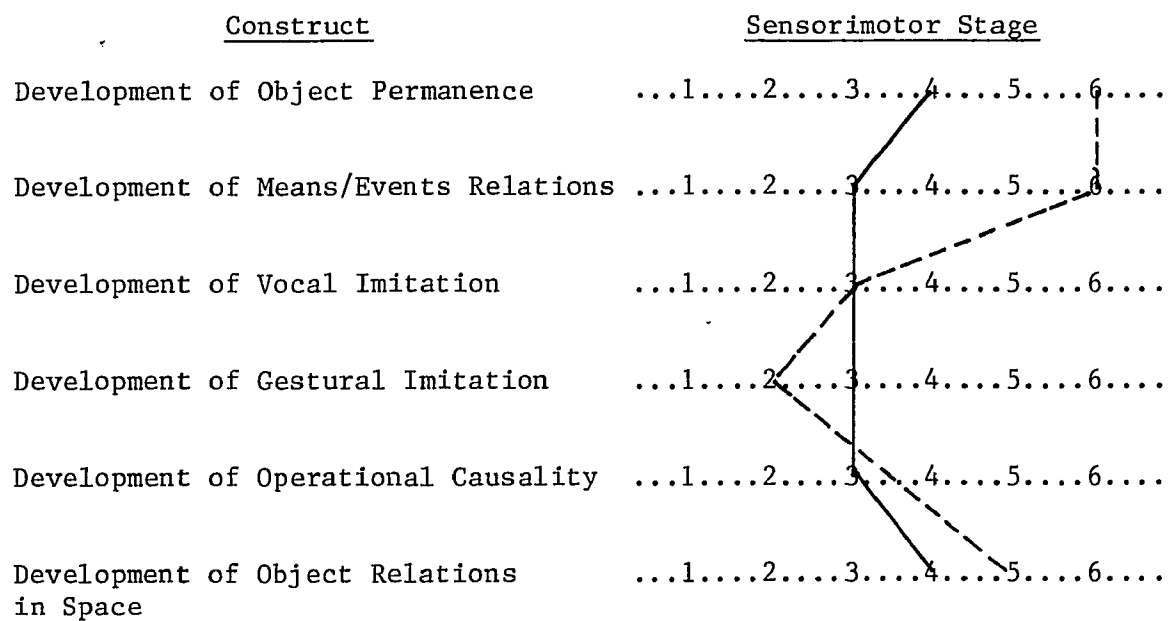


Figure 1. Sensorimotor Profile of Two Children.

Table 9
Cross-Correlations of BRIAAC with Uzgiris and Hunt Scales

	U&H 1	U&H 2	U&H 3	U&H 4	U&H 5	U&H 6
BRIAAC 1: Relationship to Adults	-.093	.192	.159	.310	.328	.335
BRIAAC 2: Communication	.071	.272	.604**	.665**	.753**	.604**
BRIAAC 3: Drive for Mastery	.065	.273	.416	.511*	.685**	.553*
BRIAAC 4: Vocalization and Expressive Speech	-.115	.497*	.467*	.509*	.518*	.605**
BRIAAC 5: Sound and Speech Reception	.007	.359	.341	.641**	.697**	.628**
BRIAAC 6: Social Responsiveness	.206	.319	.556*	.443*	.693**	.821**
BRIAAC 7: Body Movement	-.006	.408	.550*	.589**	.737**	.741**
BRIAAC 8: Psychobiological Development	.149	.417	.648**	.609**	.523*	.562*
SUMBRI	.033	.356	.557*	.645**	.746**	.748**

U&H KEY: U&H 1: Development of Object Permanence
 U&H 2: Development of Means/Events Relations
 U&H 3: Development of Vocal Imitation
 U&H 4: Development of Gestural Imitation
 U&H 5: Development of Operational Causality
 U&H 6: Development of Object Relations in Space

* p < .05

** p < .01

Chapter VI

SUMMARY, RECOMMENDATIONS, AND CONCLUSIONS

Discussion: Implications for
Assessment and Management

In reviewing the results of this research project, we have had the opportunity to assess a number of important issues which typically confront both educators and therapists of severely emotionally handicapped children. To begin with the most obvious and perhaps most pertinent finding of the study, we may confidently dispute the widely held clinical notions which suggest that psychotic children are untestable. Without exception, even the most impaired child was able to perform the base level items of the Uzgiris and Hunt scales successfully. In fact, in many cases it appeared that had we been equipped with suitable measures, our subjects might have well surpassed the upper limits imposed by some of the sensorimotor scales. The extremely high inter-rater reliability which was attained supports our original contention that psychotic children are indeed testable if the level of task difficulty does not exceed the capabilities of the child being assessed and supports the findings of other researchers (Alpern, 1967; DeMyer et al., 1974) who have used infant scales in their assessment of psychotic children.

Our success in eliciting scorable performances from children previously thought to be untestable (the children in this study had been unsuccessfully evaluated on traditional psychometric measures)

raised a number of interesting and provocative questions. For example, we might wonder if the children's performance was due to the nature of the items used, or if the manner of the evaluation itself was inextricably related to the quality of participation. We believe that the procedure employed was, in fact, a most integral part of our research work. Kaplan has noted that even when a severely disturbed child can submit to a standardized administration of a test battery he is still nontestable in a larger and more important sense. That is, he is unable to reveal himself or his potentials for maturation and development in a situation standardized for children on different levels of emotional and intellectual organization. She goes on to suggest that the idea behind all testing is to create an environment that permits the child to reveal himself. This diagnostic environment must be thought of as a realm somewhere between the objective and subjective (Kaplan, 1975). By constantly adapting ourselves and the test materials to the sometimes momentary needs of a particular child, we believe that such an atmosphere was created in the administration of the Uzgiris and Hunt scales. It often appeared as if a child who entered the testing room looking rather sullen and removed would begin by cautiously feeling out the environs before making his way to the table where testing would begin. The sense of mastery which all of the children managed to acquire during the course of an administration more often than not showed itself in the smiles and squeals of delight that accompanied each item passed; and it may be considered noteworthy as well that the anticipation of success rather than failure (as is often the case on more formal psychometric

instruments) served as an important motivating influence for these children. The overall efforts to reduce the level of anxiety which is indigenous to test-taking, i.e., the period of familiarization with objects and examiner, the accompaniment of each child's companion to the test room, the flexibility in procedure so that structural competence rather than typical performance be evaluated, were integral to the stated task of the design: to provide the child with an environment of trust and comfort where he could be the creator of an event rather than its creation. The clinical method adapted by Uzgiris and Hunt and adapted by this author provides just such an environment.

While we believe that both the method of administration as well as the choice of test materials were important factors in the successful administration of sensorimotor tasks of development to severely emotionally handicapped children, it is important to note, once again, that these scales were originally designed to assess patterns of development in normal infants, not in psychotic children between the ages of 6 and 8. The limitation or restriction of significant correlations between age and performance on the Uzgiris and Hunt scales to measures of Gestural Imitation and Operational Causality, however, taken together with the frequent inability of the children in this study to reach the top levels of the various constructs, attests to the applicability and utility of primitive tests of cognitive development for psychotic children who one might predict would be concrete operational given their age.

At this juncture, one might question how we can be certain that the eventual failure of some items was reflective of a child's

inability to perform, rather than the result of a relapse into the typical amotivational state characteristic of psychotic children. It is our contention that a child is unlikely to suddenly become disinterested in a task after a pattern of interest and success has been well established. Furthermore, an examination of the raw data clearly indicates that performance did indeed not drop off precipitously, but, instead, diminished rather gradually as each child would often grope in unsuccessful attempts to solve a task before abandoning all efforts at achieving his goal. In fact, many of the children perseveratively continued to apply schemes of behavior which had previously resulted in success, even when they were no longer suited to a particular task. The ready substitution of one object for another, and the very careful appreciation by the examiner of whether a child needed to work alone or with encouragement were important elements in the development of a test environment where a child could be as much of an experimenter as a subject.

Kaplan (1975) has cogently argued that:

Psychodiagnosticians usually test a child for an existing environment--a school, a therapist, a day treatment facility, a hospital. And usually the environment dictates to the diagnostician what it is he wishes to know about the child. . . . Psychodiagnosticians could be defining and refining the environment by their manner of testing the child rather than simply complying with the requests of the environment. If a mode of testing the child elicits his optimal level of performance, this very mode of testing could provide suitably applied suggestions for more suitable environments for children with special needs. . . . Perhaps psychodiagnosticians have been the handmaidens of institutional environments when they might have been the reformers of these institutions. (p. 433)

In adapting the Uzgiris and Hunt Scales of Cognitive Development in Infancy for use with psychotic children, we believe a potentially

important gain in reforming current systems of education and psychotherapy has been achieved. In creating social situations wherein psychotic children may have an opportunity to demonstrate both their cognitive strengths and weaknesses, the scales employed in this study provided the structure not only for the assessment of the disturbed child but for his learning environment as well. The psychotic child's greatest strengths must clearly be utilized in any educational endeavor, and the recognition and appreciation of his difficulties must be considered with equal care and precision as well. As a group, psychotic children are most successful on scales measuring the development of object permanence and the development of means for obtaining desired environmental events. They have a modicum of difficulty on scales assessing sensorimotor causality and object relations in space and experience their greatest difficulty in developing the skills required for both vocal and gestural imitation. This overall pattern of cognitive functioning is suggestive of a number of structural features in the sensorimotor organization of psychotic thought. First, it appears that the more static and consistent the perceptual qualities of the psychotic child's environment tend to be more accessible to the processes of assimilation that lead to the expansion of the cognitive apparatus and subsequently to adaptation and mastery. Second, as objects go through displacements which are increasingly out of the prehension of a child's sensorium, they become more prone to distortion and may elude the coordination of sensorimotor schemes of behavior which had previously resulted in successful solution. Third, as the object of mediation increases in

animation, in fact become animate, and produces continually novel, complex, and often unpredictable actions, the psychotic child may, and often does, seem at a loss. Chaos replaces order, confusion replaces understanding, and mastery gives way to cognitive regression. While Uzgiris and Hunt (1975) have noted that once an infant has achieved higher levels of organization in his actions it becomes very difficult to elicit earlier patterns of behavior, our findings suggest that primitive patterns of behaviors reappear continually and predictably, that is, when the psychotic child is unable to maintain the higher levels of performance achieved through successive accommodations and the subsequent internalization of socially adaptive behaviors. The implications of these findings for the psychotic child's construction and experience of self will be discussed in the next section. That this breakdown or deficit in cognitive functioning (it is difficult to know exactly which) most typically occurs in the exercise of imitation, makes many of the remedial techniques currently in vogue seem curious at best, inadequate and impossible at worst. Social learning techniques, notably modeling through the encouragement of imitation and reward of gradual approximations of desired behaviors, are anathema to the philosophy of our work, as they attempt to remediate the areas of greatest deficit without recourse to the areas of greatest mastery. The absurdity of yelling at a deaf man to make him hear seems no less bizarre than modeling for a child whose capacity to imitate is limited to what he can see himself do. Just as one may "speak" to the deaf by using signs that can be seen, one might foster the psychotic child's imitation by making the invisible visible, the

transitory permanent. Perhaps an example of how one might expand a child's repertoire of imitative behaviors would be appropriate at this juncture.

