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AFFECT AND COGNITION IN CHILDHOOD PSYCHOSIS AND THEIR RELATION TO THE CONSTRUCTION OF REALITY: A CONVERGENCE THEORY

by

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ABSTRACT

Affect and cognition in childhood psychosis and their relation to the construction of reality: a convergence theory

by

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A convergence theory of development is presented in which neurological maturation and psychodynamic phases as described by object relations and psychoanalytic theorists lead to structural transformations in cognition observed by Piaget. Three major periods in childhood are defined and discussed: a unicosmic period, or age of unity; a dicosmic period, or age of differences; and a tricosmic period, or age of interaction. Reality, as a social and logical construct, in normal development depends on the resolution of psychodynamic and cognitive conflicts which are specific to each period. Piagetian tasks of one-to-one correspondence and class inclusion were presented to eleven psychotic children with self-selected, emotionally evocative materials. The research affirmed the importance of the psychological meanings of materials in this population for achieving the tasks. A statistically significant correlation was found between ability to answer simple reality questions and the achievement of one-to-one correspondence. Two children achieved class inclusion without the hierarchically predicted prior ability to perform one-to-one correspondence. Their performance was discussed in terms of neurological

difficulty transcending the perceptual set in one-to-one correspondence as well as unicosmic psychodynamic status which was seen as facilitating a unifying task. The convergence theory was supported by the research presented and further research suggested which would clarify relationships among the three domains.

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to Mead, who believed,
and to my children, who never doubted.

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CHAPTER I

REVIEW OF THE LITERATURE

Introduction

Reality is a disconcerting word. On some level we acknowledge two sorts of reality--that which is social, consensual, and follows logical laws, and that which is private and idiosyncratic but no less real. This personal reality is symbolic and often confusing--as in dreams and free association--and affects behavior in perplexing ways. We are taken aback by an act or utterance which seems nonsensical or inspired or bizarre and wonder where in ourselves it came from. It seems to rise from a part of ourselves that does not fit with the social, logical self and we are mystified. Yet some part of our being may also feel, as Eliot has said,

> Perhaps the dream was better. It seemed the real reality.
> And if this is reality, it is very like a dream.
> (Eliot, 1950, p. 62)

The need to understand the relationship between these two realities and their mutual structuring of each other in childhood led, at least in part, to the research on which this dissertation is based. Perhaps events in the lives of two children will better illustrate the point.

The first concerns a little girl who, at the age of two, went on a picnic with her family. She and her brothers, mother, and grandparents went off in grandfather's convertible. In the parking lot of the picnic grounds, grandfather raised the top of the convertible while the family was still in the car. The little girl began to sob in terror which only abated after she was held by her mother for half an hour. Later the same afternoon, a park truck drove across the lawn where the family was picnicking. Again the child began to cry inconsolably. She was just learning to stay out of the street so as not to be hit by cars and her fear of the truck seemed related to its violation of the rules she was learning. For the next two months the child was unable to fall asleep at night unless her mother sat with her, sometimes for an hour or two. She woke frequently during the night, crying. Eventually the night terrors faded, but she hid in a closet every time her grandmother came to visit with the convertible top down. She also hid in a closet when the top was raised or lowered. She looked forward to grandmother's visits, however, and was willing to ride in the car. Sometime later in life, when she was just past six, her brothers told her in gory detail about a movie they had seen which was all about guillotines. She developed an intense fear of guillotines, dreamt about them and again was afraid of convertibles. The dreams and fears persisted for about a year. At the onset of puberty, several traumatic events occurred

within a year including her younger brother's near death in a fire, parents' separation, and grandmother's death of cancer. At this time she had a terrifying, haunting dream in which she and grandmother were being carried off in a truck to be killed while she was helpless to do anything about it.

After several stormy, turbulent years, this girl made a satisfactory adjustment, although with much more than average difficulty. What is of interest here is the constancy of symbolism connecting grandmother, the car, and death in each period, although it is clear that cognitive and psychodynamic development reshape and elaborate the core trauma in increasingly socialized and advanced ways. The level of symbolic projection implicit in the guillotine suggests Oedipal period castration fantasies while the adolescent fear is interpersonal as well as intrapsychic. There are, of course, many interpretations which cannot be made out of context. It is important that each severe disruption occurred during a transitional period in both psychodynamic and cognitive development. The first trauma at the transition from sensorimotor to preoperational thought and during the separation-individuation period reappears, elaborated, at the end of the Oedipal period and during the rise of concrete operations. Real and overwhelming tragedy at the beginning of the formal operations period and adolescent psychodynamic upheaval is assimilated into pre-existing schemas and in some ways seems to clarify the essence of the original trauma.