Upon administration of the Uzgiris and Hunt scales we observe that child #5 (Henry) has attained a Permanence score of 6, a Vocal Imitation score of 3, and a Gestural Imitation score of 2. These gross substage scores may be further refined to specific behaviors along the continua which comprise each scale; and we find that this child can vocalize some sounds upon hearing his own sound patterns and can make gestural responses upon seeing familiar gestures, but can neither make sound patterns which match that of the model nor imitate novel body movements. If we present the child with a mirror wherein he can observe his own actions, unfamiliar gestures soon become familiar, and the prospect of progression (albeit extremely slight) along this series becomes more plausible. In a similar vein, if we break a compound vocal pattern into its parts we tend to improve the quality of a "match" and if we then present these matched sounds of the child through the utilization of recording devices so that the sound he has now made is his very own, the portent of increased vocal imitation seems to hold greater promise. To be sure, none of this guarantees anything; to claim success for what exists at the present time as a potential strategy would be silly, but the precise specification of points of cognitive fixation and the utilization of what the child can already do seem obvious practical extensions of the assessment techniques discussed in this work.

On the other end of the spectrum of treatment programs offered to psychotic children stand psychodynamically oriented therapies which rely primarily on the establishment of a secure and trusting relationship, wherein interpretations may allow the child to feel understood and concomitantly heal the wounds inflicted on the psyche during periods of extreme vulnerability in the early differentiation and integration of the mental apparatus. While this is an obvious oversimplification of a very complex theory of treatment, I believe it captures its spirit and intent. The question which arises almost by necessity asks how children who seem unable to understand and relate to people can derive anything out of a process which relies principally on verbalization. It is not only an obvious question, but a difficult one as well, and explanations which disclaim its effectiveness are certainly more bountiful than those which argue its value. In the next section I will discuss the structural difficulties of treating psychotic children through psychoanalytic techniques; but for my purposes here it should suffice to remind the reader that our results clearly suggested that the sensorimotor period of development in psychotic children lacked the closure required for successful representation of the world and the concomitant development of the symbolic function. To immerse the child in a world of symbols when he lives in a world of actions, often immediate and discontinuous, seems inconsistent with the dictates of conventional logic. To engage the child, however, on a plane of action, taking into account always what he can and cannot do and striving to integrate the various sensorimotor constructs, would contribute to the development of trust

and confidence in a relationship where interpretation and verbal interaction may eventually become the modus operandi of treatment. Again, the Uzgiris and Hunt adaptation for psychotic children developed in this work should prove a useful if not necessary therapeutic adjunct.

A final point to be made in this section concerns the difficulties which are indigenous to the differential diagnosis of severe forms of early childhood psychopathology. Although it is apparent that the DSM-II has little, if any, utility in the diagnosis of psychotic children, the surface clarity of the DSM-III's categorization of Childhood Onset Pervasive Developmental Disorders may be somewhat illusory as well--in its use if not in its intent. The children tested in this study demonstrated no differences whatsoever when regarded as subgroups within the psychotic range. And although it may be argued that our sample size was too small to make any sort of definitive statement about the relative efficacy of diagnostic instruments, the gross overlap in performance on the Uzgiris and Hunt scales among the four DSM-II subgroups speaks strongly for a more generic classification. The DSM-III provides such a category, but in delineating the criteria which are essential to the diagnosis of Pervasive Developmental Disorders one may erroneously conclude that a homogeneous population exists where the real data suggest otherwise. To be sure, all of the children in the DSM-III category shared many of the same features; but just as the four groups subsumed under the new classification demonstrated no significant differences among each other, while differing, as a whole, from the control group (thus attesting to uniformity), no two children demonstrated identical profiles on the

Uzgiris and Hunt measures. At the risk of belaboring the point, we feel that while the DSM-III's classification is a useful adjunct for the location of a child's pathology along the continuum of adaptation, recognizing as well the important patterns of sensorimotor functioning which exist within the group as a whole, the recognition and appreciation of individual differences within the larger group remains essential. As Holt (1968) suggested that all contours lost their sharpness under close inspection, we might do well to regard the psychotic child as just as unique and complex as the rest of us--in essence, as a group of one.

Sensorimotor Organization and Representation:
Implications for Internalization and
the Development of the Self

The relationship of man's subjective experience of reality to a world defined by some objective criteria and consensual validation has long been a subject of interest and controversy among scientists and philosophers. While most would agree that the two realities are somehow related, the quality of their relationship and the mechanisms which might account for their interaction are, at once, elusive and perplexing, mysterious yet seductively obvious. In essence, the question which presents itself asks how the "out there" gets in and becomes part of what we consider the self. This problem in what might be termed internalization has received much attention in the writings of psychoanalysts and is of particular significance in our understanding of psychotic children, whose adaptation to conventional reality is strikingly impaired, and whose sense of self appears to

reflect a fragmented and confused nexus of inner and outer worlds.

In his Outline of Psychoanalysis (1938/1975), Freud differentiated the external and internal worlds of the child, noting that the youngster's objects are initially located in the external world until an important change, at around the age of 5, alters his experience of and relation to reality. He writes: "A portion of the external world has, at least partially, been given up as an object and instead, by means of identification, been taken into the ego and thus becomes an integral part of the internal world. This new psychological agency continues to carry on the functions which have hitherto been performed by the corresponding people in the external world" (p. 205).

Sandler and Rosenblatt (1962) have cogently argued that Freud's distinction of the internal and external worlds of the child is a purely descriptive one which lacks logical clarity and avoids or ignores the obvious fact that much of what is called external is, by the age of 5, already internal as well. Freud's allusion to the taking in of the external, then, clearly does not refer to the primary assimilation of discrete and discernible wholes, but suggests, instead, that some aspect of what was at one time experienced as foreign is now regarded as not only familiar but as part and parcel of the experience of self. Sandler and Rosenblatt (1962) contend that "it is extremely difficult to talk of introjection or identification as simply 'taking in' the parents. The parents must first be perceived in order later to be introjected and in order to be perceived they must have been built up within the representational world as object representations of one sort or another" (p. 132). This taking in and building

up of object representations is the focus of much of Piaget's work on cognitive development in infancy; and given the intent of this section--i.e., to explore the organization of sensorimotor capacities and its relation to representation--a brief review of the infant's early constructions of reality should prove useful.

Within the average expectable environment, the infant's major task during his first 18 months is the construction of a concept of object permanence and all those cognitive structures which support such a concept--causality, alternation, anticipation, time and space, and imitation. At first the infant perceives vague, isolated, yet total gestal patterns. These patterns appear in psychological space over and over again, and the infant, through his actions upon him, gradually comes to an understanding that these patterns, or groups of displacements, are somehow connected. A sense of anticipation develops, as the infant begins to feel comfortable in his environment. He can investigate and experiment within this space, enlarge it through his own actions, appreciate the relationships that occur within it, and eventually come to the grand conclusion that an object continues to exist even though it may disappear from view. The domains of sensorimotor intelligence coalesce and a structure of sensorimotor logic, a coordination of actions, emerges and paves the way for the inception of the internal representation of reality.

Mahler, Pine, & Bergman (1975) have recently summarized the major psychoanalytic criticism of Piaget's work by noting that most of his studies "focus on inanimate, transiently cathected, physical objects" (p. 111). They argue that development vis-à-vis the libidinal

object, the mother, takes place at a substantially different rate, contending that there are at least two major differences between the libidinal object and those objects studied by Piaget: "(1) the child is in continual contact with the libidinal object . . . and (2) these contacts often take place under conditions of high arousal--of longing, frustration, gratification, excitement. The mother, an 'object' in the psychoanalytic sense, that is, something through which drive gratification is achieved, is far more than an 'object' in the merely physical-descriptive sense" (Mahler et al., 1975, p. 111). In a similar vein, Meissner (1979) suggests that:

Perceptual processes can be said to give rise to an inner image of the external object, yet perception or the cognitive apparatus allied to perception cannot be said to be a form of internalization. Similarly, the complex processing that gives rise to the formation of an object representation remains in the cognitive or representational frame of reference and does not yet constitute an internalization. While these processes and their products may be inner in some sense and may constitute some part of the subject's inner world, they have not yet become a part of his functioning self. (p. 1347)

In their respective differentiation of inanimate objects from libidinal ones, and the "representational" world from the "internal" world, Mahler et al. and Meissner have presented powerful arguments against the facile application of theories of developmental cognition to a process as complex as that involved in the construction of the self. But in their recourse to the somewhat mystical (if not archaic) process of cathexis, fusion, and cohesion, they bypass cognitive mechanisms which may, in fact, contribute to a richer and more comprehensive understanding of the internalization indigenous to self-development. Again, Sandler and Rosenblatt (1962) provide a

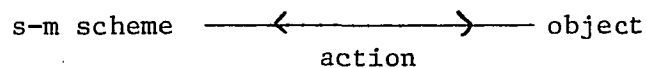
useful entree to integrating the concepts of internalization and representation as they apply to the maturation and integration of phenomena which coalesce as the "self." These authors regard the self-representation as the "organization which represents the person as he has consciously and unconsciously perceived himself, and which forms an integral part of the representational world. This self-organization is a perceptual and conceptual organization [my italics] within the representational world . . . [and] is a product of ego functions" (p. 134).

As noted previously, the various developmental constructs of the sensorimotor period typically coalesce by the end of the second year of life in a "logic of actions" which give rise to symbolic representation and signifies the development of thought as an internal process. Perhaps the most striking finding of this research project concerns the relative independence of the six Uzgiris and Hunt scales designed to assess the six domains of sensorimotor intelligence. The absence of some organizing principle, a developmental glue, so to speak, which binds these disparate constructions, would suggest that the development and elaboration of representational capacities which are characteristic of the preoperational period of development would be adversely affected --perhaps extremely so. To some extent we know this is the case. The clinical literature abounds with tales of psychotic children whose play is rigid and empty, whose language is most often bizarre and uncommunicative, and whose relationships with objects seem more relaxed and developed than those with people. The empirical literature, as well, attests to the pronounced difficulties psychotic children

experience in deriving meaning from their environment, in communicating to others, and in organizing the perceptual inputs of the world around them. It seems clear that the processes of representation available to psychotic children are extremely limited. However, as clarity can obscure reality, our presumed conclusions about the psychotic child's representational world should be held, for the moment, in abeyance. The development of object permanence--regarded as the principal achievement of the sensorimotor period--as well as the development of means to obtain desired environmental events were achieved by nine of our ten psychotic subjects and supports the contention that the psychotic children do, indeed, have some forms of internal representation. In fact, as a group, the children in our study approached the upper levels of scales assessing object relations in space and operational causality as well. When confronted with tasks requiring either vocal or gestural imitation, however, their performance waned dramatically. This pronounced deficit in the capacity to imitate, usually at levels requiring the child to copy movements not immediately visible to him, may be argued to have major implications both for the afflicted child's developing self and the quality of his object relations. The developmental process by which a child can achieve object permanence but not imitate sounds or gestures beyond a certain point is certainly a complex and confusing one. But, given its apparent reality in the life of the psychotic child, I will attempt to elucidate in a schematic way its path and its consequences.

To begin with, we may assume that there exists some sort of relationship or interaction between an infant and the object of his

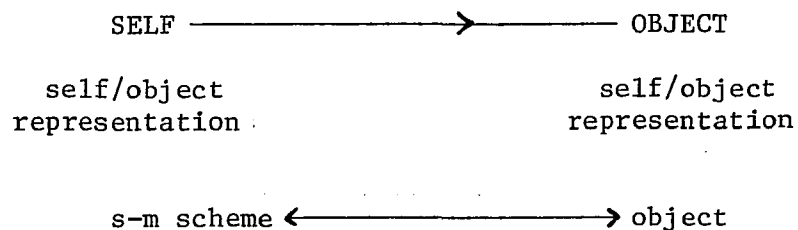
concerns. (This object may be either animate or inanimate, and in reality is not restricted to one or another.) This relationship is initially born out of action and, in fact, it is the action itself which may be said to describe and define both the child's self (as it may be understood at this level) and the objects upon which he acts (Piaget, 1937/1954).



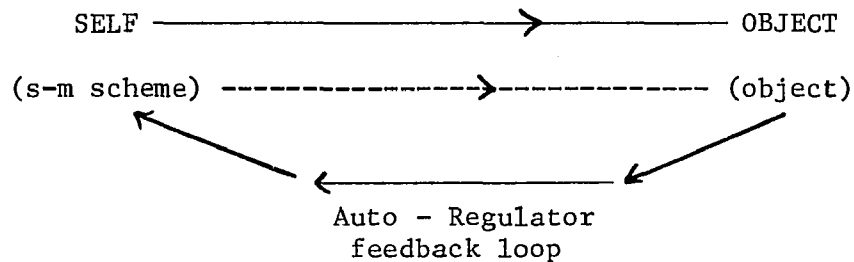
The coordination of sensorimotor actions, which derives in part from the primary apparatus of the ego, may be said to represent the basic core of the child's early self-object representations and when taken together with the affective component intrinsic to all interactions sets the cognitive stage for subsequently differentiated self-representations and object representations.

As Sandler and Rosenblatt (1962) note:

The delineation of discrete self- and object representations in the representational world can only come about gradually, with maturation and experience. We assume that initially the child's representational world contains only the crudest representations of pleasure and unpleasure, of need-satisfying experiences, and activities, and it is only gradually that the infant learns to distinguish self from not-self, and self from object in his representational world. (p. 134)

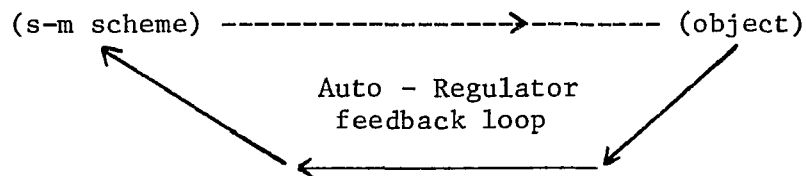
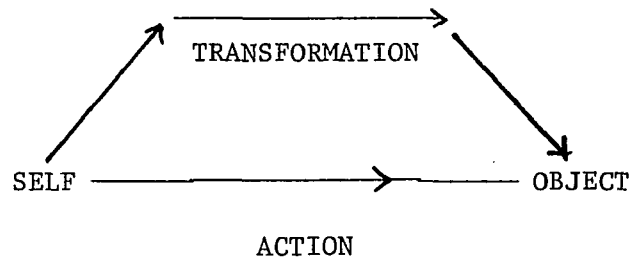


The relationship between the primitive self and the object with which it interacts may be said to consist of a series of actions--the most basic of which is the direct manipulation of the object by the child. In addition, there are a number of feedback mechanisms from the object to the subject which allows information to be assimilated by the child, thus allowing the most primitive confirmations of the perceptual stability of the object itself.

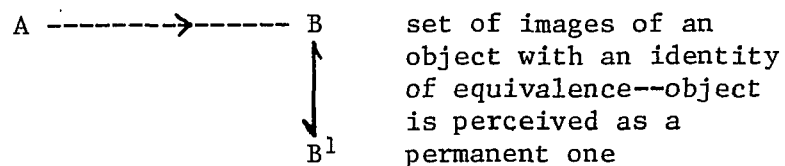


Knowledge of the object which is gathered through the child's direct experience with it may be termed exogenous knowledge. Empirical in nature, it consists of both the material aspects of an object as well as the results of the actions performed upon it--actions which presuppose an assimilative framework which is endogenous in nature. Endogenous knowledge, then, without being innate, is drawn from the internal coordination of actions within an individual. These coordinations, it should be emphasized, are the consequents of internal structurations of the real rather than mere replications of exogenous experience. These coordinations are assimilative in nature and operate according to systems of transformations which allow the system to develop.

Perhaps more simply stated, as the child continues to act on an object, the object is necessarily transformed and given new meaning by the child--meaning which allows the object to be incorporated into a system which is constantly enlarging and becoming more complex as new schemata form and interact.

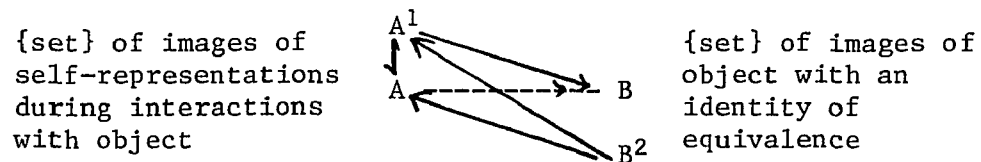


As the child's actions on the object change the manner in which the object may be both perceived and related to (i.e., acted upon) an identity of equivalence must be established as it appears pre- and post-action. This equivalence allows for the progressive construction of the permanent object.

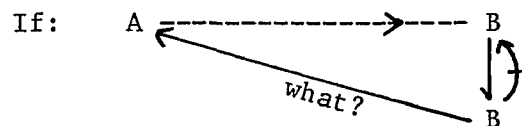


Concordant with the establishment of a set of object images is the development of a similar set of images of self-representations

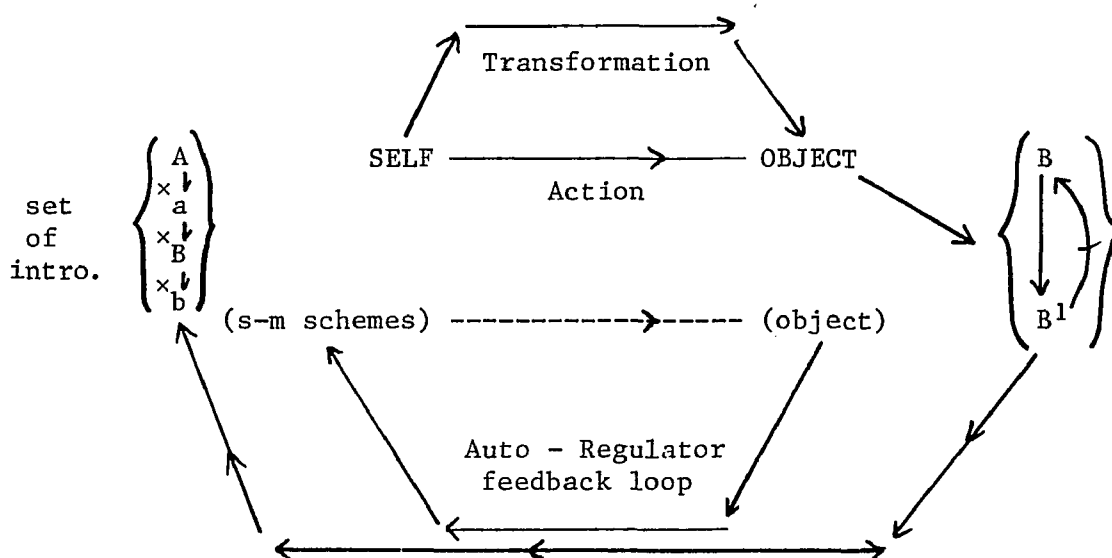
during interactions with the object. In other words, the primitive self becomes defined in terms of its interactions with objects (Kernberg, 1975).



Thus far, I have proposed a model which is based on the significance of interactions between a child and an object. Perhaps the most critical notion entertained thus far concerns the concept of equivalent identities in both object representations and self-representations. Sandler and Rosenblatt (1962), in a related approach, distinguished representations from images, noting that a representation can be considered to have a more or less enduring existence as an organization which is constructed out of a multitude of impressions or images. At this point, two questions of critical significance arise. First: What happens to the set of self-representations if the identity of equivalence among objects, or, more accurately, within the class (or set) of an object, fails to be established? And, second: What sorts of events might preclude such an identity from being established? In other words, if in the course of acting upon an object the object is transformed without establishing a corresponding identity to the object which preceded it, what may we speculate about the nature of the development of the self?



If we accept the premise that the self is composed of or defined in terms of its interactions with objects, it follows that the failure to achieve an identity of equivalence within an object set will result in a set of self-representations of a changing and unstable nature.



As stated previously, the children in this study demonstrated considerable facility in their appreciation of object permanence. It seems reasonable to assume, then, that the set of object images gained equivalence for inanimate objects in a relatively normal fashion. The difficulty our children experienced in imitating novel sounds, or gestures they could not see themselves doing, however, suggests that the acquisition of identities of equivalence for animate or libidinal objects is beset with difficulties that the psychotic child cannot resolve. The logical consequence for the development of a self-representation is thus twofold: (1) the self-representation is comprised primarily of inanimate, perceptually stable objects; and (2) the libidinal representations that are internalized are

inconsistent, discontinuous, and highly unstable. The behavioral manifestations of such a self-structure are manifold and quite obvious to the clinician who works with such disturbed children. The child may appear mechanical, speaking in metallic-like tones, avoiding contact, and seemingly content to play with his limited assortment of toys in a repetitious manner for hours on end. Rituals replace the novel, and transitions portend violent tantrums which are eased not by the caress of an arm but by the terribly slow passage of time itself. My description could easily continue but the point should be clear. Internalization, for the psychotic child, becomes a process of taking in the inanimate, keeping out the dangerously unpredictable libidinal object, and maintaining an armor which protects the child from psychological implosion.