The second story concerns a child tested on Piagetian tasks in a mental hospital. This child, like the first, was exceptionally bright. At the age of eight he had been hospitalized with a diagnosis of childhood psychosis for several years. Early history included the breaking and resetting of malformed legs at age two. At a time when he would ordinarily have been mobile and reaching the end of the separation-individuation period, he was immobilized in a cast for several months. He developed severe separation anxiety during his hospitalization. When he went to school he was a severely disruptive child. He began to make suicidal gestures which, along with other dangerous behavior, led to psychiatric hospitalization.

When first seen, the boy seemed alert, well adjusted, and an unlikely patient. During testing, however, a curious pattern emerged. On Piagetian tasks which were highly logical and impersonal, he performed at a transitional, formal level--about four years before he could be predicted to do so. The more animate or personal the material became, the less able he was to perform. For example, when presented with a task normally achieved at age five or six (one-to-one correspondence), he did well when the materials were small, humorous camels and kangaroos. When the camels were paired with scale model gorillas, his justifications became egocentric: from "they're the same because you didn't add any or take any away" to "they're

the same because I'm always right." When the gorillas were paired with humorous wooden cut-outs of mothers, he clearly regressed to a preoperational level of thought and could not do the task. He left the room in a panic, refused any attempts to reassure him and finally complained to a nurse that he was being followed. Ultimately, he refused to return for further experimentation and became part of a group of boys who did all they could to disrupt the testing of other children. We were never able to establish what gorillas meant to him, although his response to a Rorschach card which often evokes feelings about male authority was "a gorilla with elephant ears."

Here again, inner symbolic reality was overwhelmingly real and disrupted the organization of a highly logical and advanced cognitive structuration to such a degree that it was no longer functional. The dissolution of ego boundaries between the inner and external real permitted inner sumbolic reality to invest a small, scale model gorilla with fantasied power and malevolence such that it interfered with observable behavior in a cognitive task. The importance of this disintegration, from a Piagetian point of view, is that it has been assumed that transformations in the structure of thought are always available once achieved. In normal children, a "logic of necessity" is observed once concrete operations are achieved and the child knows that apparent perceptual changes do not affect the under-

lying abstraction. Here, the organization of structure of thought processes was sufficiently disturbed by severe disequilibrium that the assimilated meanings of "gorillas" overwhelmed an advanced structural organization which had previously been seen to exist. In psychoanalytic terms, the dissolution of ego defenses under the impact of highly evocative material led to an observable teleological regression as described by Arieti (1974) within the space of an hour. The highly abstract, dissociative distancing device that logic and impersonality create for this child seem not to permit him to resolve intrapsychic conflicts or dialectic but rather to maintain them at a primitive level in isolation from intellect.

In both instances cited, tantalizing questions are raised. Both children in question are of superior intelligence as measured by traditional intelligence tests. They are of middle class families with father substantially older than mother. Both experienced traumatization at a critical period in early childhood which clearly affected later development. One became psychotic, one did not. The question, then, is whether the absolute nature of the trauma was critical, as one might expect with the boy, or whether its occurrence at a particularly vulnerable moment in development was more crucial. Although both were two years old, perhaps the little girl's more mature neurological development (Knobloch and Passamanick, 1976) gave her an edge,

but that does not explain why overwhelming life trauma at another critical period led to severe personality disorganization for several years but not to psychosis. The earlier intrapsychic traumatization is clear in her later symbolic elaboration yet she was ultimately able to make a "good enough" neurotic adjustment. The boy, on the other hand, apparently was unable to do so. The inner reality constructed around life events became so intense that it retained its capacity to disintegrate advanced cognitive structures which had been observed in manipulating materials which were not personally evocative. It would appear that extreme disequilibrium between inner and outer reality or between affect and cognition is crucial but the underlying mechanisms in achieving the necessary balance remain very unclear indeed.

Although it is difficult to decisively answer such questions about the interplay between affect and cognition, the experience of these children suggests a starting point. For both of them, traumatization of unknown dimensions occurred during a period when psychodynamic and cognitive transformations were taking place. As Ekstein (1975) has pointed out, psychic trauma can only be defined by the person who experiences it, which is not possible at two years of age. He also holds that trauma becomes an organizing factor in both normal and abnormal development. Each transitional period of life presents an