A final point to be made in this discussion concerns the organization of cognitive processes in psychotic children. In normal development, a child goes through four stages of cognition: the sensorimotor period, the preoperational period, the stage of concrete operations, and finally the plateau of formal operations. Each stage has a cognitive task and, in meeting that task, the child achieves a certain integration of divergent processes which culminate in a structure which is characterized by a definite organization and the quality of closure. Each succeeding stage reorganizes the cognitive processes of the preceding stage in such a manner as to ensure the fulfillment of its task--intellectual adaptation. In the pioneering research of Voyat (1980) and Mook (1972), it became apparent that the organization of cognitive competencies in concrete operational

schizophrenic children was qualitatively different from what is typically observed in normal children. Hierarchical invariance in the acquisition of cognitive structures was absent in many of the children who were studied, as evidenced by the simultaneous presence of advanced skills (e.g., conservation of matter) and the absence of more primitive capabilities (e.g., class inclusion). In addition, the coexistence of preoperational and concrete operational modes of thought suggested that the structure of cognition was somehow different in these children; in a sense, they didn't play by the same rules.

One of the goals of this research project was an attempt to uncover and understand some of those rules by studying the earliest levels of cognitive development in psychotic children. As Novikoff (1945) pointed out, however, this is not a task easily accomplished:

Each level of organization possesses unique properties of structure and behavior which, though dependent on the properties of the constituent elements, appear only when these elements are combined in the new system. Knowledge of the laws of the lower level is necessary for a full understanding of the higher level; yet the unique properties of the phenomena at the higher level cannot be predicted, a priori, from the laws of the lower level.
(p. 214)

We believe that this argument is a well taken one. The mechanisms which effect transitions in the organization of cognition are enigmatic enough in normal development. To presuppose that one can predict the structure and form of thought in psychotic children given an understanding of their sensorimotor antecedents seems at the least presumptuous. But in studying these primitive forms of cognition, I believe we have begun, slowly, to understand the grammar of development, a skeleton to be fleshed out as we advance our understanding of

cognition and affect. That task is an arduous one indeed. But as Freud (1920/1975) quotes Ruckert in closing Beyond the Pleasure

Principle:

"What we cannot reach flying, we must reach limping. The Book tells us it is no sin to limp."

Appendix 1

THE EIGHT SCALES OF THE BEHAVIOR RATING INSTRUMENT
FOR AUTISTIC AND OTHER ATYPICAL CHILDREN

ADAPTED FROM: B. A. Rutterberg, B. I. Kalish, C. Wenar, and E. G. Wolf,
Behavior Rating Instrument for Autistic and Other
Atypical Children (BRIAAC)--Scales and Instruction
Manual (Philadelphia: Developmental Center for Autistic
Children, 120 North 48th Street, 1976).

SCALES:

I. Relationship to an Adult	pp. 41-45
II. Communication	pp. 47-49
III. Drive for Mastery	pp. 51-53
IV. Vocalization and Expressive Speech	pp. 54-57
V. Sound and Speech Reception	pp. 59-61
VI. Social Responsiveness	pp. 63-66
VIIa. Body Movement--Passive	pp. 71-76
VIIb. Body Movement--Active	pp. 77-83
VIII. Psychobiological Development	pp. 89-96

BRIAC Scale I: Relationship to an Adult

1. Imperviousness to or obliviousness to people. No apparent awareness of presence or absence of adults (obliviousness). When adult impinges on him, shows no overt response (imperviousness).
e.g. There is a continuous lack of response as the child behaves as if there is no one present. May use part of the person as an object.
2. Withdrawal or intermittent imperviousness.
e.g. When someone comes close, the child stops visual following and becomes totally unresponsive.
3. Resistiveness.
e.g. A continued but less extreme way of warding off a relationship. Two types can be distinguished:
Active: The child turns away, averts his gaze, or looks just past the adult's face rather than through the person. The child does not appear impervious any longer but, through withdrawal of attention or physical avoidance, shows continued awareness of and negative reaction to people
Passive: Passivity with minimal involvement. Responsiveness is shallow and superficial as the child endures the affectionate or friendly behavior of others.

The following levels mark the beginning of initiative on the child's part in making meaningful contact (as opposed to the defensive responses in #3), and the ability to tolerate mutuality or positive approaches from others.

4. The child will attend to a person at a distance of approximately six feet or more, and will sustain eye contact at this distance if it is made. Can tolerate nearness if can back up into a person. However, if the adult persists in making overtures, he becomes aloof and ignores the adult.
5. Brief, sporadic, but recurring attending to an adult at a close range. This may include brief touching and body-surface contact without accompanying eye contact. This behavior usually occurs when the child is hungry, uncomfortable, tired or involved in a task.
6. Regularly recurring responses to a person as a whole.
e.g. For the first time the child sustains close physical proximity and establishes and maintains eye to eye contact. Direct physical exploration of the adult begins at this stage.
7. A consistent searching out and attending to one person for comfort, approval, help, and play. Selectively and specifically rejects others.
8. The child is beginning to anticipate approval and disapproval and can control his behavior accordingly. He is regularly responsive to requests and suggestions from a familiar person.
9. Sharing of experience.
e.g. The child expresses pride in achievement and acquisition to the adult.
10. Empathic behavior and ability to assess an adult's mood.

BRIAC Scale II: Communication

1. No sign of directing any behavior toward or reacting to another person
e.g. The child does not express interest in or awareness of his surroundings even where there is a high level of stimulation.
2. Undirected, indiscriminate manifestations of exertion level and expression of affect, and anxiety, apparently with no audience in mind.
e.g. stereotypic behavior such as whirling or rocking.
3. The quality of seeking relief from distress appears, as do signs of pleasure and contentment.
4. There are subtle signs that the child is directing his request for help or attention toward a specific person or people. Also, first signs of specific avoidance and directed protest.
5. There are regular but simple and limited approaches to others, communicating a request for simple acts of help or attention from the adult, or communication of displeasure and protest to the adult.
6. The child has a clear concept of the needful self and of the person he approaches for help attention, or complaint. However there is still no mutuality.
7. A regular, sustained, refined and varied pattern of approach and rejection appears. A quality of mutuality begins to emerge.
8. The child begins to communicate observations, ideas, associations, and feelings about the present state of himself and the environment
e.g. "Look! I can do", or "I am happy!, unhappy, angry."
9. The child begins to communicate about the past.
10. The child is able to communicate about the future.

BRIAC Scale III: Drive for Mastery

1. Stereotypy. Child tends to repeat the same behaviors in relation to the same stimuli continuously. He is unreactive to new objects and situations.
2. Resistiveness to or avoidance of the presentation of a task or object.
3. Hesitant and/or momentary engaging in exploratory activity; another person must initiate this activity and provide the object or materials.
4. After presentation of the task and/or object by the adult, the child responds with some sustained activity, but with little overt interest. The child is still indifferent and affectless.
5. Child is beginning to initiate and shows purposeful interest in exploration. Responds to easily accessible objects.
6. More varied activity and sustained interest with available objects. Behavior is characterized by coordinated visual and manual exploration.
7. Initiative is shown in a variety of ways. It may be a purposeful and specific resistance to a specific task.
8. Focused, sustained attention; behavior is goal oriented as the child can continue an activity for the appropriate period of time to complete the task.
9. Concept of the achieving self as the child demonstrates (either by production or production with subsequent destruction) that he has accomplished something on his own.
10. Self-monitoring. The child can critically examine what he is doing, change it and improve it. He can put the task aside in favor of something else and return to it later.

BRIAC Scale IV: Vocalization and expressive Speech

1. Generally non-vocal.
2. Guttural explosive or strained sounds may include sudden shrieks, cooing, crying, whimpering or sighing. They may be spontaneous or only exhibited when the child is distressed. There is a beginning of vowel-like sounds similar to "ah" (as in hot), "ah" (as in cat), and "ee" (as in see). Humming, droning, nasalized sounds which are fairly continuous and of monotonous quality are used.
3. Variations in volume and pitch and intonation become apparent. Vowels are now distinct and consonants are beginning to appear, although of poor quality. Babbling and vocal play begin, usually produced when the child is alone or is not responding to a person. May gurgle or laugh.
4. Highly developed, musical babbling intermingled with single-word vocalizations which may include "mamma" and "dada".
5. Echolalia, mirroring of single words and short phrases begins. Echolalia may be greatly delayed and or recurrent. Pitch may be high and quality hollow. Child's voice sounds mechanical; like a robot.
6. Jargon--series of varied sounds with recognizable intonation patterns. Child may sound as if he is speaking a definite language, but it is unintelligible.
7. Spontaneous or cooperative naming of objects or activities important to the child. Words have a definite meaning.
8. Use of ungrammatical two or three word phrases or simple active declarative sentences consisting primarily of class words (words which name things or actions which can be seen, i.e. "eat cake," "Mommy home"). Use of own name in place of first person pronoun.
9. First person pronoun used instead of second person or own name in word groupings.
10. Use of sentences of three or more words. The child has some awareness of word order and at least one word should be other than a noun, or verb which can be visualized.
e.g. "Alan ride home" is Level 8, "Alan goes home" is Level 10.

BRIAAC Scale V: Sound and Speech

1. Complete obliviousness to sound. No overt signs of awareness of noises, voices or music.
2. Reflexive response to sound is followed by withdrawal into unresponsiveness. There is some initial reaction mostly on a fleeting, reflexive level, and then a complete rejection. If there is a sudden noise the child will briefly blink, make a sudden movement, or turn away from sound. Usually, if sound is repeated, the child will be able to ignore it completely. There is no sign that sound is meaningful to the child.
3. Negativism to sound. Active attempt to push away sound or prevent sound from impinging on him. On this level the child does not withdraw by tuning out. Rejection appears to be unselective.
4. Brief and inconsistent reactions indicating awareness of sounds and words from which the child does not attempt to withdraw. A quality of indifference still exists once initial interest is aroused; as the child may appear to listen but will not look toward the source of the sound.
5. Awareness of sounds and words. Responds by cessation of activity. Turns toward the source of the sound, speech or music. Child responds if called. Signs of understanding inhibitions. (Halt in ongoing activity).
6. Discrimination, localization and selectivity of sound and its source. The child attempts to localize and/or repeat sounds. He will selectively listen to some sounds with interest; after initial awareness he will reject other sounds. Shows awareness by attending in some manner. Beginning indication that words are meaningful, but he may not know what meaning is. Child turns toward sound in a searching manner as he picks up cues from context.
7. Understanding of sounds and words in familiar context or with clues such as movement and gesture.
8. Comprehension of commands and words without accompanying gestures or familiar context.
9. Child can understand sentences requiring him to identify objects by use, such as "Show me the one you wear". Follows, or specifically refuses to follow directions. Differentiates a subtle change in a sentence, such as "Put the ball in the box" as opposed to "Put the ball on the box."
10. Language reception appears adequate to life situation of child in a limited environment. The child now follows directions requiring two or more responses, e.g. "Go to the shelf and bring me a puzzle."

BRIAAC Scale VI: Social Responsiveness

1. Obliviousness.
2. Partial awareness of social requirements. This level contains signs of response and more variety of behavior than Level 1, but the flat affect of Level 1 continues. It reflects a higher level of general development more than a real response to social requirements. The behavior takes one or more of these forms:
 - a. Limited (in quality and quantity) and perseverative, stereotyped, inappropriate behavior with a few objects associated with self-help functions.
 - b. Lethargy.
 - c. Dependent Passivity.
3. Idiosyncratic, bizarre, often auto-erotic behavior which only secondarily involves the actual performance of the social function. Specific behaviors are repetitive and apparently ritualistic, but not complex and sophisticated. e.g. Bizarre finger and hand movements and posturing at meals.
4. Earliest sustained response to a social demand. This takes one or more of these forms:
 - a. Indirect and passive resistance and generalized disinclination to adapt to the social environment; especially resistance to people's requests.
 - b. Direct active, generalized resistance. Stubborn insistence on the infantile mode. Persistence in attaining, retaining or resisting an object or activity. Manipulation and persistence are direct, repetitive, and unvaried.
 - c. When confronted with a social demand the child responds with either pseudo-relationship behaviors or mechanical compliance and then returns as quickly as possible to his autistic aloofness or activity.
 - d. The child seems responsive to social requirements only if the person remains present to monitor the child.
5. Beginning of acceptance of social requirement. Superficially mirrors actions of peers and adults. Some awareness and anticipation of schedules, routines, specific requirements and requests, but the child needs to be reminded.
6. The child will now carry out a number of social behaviors on his own. However, persistent demands from the environment may produce resistive behavior, inattention, deliberate, studied helplessness, angry whining, or, in the extreme, withdrawal.
7. A growing repertoire of social behavior. Persistent demands still bring resistance, but testing out is more selective and controlled.
8. A growing attentiveness and interest in social requirements. Will conform. The child is receptive and consciously imitative. Sporadic resistance is present.
9. Cooperation and sustained response to request or direction. Reflects and takes on attitudes of authority figures.

10. Sustained motivation. Social functions/skills are used integratively most of the time in interaction with key people in his environment. By this time lapses in rules or amenities embarrass the child.

BRIAAC Scale VIIa: Body Movement - Passive

1. (a) Body is limp.
 (b) Few movements observed.
 (c) Unaware of body or body parts.
 (d) Lowest exertion level.
 (e) Demonstrates no awareness of environmental movements.
 (f) No visual following.
2. (a) Body is limp, but will exert minimum effort to change position unaided.
 (b) Simple movements of body extremities.
 (c) Low exertion level, but occasional spontaneous locomotion.
 (d) Plasticity.
 (e) Occasional visual following.
3. (a) Body is no longer limp; some beginning interest in own movements.
 (b) Moving body part functions as if unconnected to rest of body.
 (c) Movements show some variation but remain simple.
 (d) Some resistance to touch.
 (e) Imitation is rare. When it does occur, it is usually a delayed response.
 (f) Visual following has a guarded quality, especially if motion comes to close to child's spatial territory.
4. (a) Incipient action indicated in body position and tone.
 (b) Body parts are becoming tools to serve the child's primitive needs. No assertive quality to actions.
 (c) Child can be fleetingly energetic but is still typically sluggish.
 (d) Some 'mirroring' of motions in environment for a brief time.
5. (a) Unsureness in locomotion.
 (b) Simple movements of body parts are used on level of primitive need gratification, with some assertive quality present. Child is aware of parts and what they can do.
 (c) Imitation is gestural.
 (d) Will respond with appropriate action on occasion when verbal request is made.
 (e) Normal exertion level is seen but for short periods of time.
 (f) Limited use of space most of the time.
6. (a) Angular stiff body.
 (b) Can manipulate pegs, cut with scissors, etc. for short periods of time.
 (c) Can sustain low normal level of exertion without reverting to long periods of sluggishness.
 (d) Face shows muscular changes. Attempts to explore reflection in mirror.
 (e) Child will venture away from a limited spatial area on occasion.
7. (a) Body as whole still looks angular and stiff, but movements flow on rare occasions.
 (b) Movements of body are sometimes appropriate to affective states.
 (c) Consistently follows motion in environment visually; will spontaneously participate on occasion.
 (d) Child is exploring and moving in enlarged spatial area.

8. (a) Child's movements suggest he has not yet achieved complete awareness of body as a unit. Movements are no longer stiff and angular.
(b) Child can point to some parts of body when requested to do so.
(c) Bilateral movements are consistently used with skill.
(d) Simple movements are usual; there are occasional complex movements.
(e) Child is aware of his own kinesphere.
9. (a) Child's movement behavior indicates that he has achieved an integrated concept of his own body (e.g. running -- good muscle tone).
(b) Alternating parts of body can work together; e.g. child can jump from one foot to another or climb.
(c) Exertion level is less than normal but not low.
(d) Child varies his movements through imitation.
(e) Actions demonstrate appropriate use of space. Still lacks spontaneity.
10. (a) Most of the time, child uses self in relation to objects and own body parts with skill.
(b) Child has not completely lost his own 'unique' movements, but they can be interrupted.
(c) Low normal exertion level can be maintained when child is invested, especially when there is external encouragement.
(d) Child is aware of the defined spatial area in which he is being observed, as well as his relation to the space.
(e) Child can incorporate fantasy into action.

BRIAC Scale VIIb: Body Movement - Active

1. (a) Body is rigidly held.
 (b) Muscles of arms, legs, and/or torso demonstrate resistance and tension.
 (c) Actions are repetitive movements using same rhythm and spatial pattern.
 (d) High level of exertion.
 (e) No visual following.
 (f) Little or no orientation to space.
2. (a) Body is rigidly held, but movements are erratic.
 (b) Large sections of body such as upper or lower torso are often involved in some repetitive action.
 (c) Movements are of the simple gestural type.
 (d) Exertion level is high.
 (e) Eyes may dart about, but there is no sustained focusing.
3. (a) Part and/or parts of body are rigidly held.
 (b) Tensions shift from one part of the body to another. Constant toe walking.
 (c) Exertion level is usually high, but seems to be used to avoid.
 (d) Occasionally, eyes will follow movement in environment, usually at a distance, with some sustained focusing.
 (e) Face will grimace or show tension with distortion.
 (f) Some awareness of space.
4. (a) Rigidly held body part can relax temporarily.
 (b) Some visual following and effort to mirror briefly, but quality is superficial.
 (c) Some toe-walking, but not constant.
 (d) Eyes will follow movement most of the time.
5. (a) Alternating intervals of rigidity and relaxation can be seen in body as whole.
 (b) Some awareness of own movements.
 (c) A variety of movements can be seen over a period of time.
 (d) Although there is a variety, the movements remain mostly quick and staccato (jerky).
 (e) Occasional toe-walking.
 (f) Child will sometimes cling intensely.
6. (a) Child will sometimes hold part of body rigid and will suddenly go to other extreme of limpness.
 (b) Child can use his movements to tease.
 (c) When child rejects environment, he can be seen engaged in tense repetitive movements.
 (d) Child is aware of own kinesphere.
7. (a) Body as a whole is similar to (6a) with the addition that rigidity or limpness are more appropriate to affective states.
 (b) Parts of the body are used appropriately most of the time.
 (c) Visual following and some change in facial expression.
 (d) Tantrum behavior may lead to loss of control or even self-abuse.
 (e) Compulsive routines can be seen in some children. The child is capable of varied and complex ways of moving. His routines, however, cannot be interrupted without causing extreme distress.
 (f) Imitation is seen for short periods of time.

8.
 - (a) Body as a whole tends to move from joints.
 - (b) Level of exertion remains high but it is possible to guide child in channeling it in a specific direction.
 - (c) Child has a variety of facial expressions but he does not always use them appropriately.
 - (d) Child seems aware of his environment most of the time. He will often demonstrate a body change when a strange person enters his environment.
 - (e) Children with compulsive routines can be diverted on occasion without distress.
 - (f) Child can consciously imitate.
9.
 - (a) Child has achieved a body image.
 - (b) Exertion level is still higher than a normally active four year old.
 - (c) Although child is capable of doing a variety of movement actions, he does not always do them spontaneously in a continuous flow.
 - (d) Occasionally child will revert to perseveration or compulsive routines but is able to "pull himself together" with external support.
10.
 - (a) All characteristics of normal movement are present.
 - (b) Child is aware of his body as a unit as well as of the parts.
 - (c) Can incorporate fantasy into action.
 - (d) Child continues to need some assistance from environment when levels of tension mount.

BRIAAC Scale VIII: Psychobiological Development

1. Infantile Sensory Stage.
 - (a) Undirected rage (objectless).
 - (b) Rhythmic, proprioceptive, and kinesthetic self-stimulation.
 - (c) Cutaneous excitation; seeks tactile, deep pressure and temperature stimulation; may involve any body surface.
 - (d) Perseverative looking, listening, smelling, or manipulation. Frequently focuses on one aspect of the total stimulation pattern.
 - (e) Insensitive or hypersensitive to stimuli; light, sound, or pain.
 - (f) Screaming, grunting and other primitive nonspeech vocalization.
 - (g) Prolonged indifference or failure to feed or swallow voluntarily.
 - (h) Rumination (i.e. ability to regurgitate easily).
 - (i) Perseverative grasping.

2. Oral Mouthing and Sucking Stage.
 - (a) Persistent and extensive indiscriminate mouthing, licking, sucking, blowing and tasting.
 - (b) Perseverative or excessive drinking, mouth stuffing. Frantic, bizarre, or prolonged insistence on limited food types, brands, or consistencies.
 - (c) No interest in gumming or chewing.
 - (d) Easily chokes or gags on food. May have dry heaves or frequent vomiting.

3. Oral Biting Stage.
 - (a) Chews self, others, inanimate objects and substances; grinds teeth.
 - (b) Pica.
 - (c) Biting self or others.
 - (d) Specific refusal to bite or chew anything.
 - (e) Uses tongue, lips and teeth to produce and modulate sounds.

4. Anal Expulsive Stage.
 - (a) Awareness of urge to defecate and relief of tension by discharge of stool develops fully at this level.
 - (b) Pleasure in smearing feces, saliva, food or other materials.
 - (c) Interest in and pleasure in smelling of fecal and similar odors.
 - (d) Movements are gross and often destructive.
 - (e) Explosive tantrums in response to specific frustrations or other observable stimuli.
 - (f) Anal masturbation.
 - (g) Interest specifically in the buttocks area of others without interest in the whole person.

5. Anal Retentive Stage.
 - (a) Retention of stools and bowel distention.
 - (b) Revulsion, anxiety, or even panic about contact with anything messy or out of order or place.
 - (c) General withholding, stubbornness, or resistiveness. Not related to specific activity.
 - (d) Primitive ambivalence; extreme and panicked alternation between opposite wishes or impulses.