opportunity for reworking the original trauma as does each re-traumatization. From that point of view, the little girl having in some way overcome a two-year-old crisis reworked it at six and again in adolescence. It may well be that the transition from sensorimotor to preoperational intelligence, which begins in the second year of life (Piaget, 1962) and the separation-individuation period at the same time (Mahler, 1942) constitute a particularly vulnerable period in development and that trauma at this period in time either makes the transition impossible and results in psychosis, or reappears as a key issue in neurotic development. It is also possible that later appearing psychotic organization has its roots in this period and that the teleological regression Arieti describes is a regression to incomplete resolution of the cognitive and affective crisis implicit in differentiations which occur at this moment in development. Neurologically, the child is now fully mobile in space and at the end of a period of rapid brain growth. Cognitively, a logic of actions has developed and the preoperational period and semiotic function emerge. Affectively, separation and individuation are in progress. All three are connected with a transition from lack of differentiation between inner and outer reality to experience in which distinctions between symbol and object, thought and action, child and mother, self and not-self are achieved. Only at adolescence is the coincidence

of psychological, cognitive and physiological change so intense. However, the adolescent has various strengths the two year-old does not. For one thing, he or she can tell us what is happening. Language and symbolism serve to shape and mediate the experience at puberty while at two years of age, it is a nascent ability subject to experience more than a shaper of it. The role of language and symbolism changes with development so that at the formal level it serves to direct action and intention, which is substantially different from the two year-old experience in which action leads to the rise of language and symbolism.

This crucial transformation, then, has far-reaching implications. It may even be that it divides psychosis from neurosis. That is to say that conditions which are essentially neurotic can be seen as those which allow for differentiation symbolically between the self and other even when specific areas of development are fixated, while the psychoses are characterized precisely by insufficient organization on cognitive, affective, and neurological levels for such distinctions to be made. The psychotic child's distancing devices, for example, can be seen as persistent attempts to achieve differentiation and the spaceship fantasies cited by Ekstein (1966) are another example of the same mechanism. Therapy with psychotic children--which seems to depend on the therapist entering the metaphor with the child until differentiation emerges from the child's increased

ability to separate and individuate--differs from therapy with neurotic children specifically in the child's distinctions achieved at this age. Ego interpretations depend on ego defenses which are sufficiently strong as to maintain the division between self and other. The thrust of therapy is to allow more adaptive defensive constellations to emerge. With psychotic children, the reverse seems to be true--ego defenses become the goal rather than the focus of treatment.

Important as it is, this early transformation is not sufficient in itself to result in normal development. A second equally important transformation occurs with the resolution of the Oedipal conflict and subsequent development of concrete operational thought. These two developmental periods, however, appear sequentially and not at the same moment. Together they allow the child to organize more than two dimensions of experience at the same time. The Oedipal period can be understood as the affective negotiation of triangles while concrete operations result in the cognitively equivalent ability to coordinate more than one dimension of real objects in abstract relationships. Within the child, the need to negotiate the Oedipal period may lead to parallel cognitive development in coordinating two external dimensions. Further development at adolescence is, of course, expected. However, it is not clear that formal operations on a cognitive level are essential for living in a "real" world while concrete operations are universally found (Greenfield, 1966;

Price-Williams, 1961).

The question of the relation between inner and outer reality remains unresolved. The beginning capacity to distinguish them certainly centers in the second year of life in our culture and it is clear from Piaget's work (1969) that knowing and later conceptualizing the difference is an achievement of late childhood when concrete and formal operations emerge. It is as late as age eight or nine that children come to realize that dreams are in the mind and a product of thought, that names are handed down by the culture and not given by God, that everything that moves is not alive. Various cultural expectations also affect what "reality" is. Because of these cultural variations, reality as defined by Western civilization at a particular historical moment is the context in which childhood psychosis will be discussed. Although this understanding of the condition may apply to other cultures, the attempt to do so seems cumbersome and unwarranted.

Historical Perspectives

At some point in evolution, man moved from being at home in an unquestioned universe to questioning not only the nature of the universe but his own experience in light of some transcendant "real" which he assumed had order and purpose. In so doing, he became an observer, separate and distinct from the physical world in which he existed. This first and essential dichotomy

between experience and observation became the sine qua non of human consciousness. The unselfconscious, unitary cosmos, once shattered, became paradise lost. The history of every culture is in some sense the history of attempts to reverse an irreversible process.

Although it is a fundamental presupposition that humanness consists of the capacity to make distinctions, Western civilization has its own set of possibilities which differ from those of other cultures. Cosmologies change over time as well as across cultures. Behavior we might well call psychotic has led to other labels: shaman, prophet, mystic, witch. Unless one fully understands the meaning systems expressed, the behavior of Indian yogi, earlier Christian mystics and hari krishna believers is very strange indeed. This problem in no way denies the need of human beings to agree on parameters for defining the "real", but it does highlight differences in what a particular society does with its members whose paradigms of reality are substantively different. Underlying assumptions by and large determine which members of society we feel we must deal with in some extraordinary way as well as what we are inclined to do about, to and for them.