6. Stage of Interest in Phallus.
 - (a) Masturbatory activities are not inhibited in presence of other people.
 - (b) Open sexual curiosity and exploration of self and others.
 - (c) Uninhibited exhibition of genitals with excitement. Display of whole self.
 - (d) Excited by and directs genital activity toward the opposite sex.
 - (e) Use of whole body or extremities in projectile-like, intrusive, or enveloping manner.
 - (f) Penis envy in girls. Castration anxiety in boys.
7. Infantile Sensory Traits.
 - (a) Enjoys games, play, expressive movements and social interactions involving proprioceptive, kinesthetic, and tactile stimulation.
 - (b) Explores and uses appropriately objects that provide kinesthetic and tactile stimulation.
 - (c) Emotional reactions easily reflected through skin and deep organs and musculature.
8. Oral Traits.
 - (a) Finicky eater, but less insistent and inflexible than level 2. Preferences may be maintained for long periods of time.
 - (b) Procrastinates at meals or eats voraciously.
 - (c) General attitude of impatient and optimistic expectation.
 - (d) General quality of insatiability; is demanding of other people and their attention.
 - (e) Curiosity in the form of attending, touching, testing, and scanning of environment.
 - (f) Inappropriate lack of curiosity.
 - (g) Fantasy play related to orality.
9. Anal Traits.
 - (a) Aversion for and disgust with fecal and similar smells and consistencies. Interest in other odors.
 - (b) Interest in playing with sand, clay, paints, etc.
 - (c) Possessive collecting and accumulating.
 - (d) Ritualistic; compulsively orderly.
 - (e) Controlling and manipulative of other people.
 - (f) Imposition of power.
 - (g) Selectively stubborn and resistive.
 - (h) Nastiness; torments and teases others.
 - (i) Temper tantrums.
 - (j) Uses musculature in constructive or destructive but controlled manner.
 - (k) Ambivalence.
10. Phallic Traits.
 - (a) Possessive, seductive, or coy with opposite sex.
 - (b) Begins to develop modesty; wants privacy. Shows shame and embarrassment.
 - (c) Challenging toward authority. Assertive, voluble, exhibitionistic; defies danger.
 - (d) Ambition, curiosity exploration. Attempts at mastery.
 - (e) Uneasy with incomplete and broken objects, or people with injuries and deformities.
 - (f) Cringing and other signs or expressions of expectation of punishment.
 - (g) Unfounded, prolonged and intense fears of harm to self or others.

Appendix 2

THE SIX SCALES OF THE UZGIRIS AND HUNT SCALES
OF COGNITIVE DEVELOPMENT IN INFANCY

ADAPTED FROM: I. C. Uzgiris and J. McV. Hunt, Assessment in Infancy: Ordinal Scales of Psychological Development (Chicago: University of Illinois Press, 1975).

SCALES:

- | | | |
|-----|--|-------------|
| 1. | Sequence of Steps in the Development of Visual Pursuit and the Permanence of Objects | pp. 105-107 |
| 2. | Sequence of Steps in the Development of Means for Obtaining Desired Environmental Events | pp. 110-111 |
| 3a. | Sequence of Steps in the Development of Vocal Imitation | p. 114 |
| 3b. | Sequence of Steps in the Development of Gestural Imitation | p. 115 |
| 4. | Sequence of Steps in the Development of Operational Causality | p. 118 |
| 5. | Sequence of Steps in the Construction of Object Relations in Space | pp. 120-121 |
| 6. | Sequence of Steps in the Development of Schemes for Relating to Objects | p. 123 |

Scale 1: Sequence of Steps in the Development of Visual Pursuit and the Permanence of Objects

1. Momentary perceptual construction of an object is implied by a sustained attempt to follow an object visually.
ex. Follows a slowly moving object thru a complete arc of 180° with smooth accommodations.
- 2*2. A momentary organization of central processes to include a perceptually absent object is implied by maintenance of orientation in the direction in which an object was last seen.
ex. Lingers with glance on the point where a slowly moving object disappeared.
- 3*3. Some guidance of behavior by central processes which incorporate perceptually absent objects is implied by reconstruction of a whole object on the basis of a small visible portion of the object.
ex. Searches for a partially hidden object.
4. Guidance of behavior by central processes which differentiate somewhat the organization of actions from the constructions of perceptually absent objects is implied by turning of the glance in the direction from which a perceptually absent object has appeared before.
ex. Returns eyes to starting point when a slowly moving object disappears.
5. Guidance of behavior by central processes which differentiate the constructions of perceptually absent objects from actions previously directed at them is implied by search for a perceptually absent object.
ex. Finds an object hidden under a single screen.
6. Guidance of behavior by more differentiated constructions of objects is implied by correct search for a perceptually absent object in the face of potentially confusing cues.
ex. Finds an object hidden under one of two screens by searching directly under the correct screen.
7. Guidance of behavior by constructions of objects differentiated from their previous spatial locations is implied by correct search for a perceptually absent object in the face of a greater number of potentially confusing cues.
ex. Finds an object hidden under one of three screens by searching directly under the correct screen.
- 4*8. Greater persistence of central processes pertaining to constructions of objects is implied by maintenance of search for a perceptually absent object when a single action does not reveal the object.
ex. Finds an object hidden under a number of superimposed screens.

- 5*9. Further persistence and differentiation of central processes pertaining to constructions of objects is implied by ability to deduce the location of an object from observing the spatial displacement of a container with the object.
- ex. Searches in box top and then under the screen for an object hidden by an invisible displacement under a single screen.
10. Increasing persistence of the constructions of objects is implied by ability to deduce the location of an object from observing the spatial displacement of a container with the object in the face of potentially confusing cues.
- ex. Searches in box top and then directly under the correct screen for an object hidden by an invisible displacement under one of two screens.
11. Persistence of the constructions of objects and guidance of behavior by these differentiated constructions is implied by the ability to deduce the location of an object from observing the spatial displacement of a container with the object to different positions in space.
- ex. Searches in box top and then directly under the correct screen for an object hidden by an invisible displacement under one of two screens alternately.
12. Guidance of behavior by enduring constructions of objects differentiated from their spatial locations is implied by the ability to deduce the location of an object from observing the spatial displacement of a container with the object to a greater number of different positions in space.
- ex. Searches in box top and then directly under one of the three screens.
- 6*13. Even greater persistence of the differentiated constructions of objects is implied by continued guidance of behavior by these constructions in the face of a number of successive displacements of an object within a container, when only the container is seen to be displaced, and the concomitant displacements of the objects have to be inferred.
- ex. Finds an object hidden by a series of successive invisible displacements by searching along the path that the container was observed to take.
14. Persistence of the constructions of objects and their mobility is implied by ability to infer the spatial displacements of the object hidden in a container in reverse of the order in which the displacements were observed.
- ex. Finds an object hidden by a series of successive invisible displacements by searching under the last screen first and then retracing the path of the container.

Scale 2: Sequence of Steps in the Development of Means for Obtaining Desired
Environmental Events

- 2*1. Coordination between two schemes permits a rudimentary differentiation of means and ends as evidenced by commencement of eye-hand coordination leading to visual exploration of the hand.
ex. Hand-watching behavior is observed.
2. Some differentiation of means and ends is implied by immediate repetition of schemes which accidentally produce an interesting result.
ex. Attempts to keep a toy in motion by repeated hand or leg movements.
- 3*3. Greater differentiation of means and ends is implied by singling out of a scheme as means for multiple ends, evidenced by progress in achieving visually directed grasping.
ex. Grasps toy when both hand and toy are in view.
4. Further progress in the use of a scheme as a means for multiple ends is evidenced by attainment of visually directed grasping.
ex. Grasps toy with just toy in view.
5. Some anticipatory differentiation of means and ends is implied by execution of one scheme preparatory to the execution of another.
ex. Quickly drops one or both objects already held in hands before reaching for a third.
6. Some anticipatory adaptation of means (particular actions) to ends is implied by exploitation of perceived relationships between objects for desired ends.
ex. Pulls a support to obtain a toy with or without a demonstration.
- 4*7. Further anticipatory differentiation of means from ends is implied by use of common behavior patterns as means for multiple ends.
ex. Uses some form of locomotion to retrieve a toy needed in play.
- 5*8. Further anticipatory adaptation of means (particular actions) to ends is implied by more discriminate exploitation of relationships between objects.
ex. Resists pulling the support when the object does not rest directly on it.
9. Some anticipatory construction of alternate means for a given end is implied by exploitation of perceived characteristics of a situation in order to obtain an desired object.
ex. Uses a string tied to an object to obtain the object on a horizontal surface with or without demonstration.
10. Further progress in anticipatory construction of means adapted to an end is implied by the use of an extension of an object as means while the object (the end) is not directly in view.
ex. Uses a string tied to an object to obtain it while it is not in the direct line of sight, pulling the string vertically with or without demonstration.

- 6*11. Additional progress in anticipatory construction of means adapted to an end is implied by exploitation of other objects as extensions of one's body.
- ex. Uses a stick to obtain a toy out of reach on a horizontal surface with or without demonstration.
12. Anticipatory coordination of an end and appropriate means is implied by evidence of foresightful behavior in the face of a problem situation.
- ex. In the problem of putting a long necklace into a tall container, foresees the likely fall of the container and adopts a successful approach from the start.
13. Perceptual recognition of hindrances toward an end implies representation of the end, of the means, and of the applicability of specific means.
- ex. Does not attempt to stack a solid ring mixed in among other rings onto a peg.

Scale 3a: Sequence of Steps in the Development of Vocal Imitation

1. Some differentiation of the vocalizing scheme is implied by instances of non-distress vocalization.
ex. Cooing is observed.
- 2*2. Some rudimentary standard for infant's own vocalization is suggested by apparent recognition of 'own' sounds.
ex. Increases mouth movements &/or smiles upon hearing "own" sounds.
3. Further facility in recognition of familiar sounds is implied by matching own vocalizations to the familiar ones just heard.
ex. Vocalized similar sounds upon hearing "own" sounds.
- 3*4. Recognition of familiar sound patterns is implied by vocal response to such sound patterns.
ex. Vocalizes some sounds upon hearing "own" sound patterns (babbling).
- 4*5. Further facility in recognition of familiar sound patterns is implied by matching own vocalizations to the familiar sound pattern just heard.
ex. Vocalizes similar sound patterns upon hearing familiar ones.
- 5*6. Inability to accommodate to a novel sound pattern is implied by vocalization of familiar sound patterns in response to novel ones.
ex. Vocalizes, but not similar sounds, upon hearing novel sounds.
7. Some accommodation to novel sound patterns is implied by approximation of the novel sounds through repeated attempts.
ex. Vocalizes sounds similar to novel ones presented through gradual approximations.
8. Further plasticity of the vocalizing scheme is implied by reproduction of novel sound patterns without overt groping.
ex. Vocalizes novel sound patterns directly.
- 6*9. Greater plasticity of the vocalizing scheme is implied by direct repetition of new words.
ex. Repeats new simple words.