Childhood psychosis, as the idea of a treatable, definable condition, rises from several tributaries which merged in the 19th and 20th centuries. Medical practice removed some of the population from prisons and put them in hospitals to be

treated, which required models of "illness" and models of "cure." As Foucault (1965) has pointed out, the idea of insanity as a social problem only appeared after the medical disease of leprosy had been brought under control in Europe. Society's need for outcasts, or for control of deviance, found a new outlet and also new agents, psychiatrists, who became our "reality police" (Brandt, 1975). In the 20th century, medicine also led to the discovery of antibiotics, the invention of incubators, and refinement of delivery techniques which kept babies alive who previously would have died. Symptom patterns were observed in children that were enough like those seen in adults to be called "psychotic" although resistance to the idea that "dementia" could present from birth was strong.

The industrial revolution created a large population of urban people whose deviance was more visible than it had been in agrarian, extended families. It also created an economy in which all members of society could not be gainfully employed. The eccentric individual was no longer shielded from public consciousness by intention or distance nor could he be absorbed by the family and kept busy at simple tasks. Society assumed more and more responsibility for the members of the society excluded from the work force, and with that, responsibility for long term care of deviant individuals.

At the same time, the idea of childhood as a distinct period of life was consolidated. As Aries (1962) has pointed

out, this notion rose in the 17th century but came to flower in the 19th with mother's classes designed to acculturate the child. Engel (1972) has suggested that this emphasis on teaching children to be compliant, good, and obedient produced many autistic children who went unnoticed. Binet's investigation of early intelligence, Freud's work on infantile sexuality, and Piaget's studies of cognitive growth were among the explorations which led to the notion of "normal developmental stages." The work of developmental psychologists in clarifying a predictable sequence of growth also made possible early identification of children whose development did not fit that sequence. Bettleheim (1976) holds that the result of many investigations led to a focus on early mother-child interactions--he says we found out that many problems were the parents' fault and told them so, making child rearing increasingly difficult. In place of public sympathy for the tragedy of having such a child, emphasis shifted to self and social blame with concomitant pressure for psychotherapy. The work of Kanner (1942) on infantile autism and Bender (1947) on the neurological substrates of abnormal development introduced the concepts of childhood psychosis which have absorbed the energies of outstanding scholars ever since. It is consistent with the forward thrust of developmental psychology that Piagetian theorists should now begin to look at the nature of cognition among psychotic children within a structuralist framework. Structural trans-

formations seen in normal development provide the background for looking at the nature of psychotic cognition and similarities between the thought of psychotic children and normally developing children of a particular age.

Methodological Problems

In trying to understand the underlying mechanisms of childhood psychosis from several points of view, a further problem arises. As Kuhn (1970) has pointed out, a scientific model is a belief system like any other. Its adherents accept a set of underlying assumptions which they believe most closely approximate reality. As new data are gathered which do not fit the model, the model is expanded to include the new data, the new information is seen as epiphenomenal or a new model arises. During this process, defenders and detractors battle intensely. But as Kuhn has also pointed out (1970, pp. 10-22), a science must necessarily have a common language which its members understand and accept before it achieves full status as a science. Therefore, problems of comparing psychoanalysis, developmental neurology and developmental cognition are perplexing ones. Either one of the models must subsume the others or a common language be used which is acceptable to but not exclusive to any of the models. While there are differences among the theories, certain basic principles are held in common which somewhat simplifies

the task. For example, all three assume that development is hierarchical with critical transformations which occur in the transition from one stage to the next. The sensorimotor period gives way to preoperational thought in Piagetian theory, orality to anality, symbiosis to separation-individuation, part object relations to object constancy in psychoanalytic theory. It is also assumed that the earlier stage does not disappear but is reorganized in the later one--is, in fact, the substrate on which later development is based. In normal circumstances, the transformation is irreversible and crippling residual effects of earlier development are seen as fixations or deviations. A certain teleology is assumed; growth is not random but has a direction and goal which is both socially and intrinsically given. The limitations of the organism set the further reaches of possibility but a particular society actualizes some but not all of these potentialities. A third idea is that development leads to complexification both of underlying structure and the ability to deal with different kinds of reality. The end result--adulthood--allows for interpersonal relationships of varying degree and intensity, intrapsychic associations of widespread complexity, and the combination of ideas abstracted from other ideas in combinatorial matrices. The integrity of neurological systems and increasing complexity of central nervous system connections appears necessary for this optimal development to

occur. Higher cortical functioning necessary to cognitive activity appears to be species specific to man--especially where complex language is concerned--and recent research has explored neurological correlates of conscious and unconscious experience (Ornstein, 1972; Penfield, 1975). Here, too, there is an assumption of hierarchical development, teleology and increasing complexification. The building of "reality" depends on the relationship among the three realms although other factors are also important.