Scale 3b: Sequence of Steps in the Development of Gestural Imitation

- 3*1. Some recognition of a familiar body movement is implied by a selective response to it.
ex. Makes a gestural response upon seeing a familiar gesture.
2. Further facility in recognition of familiar body movements is implied by matching of own movements to the ones presented.
ex. Makes the same gesture upon seeing a familiar gesture.
3. Inability to accommodate to a novel body movement is implied by only partial imitation of such movements.
ex. When shown the gesture of hitting two blocks together, responds by hitting a block on the floor or in the examiner's hand.
- 4*4. Some accommodation to novel body movements is implied by imitation of such movements through gradual approximations.
ex. Imitates the hitting of two blocks together after overt groping.
- 5*5. Further plasticity of motor schemes is implied by immediate imitation of a novel body movement.
ex. Imitates the hitting of two blocks directly.
6. Facility in accommodating to novel body movements which the infant can see himself perform is implied by immediate imitation of such novel movements.
ex. Imitates several novel gestures which he can see himself perform.
7. Inability to accommodate to novel body movements which require representation of own body parts is implied by failure to reproduce "invisible" gestures.
ex. Responds with some movement, but does not succeed in imitating a facial gesture.
- 6*8. Representation of own body parts is implied by imitation of an "invisible" gesture.
ex. Imitates at least one facial gesture.
9. Increased facility in accommodating to novel body movements and in representation of own body parts is implied by ready imitation of "invisible" gestures.
ex. Imitates more than one facial gesture.

Scale 4: Sequence of Steps in the Development of Operational Causality

- 2*1. Momentary control over a source of input is made possible by coordination between two schemes.
 ex. Hand-watching behavior is observed.
2. More definite control over a source of input is made possible by immediate repetition of efficacious actions.
 ex. Immediate repetition of an action resulting in an interesting input is observed.
- 3*3. Generalization of efficacious actions is implied by evidence of a "procedure".
 ex. Cessation of an interesting spectacle evokes a procedure.
- 4*4. Some appreciation of centers of causality outside the self is implied by direct action on such centers.
 ex. Touches the examiner's hand after demonstration of hitting two blocks.
 Touches the examiner's hand and/or container after a demonstration of shaking an object in a container.
 Touches the examiner's hand or the toy after a demonstration of spinning it.
- 5*5. Further appreciation of centers of causality outside the self is implied by substitution of request for direct action on another person.
 ex. Hands the toy back to the examiner after a demonstration of spinning it.
 or
 Hands a mechanical toy to a person to be started again after it stops.
- 6*6. Further objectification of causality is implied by behavioral recognition of direct ways for activating objects.
 ex. Attempts to activate a mechanical toy himself after a demonstration.
7. Greater objectification of causality is implied by spontaneous behavioral construction of direct ways for activating objects.
 ex. Attempts to activate the mechanical toy himself directly.

Scale 5: Sequence of Steps in the Construction of Object Relations in Space

- 2*1. Some accommodation to two loci of input is implied by successive shifting of the glance between two objects.
 ex. Alternates glance slowly between two visual targets.
2. Some anticipation of two loci of input in space is implied by rapid alternation between two targets.
 ex. Alternates glance between two visual targets repeatedly and rapidly.
- 3*3. Further construction of loci of input in surrounding space is implied by correct localization of perceived inputs.
 ex. Localizes source of sound correctly.
4. Further accommodation to distances in surrounding space is implied by accurate approach to near objects.
 ex. Grasps an object directly when within reach.
5. Construction of the movements of objects in surrounding space is implied by following rapidly moving objects.
 ex. Reconstructs the trajectory of a falling object and directs the eyes to about where it must have come to rest.
6. Further construction of the movement of objects in surrounding space is implied by localization of rapidly moving objects even when portions of their trajectories are obstructed from view.
 ex. Leans forward to search for a dropped object in the direction in which it fell.
- 4*7. More complete construction of three dimensional objects is implied by appreciation of their rotation in space.
 ex. Recognizes the reversal of an object.
- 5*8. Construction of some interrelationships between objects in space is implied by behavioral utilization of these relationships.
 ex. Uses one object as a container for another.
9. Further construction of the interrelationships between objects in space is implied by behavioral anticipation of natural forces acting on objects.
 ex. Builds a tower by placing one block in equilibrium over another.
10. Further construction of the surrounding space is implied by behavioral anticipation of the effects of natural forces acting on it.
 ex. Uses a string as an extension of an object vertically, compensating for gravity.
- 6*11. Representation of familiar space is implied by memory of the usual location of objects or persons in it.
 ex. Indicates knowledge of usual whereabouts of familiar persons and recognizes their current absence.

Scale 6: Sequence of Steps in the Development of Schemes for Relating to Objects

1. Incidental use of objects in the exercise of a scheme.
ex. Mouthing.
2. Appearance of a momentary attention to the object involved in the exercise of a scheme.
ex. Visual inspection.
3. Systematic use of objects in the exercise of schemes.
ex. Hitting.
4. Beginning of differentiation of schemes as a result of interaction with different objects.
ex. Shaking.
5. Shift of attention from the exercise of schemes to investigation of the properties of objects.
ex. Examining.
6. Selective application of schemes depending on the properties of objects.
ex. Differentiation of schemes.
7. Acquisition of new schemes as a result of studying various properties of objects.
ex. Dropping and throwing.
8. Beginning of appreciation of the social uses of objects.
ex. Socially instigated behaviors.
9. Beginning of the representation of objects is implied by reference to them in a shared interaction.
ex. Showing.
10. Representation of objects in a symbolic system is indicated by verbal expressions of recognition.
ex. Naming.

Appendix 3

SCORING FORMS FOR THE UZGIRIS AND HUNT SCALES
OF COGNITIVE DEVELOPMENT IN INFANCY

ADAPTED FROM: I. C. Uzgiris and J. McV. Hunt, Assessment in Infancy:
Ordinal Scales of Psychological Development (Chicago:
University of Illinois Press, 1975), pp. 206-220.

SCALE I: THE DEVELOPMENT OF VISUAL PURSUIT AND THE PERMANENCE OF OBJECTS

Name: _____ Examiner: _____
 Birthdate: _____
 Date of Examination: _____

<u>Situation</u>	<u>Presentation</u>					
	1	2	3	4	5	6
1. Following a Slowly Moving Object thru a 180° Arc:						
a. Does not follow object						
b. Follows jerkily thru part of arc						
c. Follows smoothly thru part of arc						
d. Follows object smoothly thru complete arc						
Other:						
2. Noticing the Disappearance of a Slowly Moving Object:						
a. Does not follow to pt. of disappearance						
b. Loses interest as soon as object disappears						
c. Lingers with glance on pt. of disappearance						
d. Returns glance to starting point after several pres.						
e. Searches around pt. of dis.						
Other:						
3. Finding an Object Which is Partially Covered:						
a. Loses Interest						
b. Reacts to the loss, but doesn't obtain object						
c. Obtains the Object						
4. Finding an Object Which is Completely Covered:						
a. Loses interest						
b. Reacts to the loss, but doesn't obtain obj.						
c. Pulls screen, but not enough to obtain object						
d. Pulls screen off and obtains object						

SCALE I (cont.):

<u>Situation</u>	<u>Presentation</u>					
	1	2	3	4	5	6
5. Finding an Object Completely Covered in Two Places:						
a. Loses interest						
b. Searches for object where it was previously found						
c. Searches for object where it is last hidden						
6. Finding an Object Completely Covered in Three Places:						
a. Loses interest						
b. Searches haphazardly under some or all screens						
c. Searches directly under correct screen						
Other:						
7. Finding an Object After Successive Visible Displacements:						
a. Does not follow successive hidings						
b. Searches only under the first screen						
c. Searches under screen where obj. was prev. found						
d. Searches haphazardly under all screens						
e. Searches in order of hiding						
f. Searches directly under the last screen in path						
Other:						
8. Finding an Object Under Three Superimposed Screens:						
a. Loses interest						
b. Lifts one or two screens, but fails to find object						
c. Removes all screens and obtains object						
Other:						

SCALE I (cont.):

<u>Situation</u>	<u>Presentation</u>					
	1	2	3	4	5	6
9. Finding an Object Following One Invisible Displacement:						
a. Loses interest						
b. Reacts to loss, does not search						
c. Searches only in box						
d. Checks the box and searches under the screen						
e. Searches under the screen directly						
10. Finding an Object Following One Invisible Displacement with Two Screens:						
a. Loses interest						
b. Searches haphazardly under screens						
c. Searches directly under correct screen						
Other:						
11. Finding an Object Following a Series of Invisible Displacements:						
a. Searches only in E's hand						
b. Searches only under the first one or two screens in the path						
c. Searches under all screens in the path in the order of hiding						
d. Searches directly under the last screen in the path						
Other:						
12. Finding Object Following a Series of Invisible Displacements By Searching in Reverse Order of Hiding:						
a. Searches only under the last screen						
b. Searches haphazardly under all screens						
c. Searches systematically from the last screen back to the first						
Other:						

SCALE II: THE DEVELOPMENT OF MEANS FOR OBTAINING DESIRED ENVIRONMENTAL
EVENTS

Name: _____ Examiner: _____
 Birthdate: _____
 Date of Examination: _____

<u>Situation</u>	<u>Presentation</u>					
	1	2	3	4	5	6
1. Achievement of Visually Directed Grasping:						
a. Reaches for but does not grasp object						
b. Grasps object when both hand and object are in view						
c. Grasps object by bringing hand up to object						
d. Grasps object by shaping hand in anticipation of contact with object						
2. Repetition of Actions Producing an Interesting Spectacle:						
a. Shows interest						
b. Intensifies arm movements and activates occasionally						
c. Repeats arm movements systematically and keeps toy active consistently						
d. Only tries to grasp object						
3. Letting Go of an Object in Order to Reach for Another:						
a. Reaches for third object while holding the others						
b. Reaches for third object with filled hands and drops one in the process of reaching						
c. Drops one of the objects prior to reaching for third						
4. Use of Locomotion As Means:						
a. No attempt to retrieve object, continues play						
b. Indicates desire for object, but does not try to retrieve						
c. Moves to regain the object and resumes play using it						

SCALE II (cont.):

<u>Situation</u>	<u>Presentation</u>					
	1	2	3	4	5	6
5. Use of String Horizontally:						
a. Reaches for object, ignoring the string						
b. Manipulates the string, but does not pull it enough to get the object						
c. Pulls string and gets object after demonstration						
d. Pulls string and gets object without demonstration						
6. Use of String Vertically:						
a. Indicates desire for object, ignoring the string						
b. Drops string to the floor and becomes unhappy						
c. Plays with the string itself						
d. Pulls the string, but not sufficiently to get the object						
e. Pulls string and obtains object after demonstration						
f. Pulls string and obtains object without demonstration						
7. Foresight in the Problem of the Necklace and the Container:						
a. Does not try to put necklace into the container						
b. Attempts to put necklace in, but fails repeatedly						
c. Succeeds in putting necklace in after several unsuccessful attempts						
d. Invents a method which is successful after a failure						
e. Adopts a method which is successful from the first						
8. Foresight in the Problem of the Solid Ring:						
a. Does not stack rings						
b. Uses force in trying to stack solid ring repeatedly						
c. Attempts to stack solid ring once and avoids it subseq.						
d. Sets aside the solid ring without attempting to stack						