If one accepts these presuppositions about the direction and pattern of growth as demonstrated (and there are those who do not; see Philips and Kelly, 1975), and as common to the theories in question, the methodological problem is still difficult. There seems to be a way to look at all three theories which to some degree sidesteps differences in causal explanation and instead looks at coincidences in terms of a further abstraction. This abstraction--the notion that there are critical periods during which children move from a unitary cosmos to a dichotomous one and then to a trichotomous period--suggests necessary and sufficient conditions for normal development at the same time it focuses on convergence among developmental processes rather than the absolute importance of any one of them. Extreme deviation in any process may be sufficient to affect the total organization of personality but it may also be true

that accumulated minor deviations interplay in such a way to lead to the same effect, especially where the psychotic child is concerned.

In order to simplify the process of looking at critical transformations, three terms will be used to discuss major periods in early childhood--the unicosmos, the dicosmos, and the tricosmos. Although cosmology belongs to philosophy rather than psychology, the terms as used here seem to roughly delineate three structurally different periods in the most parsimonious way.

The unicosmos, or age of unity, describes the state of affairs in which all things are to some degree one and the same and not differentiated from each other, as is found in early infancy. The dicosmos, or age of differences, is that period during which a variety of dichotomies are established on many levels. It begins at the end of the first year of life with the advent of separation-individuation processes in Mahler's terms and the consolidation of secondary circular reactions in Piaget's. The tricosmos, or age of interaction, begins with the earliest perceptions of self in relation to more than one object, event, or person in about the fourth year of life and is achieved fully in the eighth or ninth year. Its onset is taken to coincide with the rise of the Oedipal period and its achievement is defined by the child's cognitive ability to perform concrete operational tasks. My hypothesis is that reality, as a social

and logical construct, is achieved by the child through the mutual interaction between affect and cognition during these three periods. The necessary equilibrium between inner and outer reality for acceptable or normal development also depends on sufficient neurological intactness for cognitive and affective negotiation of the transformations. Beyond that, I will argue that it is the total organization of personality which is crucial to the distinction between neurotic and psychotic conditions and cite instances in psychotic children in which a more advanced structure exists cognitively without the necessary hierarchical achievement of an earlier conservational task, even when the affective importance of the material to the child is the same. To clarify the importance of this achievement and its relationship to psychosis, I will first review major psychoanalytic and Piagetian landmarks in normal development and then review the relevant literature on childhood psychosis as it relates to lack of transition from unicosmic to dicosmic structure.

The unicosmos, or age of unity

The unicosmos is a period during which distinctions between the self and other do not exist. During the first five or six months of life, the infant develops ability to perceive and

organize incoming stimuli with little suggestion that the "outside world" exists except as it gratifies or frustrates internal needs. During the second half year of life, which Mahler describes as the practicing subphase of separation-individuation, the baby recognizes people and events but, again, as they impinge on his experience. Gradually, with the convergence of neurological maturation, cognitive structuration, individuation processes, and the development of language, he moves toward a dichotomous world on many levels. The advent of object constancy, symbolic functioning, concern with autonomy, and shifts in libidinal cathexes are observed. At this moment in development, somewhere around age two, the dicosmos is achieved although the ramifications and elaborations involved will occupy several years.

The first six months of life

There are many ways of describing this earliest period. Piaget calls them the first three subphases of the sensorimotor period. The sensorimotor period as a whole develops a logic of action without necessary internal symbolization or mental imagery. At birth, behavior is organized around genetically available reflexes. The child exercises them because they are there, and this in turn becomes an aliment for exercising the structure. Behavior is increasingly organized in the service of adaptation through the mutual but dissimilar functions of assimilation and

accommodation. Sucking, for example, serves the accommodative end of feeding as well as the assimilative function of generalization and recognition. The child who moves from sucking the breast to the thumb to the object is essentially searching for outlets for the need to suck. At the same time, recognitory assimilation differentiates between objects which feed and those which gratify sucking schemas while generalizing assimilative behavior. At this time, Piaget holds that there is little reason to believe in internal object representation but rather that the child

> . . . simply rediscovers a sensorimotor and particular postural context (sucking and swallowing combined) among several analogous complexes which constitute his universe and reveal a total lack of differentiation between subject and object. (Piaget, 1952, p. 37)

The same is true of visual and auditory stimuli (Piaget, 1954). Vision and hearing depend on chance stimulation which then, if the event is neither too familiar or too startling, leads to interesting results the child tries to repeat. Through trial and error some repetitions become habits and enter the behavioral repertoire. Vision, hearing, and prehension are later organized into schema of assimilation and accommodation and expand reflexive reactions into organized and directed movements. This organization is seen as the forerunner of intelligence. Piaget does not adequately account for the selective attention to events which are neither "too familiar" not "too startling,"

although he does refer to affect as the "force" which promotes cognitive growth (Piaget, 1962). He sees a relation of correspondence between affect and cognition but not a causal relation (Piaget, 1962) because "although a necessary condition, affectivity is not a sufficient condition in structure formation which, in cognition, is autonomous" (Piaget, 1962, p. 129). However, even at this earliest period some events are interesting, some are not, and it is unclear what "interesting" means. The events cited as interesting evoke pleasure rather than unpleasure and it is too early to speak of boredom, but one is hard put to think of another word to describe the too familiar. Avoidance of the too startling event also suggests that primitive anxiety and pain are avoided. The middle range of "interesting" results suggests that cognitive events which have excitatory or affectively pleasing results are those which enter the repertoire. That there is a neural component--i.e., that nerve myelination sufficient to transmit the sensation labeled "pleasant" exists--is beyond question. However, here, as elsewhere, it does seem that the affective component of cognitive behavior is essential. As early as two months of life, Abrams and Neubauer (1976) report differences among infants between "thing-orientedness" and "person-orientedness" which persist until at least the sixth year. They hold that "thing-oriented" infants show preference for distal sensory modalities while "person-oriented" infants

show proximal stimuli preferences (Abrams and Neubauer, 1976, p. 94). Therefore, this orientedness which persists may have to do with early receptivity in sensory perception which produces a pleasurable reaction in the child and leads to inclusion of objects or persons as central foci of cognitive exploration. One might even suggest that pleasure is the foundation for insuring the exercise of reflexive responses which constitute the beginnings of cognitive growth.

During this period of one to four months (the primary circular reaction), passive expectation rather than active exploration is the case. Margaret Mahler (1968) sees the infant of the same period "hatching" from an autistic shell (as Freud described the first month of life in 1911). External stimuli begin to enter the baby's orbit but the first weeks of life are "normally autistic" when "need satisfaction belongs to [the baby's] own omnipotent, autistic orbit" (Mahler, 1968, p. 8). During the next period, the infant behaves "as if he and his mother were an omnipotent system--a dual unity within one common boundary" (Mahler, 1968, p. 8). The symbiotic phase reaches its height around the fourth or fifth month of life when the infant achieves specific symbiotic relationship with his mother and partners are no longer interchangeable. The recognitory smile is a developmental landmark (Knobloch and Passamanick, 1975). However, Mahler holds that an essential feature of symbiosis is hallucinatory or delusional psychic fusion with the representation

of the mother with which Piaget would argue. At the end of this period, demarcations between the body ego and the outer world begin to take place. The transition from primary, autistic narcissism to the symbiotic orbit, Mahler holds, is the first shift in libidinal cathexis and also the dividing line between autistic and symbiotic psychosis. The importance of "hatching" is that it shifts libidinal cathexis from "proprioceptive-enteroceptive cathexis to sensoriperceptive cathexis of the periphery" (Mahler, Pine, and Bergman, 1975, p. 46) essential to the formation of body ego boundaries. This shift is possible, from a neurological point of view, because of the myelination of nerves and brain growth which occur during this first month of life.

Object relations theorists, who see all development in terms of interaction with significant people, also see this first period of life as receptive and undifferentiated. Winnicott (1960) speaks of a "holding" period in which a "central self" present from birth grows through "the inherited potential which is experiencing a continuity of being, and acquiring in its own way and its own speed a personal psychic reality" (Winnicott, 1965, p. 46). At this point, Guntrip feels the infant experiences

> . . . symbiosis, identity with (in favorable cases) a stable object, the good enough mother, making possible the beginnings of "being" or "security" and of "self-identity" . . . . [T]o be capable of development to full maturity, the ego must begin to differentiate out of a basic experience of full security in the mutual identification of mother and infant. (1969, p. 248)

It is obvious, therefore, that at this earliest period the intrapsychic content is a moot point but the lack of differentiation is not. Guntrip continues:

> Difficulties at this stage, before the ego is strongly consolidated, will then lead to object-splitting and ego-splitting, as studied by Klein and Fairbairn. (Guntrip, 1969, p. 247)

Not only is there lack of differentiation in this first five to six months of life, but it is crucial to development. Some object relations theorists have focused on the profound psychopathology which results from too early differentiation or shattering of the ego. Fairbairn (1952), in particular, holds that "love made hungry" is the schizoid problem in which overwhelming, painful craving for love which is not gratified leads to a terrible fear that one's love is devouring and destructive. An exciting needed object is a "desirable deserter" who shatters the symbiotic system. One can see how the unsatisfied infant might evolve such a primitive schema (in Piaget's terms) when oral and contact needs are intense and ungratified.