SCALE III a: THE DEVELOPMENT OF VOCAL IMITATION

Name: _____ Examiner: _____
 Birthdate: _____
 Date of Examination: _____

<u>Situation</u>	<u>Presentation</u>					
	1	2	3	4	5	6
1. Use of Vocalization Other than Crying:						
a. Only vocalizes distress sounds						
b. Vocalizes when not distressed						
2. Response to Familiar Vocalizations:						
a. Shows no interest						
b. Listens, does not vocalize himself						
c. Positive Response to infantile sounds						
d. Vocalizes in response to E's infantlike sounds						
e. Vocalizes similar sounds, but does not shift to match E						
f. Vocalizes similar sounds and shifts to match E						
Other:						
3. Response to Familiar Sound Patterns:						
a. Shows no interest						
b. Listens, does not vocalize himself						
c. Positive response to familiar sound patterns						
d. Vocalizes in response						
e. Vocalizes similar sounds in response, but does not shift to match E						
f. Vocalizes similar sound patterns and shifts to match E						
Other:						
4. Imitation of Familiar Words:						
a. Listens, does not vocalize						
b. Vocalizes, but sounds fail to match model's						
c. Imitates familiar words						
Other:						

SCALE IIIa (cont.):

<u>Situation</u>	<u>Presentation</u>					
	1	2	3	4	5	6

5. Imitation of New Words:

- a. Listens, does not vocalize _____
 - b. Vocalizes, but not similar sounds _____
 - c. Imitates by gradual approx. _____
 - d. Imitates a few words immed. _____
 - e. Imitates most simple words immediately _____
- Other: _____

SCALE III b: THE DEVELOPMENT OF GESTURAL IMITATION

Name: _____ Examiner: _____
 Birthdate: _____
 Date of Examination: _____

<u>Situation</u>	<u>Presentation</u>					
	1	2	3	4	5	6
1. Imitation of Complex Actions Composed of Familiar Schemes:						
a. Attends, but makes no attempt to imitate						
b. Performs some action consistently, but does not imitate						
c. Attempts to imitate, but does not approximate on successive attempts						
d. Imitates by gradual approximation						
e. Imitates model immediately						
Other: _____						
2. Imitation of Unfamiliar Gestures Visible to the Infant:						
a. Shows interest, but no attempt to imitate						
b. Performs some action consistently, but does not imitate						
c. Imitates by gradual approximation						
d. Imitates immediately						
Other: _____						
3. Imitation of Unfamiliar Gestures Invisible to the Infant:						
a. Shows interest, but no attempt to imitate						
b. Performs some action consistently, but does not imitate						
c. Imitates by gradual approximation						
d. Imitates at least one invisible gesture immediately						
e. Imitates most invisible gestures immediately						
Other: _____						

SCALE IV: THE DEVELOPMENT OF OPERATIONAL CAUSALITY

Name: _____ Examiner: _____
 Birthdate: _____
 Date of Examination: _____

<u>Situation</u>	<u>Presentation</u>					
	1	2	3	4	5	6
1. Repetition of Actions Producing an Interesting Spectacle:						
a. Shows interest in object						
b. Intensifies arm movements and activates occasionally						
c. Repeats arm movements systematically and keeps object active consistently						
d. Only tries to grasp object						
2. Use of Specific Action as "Procedure":						
a. Shows interest only during spectacle						
b. Shows excitement, but no dominant act during pauses						
c. A dominant act during pauses suggests a "procedure"						
d. Reaches for object only						
Other:						
3. Behavior in a Familiar Game Situation:						
a. Shows no interest						
b. Remains passive during pauses						
c. A dominant act during pauses suggests a "procedure"						
d. Performs part of the act during pauses						
e. Touches E and waits during pauses						
Other:						
4. Behavior to a Spectacle Created By an Agent:						
a. Shows interest only during spectacle						

SCALE IV (cont.):

<u>Situation</u>	<u>Presentation</u>					
	1	2	3	4	5	6
b. Shows excitement, but no dominant act during pauses						
c. A dominant act during pauses suggests a "procedure"						
d. Touches E and waits during pauses						
e. Attempts to imitate E						
Other:						
5. Behavior to a Spectacle Created By an Agent Acting on an Object:						
a. Shows interest only during spectacle						
b. A dominant act during pauses suggests a procedure						
c. Touches E or object and waits						
d. Gives object back to E						
e. Attempts to activate object						
6. Behavior to a Spectacle Created By a Mechanical Agent:						
a. Plays with object only						
b. Makes object perform its activity manually						
c. Touches E or object and waits						
d. Gives object back to E						
e. Attempts to activate object mechanically after demonstration						
f. Attempts to discover a way to activate object mechanically before demonstration						

SCALE V: THE CONSTRUCTION OF OBJECT RELATIONS IN SPACE

Name: _____ Examiner: _____
 Birthdate: _____
 Date of Examination: _____

<u>Situation</u>	<u>Presentation</u>					
	1	2	3	4	5	6
1. Grasping a Visually Presented Object:						
a. Moves arms in the direction of object, but does not touch it						
b. Clasps arms in front of obj.						
c. Touches object, but fails to grasp it						
d. Grasps object						
2. Following the Trajectory of a Rapidly Moving Object:						
a. Does not follow object, continues to look at E's hand						
b. Follows some, but does not locate object						
c. Follows object and locates it visually only when it lands in view						
d. Searches with eyes for the obj. when it lands out of view, but does not lean						
e. Leans to search for the obj. in the direction where it must have landed						
3. Recognizing the Reverse Side of Objects:						
a. Grasps object with no sign of appreciation of reversal						
b. Withdraws hands and appears surprised at reversal						
c. Grasps object, but turns it around immediately; or by comparing both sides indicates appreciation of reversal						

SCALE V (cont.):

<u>Situation</u>	<u>Presentation</u>					
	1	2	3	4	5	6
4. Using the Relationship of the Container and the Contained:						
a. Does not put objects in; only touches those inside						
b. Takes objects out, does not put any in						
c. Puts objects in and takes them out one by one						
d. Puts or drops objects in reverses container to get them out						
5. Placing Objects in Equilibrium One Upon Another:						
a. Does not try to build tower						
b. Approximates two objects, but does not leave the second on the first						
c. Builds a tower of at least two objects						
6. Appreciating Gravity in Play With Objects:						
a. Does not attempt action						
b. Acts without showing appreciation of gravity						
c. Acts with appreciation of the force of gravity						
7. Exploring Fall of Dropped Objects:						
a. Does not systematically drop objects						
b. Drops several objects repeatedly and does not look where they land						
c. Drops several objects repeatedly and looks to see where they land						

SCALE V (cont.):

<u>Situation</u>	<u>Presentation</u>					
	1	2	3	4	5	6
8. Making Detours:						
a. Loses interest in objects						
b. Attempts to reach for the object using the same path as the object						
c. Goes directly around the barrier, thus making a detour						
9. Indicating Absence of Familiar Persons:						
a. Does not comprehend question						
b. Goes to the usual location of the person						
c. Indicates knowledge of presence by gesture or word						

SCALE VI: THE DEVELOPMENT OF SCHEMES FOR RELATING TO OBJECTS

Name: _____ Examiner: _____
 Birthdate: _____
 Date of Examination: _____

<u>Schemes Shown</u>	<u>Objects Presented</u>
a. Holding	_____
b. Mouthing	_____
c. Visual Inspection	_____
d. Simple Motor Schemes:	
1. Hits or pats with hand	_____
2. Hits surface with object	_____
3. Hits two together	_____
4. Shakes	_____
5. Waves	_____
Other:	_____
e. Examining	_____
f. Complex Motor Schemes:	
1. Slides	_____
2. Crumples	_____
3. Swings	_____
4. Tears or stretches	_____
5. Rubs or pats	_____
Other:	_____
g. "Letting go" Actions:	
1. Drops	_____
2. Throws	_____
Other:	_____
h. Socially Instigated Actions:	
1. Drinks	_____
2. Wears	_____
3. Drives	_____
4. Builds	_____
5. Hugs	_____
6. Dresses	_____
7. Sniffs	_____
8. Making "walk"	_____
Other:	_____

SCALE VI (cont.):

<u>Schemes Shown</u>	<u>Objects Presented</u>
i. Showing	<hr/>
j. Naming	<hr/>

Describe the manner in which the child used objects during the course of testing:

Appendix 4

LIST OF MENTAL HEALTH AGENCIES CONSULTED

I. New York:

A. In-Patient Services:

- 1) Bronx Children's Psychiatric Center
1000 Waters Place
Bronx, N.Y. 10461
E. Richard Feinberg, M.D. --Director
- 2) New York State Psychiatric Institute
722 West 168th St.
New York, N.Y. 10032
Edward Sachar, M.D. --Director
- 3) Queens Children's Psychiatric Center
74-03 Commonwealth Blvd.
Bellerose, Queens 11426
Gloria Faretra, M.D. --Director

B. Out-Patient Services:

- 1) Jewish Board of Guardians
Child Development Center
120 West 57 St.
New York, N.Y. 10019
Peter Neubauer, M.D. --Director
- 2) Kennedy Child Study Center
151 East 67 St.
New York, N.Y. 10021
Mary T. Piana, M.D. --Director
- 3) New York Hospital
Payne Whitney Psychiatric Clinic
525 East 68 St.
New York, N.Y. 10021
Theodore Shapiro, M.D. --Director
- 4) St. Lukes Hospital Center
Therapeutic Nursery School
West 114 St. and Amsterdam Ave.
New York, N.Y. 10025
Clarice Kestenbaum --Director

C. Residential and Day Treatment Centers for Children:

- 1) Astor Home for Children
36 Mill St.
Rhinebeck N.Y. 12572
Sister Sheila O'Friel --Executive Director

- 2) Blueberry Treatment Centers
16 Court St.
Brooklyn, N.Y. 11241
Mira Rothenberg --Clinical Director
- 3) Bronx Developmental Services
c/o Rose Kennedy Center 141
1410 Pelham Pkwy. South
Bronx, N.Y. 10461
Herbert J. Cohen --Director
- 4) Henry Ittleson Center for Child Research
5050 Iselin Ave.
Bronx, N.Y. 10471
William Goldfarb --Director
- 5) League School
567 Kingston Ave.
Brooklyn, N.Y. 11203
Harold Coopchick --Director
- 6) Lifeline Center for Child Development, Inc.
84-74 169 St.
Jamaica, Queens 11432
Ethel S. Wyner --Director
- 7) Manhattan School for Seriously Disturbed Children
12 West 12 St.
New York, N.Y. 10011
Audrey E. Stanley --Executive Director
- 8) New York Medical College
Pre-School Unit
Flower and Fifth Ave. Hospitals
Fifth Ave. and 105-106 St.
New York, N.Y. 10029
Katherine F. Woodward --Director

II. Philadelphia:

- 1) The Developmental Center for Autistic Children
120 North 48 St.
Phil., Pa. 19139
Bertram Ruttenberg, M.D.--Director

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