The second six months

The secondary circular reaction, from the fourth to the tenth month of life, begins with an accidental movement which produces an interesting result. At this time, however, the infant perceives a connection between his movement and what

happens and tries to repeat the event. In part, this new ability has to do with cross-modal perception (i.e., vision and touch working together) and in part with an increase in fine motor coordination. However, the infant at four months is essentially passive--behavior remains essentially reproductive, not fully intentional (Piaget, 1952). At the same time, an abbreviated response to familiar situations is called recognitory assimilation--the full secondary circular reaction does not take place but a condensed version is seen. Piaget holds that this is the precursor of classification or meaning. During this phase, the signifier (the object or event) is distinguished from the signified (the child's reaction), a first distinction between subject and object on a primitive level. Further beginning distinctions are observed between slight and strong movements and their relation to slight or strong response, a precursor of quantitative thought (Piaget, 1952).

Visual anticipation of the future position of objects is another new activity (Piaget, 1954). This seems to suggest that objects have some reality beyond their accidental reappearance in the visual field. Interrupted prehension has the same result--the infant loses the object but tactilely searches for it. Some permanence is attributed to the object because of the search behavior and because the child begins to recognize objects even when only parts are visible. Thus, the coordination of vision and prehension which appears at this time has

importance beyond its neurological implication that cross-modal transfer is beginning to take place. It also highlights the predicament of the child when new acquisitions open up new possibilities but also foreclose earlier modes of behaving. When the child is able to see objects beyond its reach, he or she is faced with the necessity of finding new ways to achieve the goal because the object no longer simply disappears and reappears but now is visually perceived at the same time prehension schema are developing. Goal directed behavior arises from this dual perception and creates contradictons which can only be resolved through facing new obstacles in achieving the goal. The previous assumed disappearance and therefore lack of permanency of the object can no longer prevent a dialectic in which the object is seen to be there but out of casual, immediate prehensive behavior. The new contradiction, I believe, is precisely that which promotes both cognitive and psychodynamic structural development. Deferred circular reactions come into being. An interrupted circular reaction is reinstituted by the child when he is interrupted. The infant returns to the activity with suggestion that the object will still be there. Ginsberg and Opper (1968) point out:

> These behaviors all indicate that at this point the object does not have a fully independent or individual existence but is closely related to the infant's own action. (p. 51)

Ten to twelve months of age sees a shift to combining secondary circular reactions in novel ways. Purposeful behavior is observed in combining means-ends behavior intentionally. For the first time the infant's behavior is truly intentional and, for Piaget, intelligent. A goal exists at the beginning, and when something gets in the way, the child tries to overcome the obstacle. Signifier and signified are coordinated in actual anticipation. In terms of object constancy, a real advance takes place. Because the object has acquired features of permanence and, in essence, substance, it is pursued in active search (Piaget, 1954).

This shift from passive, receptive behavior to active exploration is described by Erikson as a shift from the receptive to the taking oral incorporative mode where biting and holding on become important. Erikson believes a basic sense of trust or mistrust are at issue: "good" and "evil" enter the baby's world (Erikson, 1952). Teething, which introduces pain into the previously gratifying oral zone, can lead to sadistic and masochistic confusion, which destroys the child's unity with the "maternal matrix" (colic may do the same to infants afflicted with it in early infancy). At this time, Erikson says,

> . . . even under the most favorable circumstances, this stage leaves a residue for a primary sense of evil and doom and of a universal nostalgia for a lost paradise. (1952, p. 80)

It is also this time, the height of symbiotic relatedness, that Mahler (1968) sees as one in which the child, by response to cues and selective attention by the mother, becomes the child who reflects for the mother her own "unique and individual needs" within the possibilities of the "child's innate endowments." Mutual cuing within the symbiosis begins to differentiate each particular mother-child relationship as well as to communicate what the mother's universe is all about. As Brandt (1976) puts it,

> This symbolic system we call reality must be taught. Reality is not something "out there" but a knowledge the infant must acquire in prograssive stages as he grows up. . . . The process by which the individual comes to acquire it--comes to believe in this symbolic system--is called socialization. . . . The mother teaches the child to objectify his perceptions of her; she is not part of him but exists in her own right. As his first contact with reality, she must teach him she is real. On the foundation stone of this primary organization of his experience, his experience of her, she can then begin to build a world for him, teach him what else is real, what else must be symbolized into a system. This system includes, of course, not only what things are, but what they are for, not only the names of things but their purpose. (pp. 21-22)

"Taught," in Brandt's sense, implies the transmission of a social system of reality from mother to child. It is during the second half-year of life that this beginning symbolization begins to take place within the symbiotic system. Stranger anxiety and curiosity are developmental landmarks which affirm that distinctions are being made. Mahler (1968) says that the child

who feels securely anchored within the symbiotic system is able to shift attention cathexes from inward to outward perception with the result of

> . . . an optimal symbiotic state in which smooth differentiation--and expansion beyond the symbiotic orbit can take place.

It appears that the interplay between assimilation and accommodation Piaget describes at this period is equivalent to what Mahler calls shifts in attention cathexis. Assimilation is like inner-directed contact cathexis in some ways while accommodation resembles outer directed sensory perception, both "anchored" in the symbiotic orbit.

An intriguing simultaneity in time at this period links the abbreviated recognitory assimilation schema cited by Piaget and behaviors observed by Mahler and her colleagues. The infant now repeats the mother's preferred pattern of soothing and stimulation to explore other people. That is, the child whose mother has stroked its cheek now strokes the cheek of a stranger. An assimilated schema appears to have generalized to the adaptive function of gathering new information, but with the important qualification that tactile, receptive experience is somehow cross-modally transfered into motor, exploratory behavior. This cross-modal coordination must have a neurological base and the infant somehow translates what he has experienced as pleasurable into a schema of exploration, a clear indication of association and differentiation at a primitive level. The pleasant sensation of being stroked in one body area (the

cheek) is associated to another body area (the finger) and applied to an object or person such that receptive experience is replicated in exploration. At some level, "empathic identification" with the mother must be assumed to have taken place. The "logic of action" of the sensorimotor period must then be assumed to have an affective component which leads the infant to reproduce behavior which is familiar (and it can be positive or negative, self-consoling or exploring as Mahler, Pine, and Bergman [1975] make quite clear) in expanding his cognitive universe. This generalizing behavior does appear to depend on the use of more than one sensory modality but it also suggests very early identification which enhances the behavioral repertoire in specific, idiosyncratic ways. This affective-cognitive "feedback loop" is the earliest observable conjunction between inner-outer reality mediated both by the particular child's experience and his ability to shift roles within the symbiotic dyad in relation to persons outside it. In relation to the symbiotic mother, behavior is rougher and more excited (Mahler, Pine, and Bergman, 1975). Mahler suggests that this beginning differentiation is crucial. It is also related to delay or disturbance in the symbiotic process. Premature "hatching" from the symbiotic unity can lead to intense separation anxiety and stranger reaction, and, in severe cases, to shattering of basic

trust, normal symbiotic narcissism and safe anchorage within the symbiotic system. The extreme disturbance related to too early shattering is symbiotic psychosis. It would also appear that the schizoid position Fairbairn describes is centered specifically in lifelong attempts to resolve the crisis of this time. The in-out schizoid program (Guntrip, 1969) is precisely defined by the need for closeness and love which threatens fragile differentiation and leads to withdrawal from the very love and closeness which is desperately needed.

Delayed differentiation, on the other hand, with insufficient symbiotic nurture, can lead to the child's attempts to nurture itself and a turning away from the world of persons. When this happens, the absence of stranger curiosity and/or anxiety suggest that differentiation is not taking place, In such children, the secondary circular reaction--which depends on an interesting external event--may be confined to objects or to repeating early, autistic, narcissistic gratification. Accommodation to the world is poorly served. The extreme outcome of this pattern is, of course, autism. Hatching, symbiotic unity and differentiation have either not taken place or are retreated from. Anthony (1958) talks of a "psychotic barrier" in autistic children which precludes response to sensory stimuli. Such children also display a lack of sensorimotor cognitive development. The cognitive growth pattern posited by Piaget on

the basis of use of pre-existing structures which are sensory, reflexive and genetic would be impossible. Autism dating from early infancy, according to Anthony, is characterized by an abnormally thick stimulus barrier which prevents emergence from primary autism as described by Mahler. The interplay between the child and the world, essential to learning and cognition, is precluded.

The first subphase of the separation-individuation process, differentiation within the symbiotic matrix, begins at about five months of age and lasts through the development of "free, upright locomotion" (Mahler, Pine, and Bergman, 1975, p. 65). Secondary circular reactions appear to be the cognitive equivalents of the "early, practicing period." Three specific developments contribute to the development of body image in this "practicing subphase"--body differentiation, a specific bond with the mother, and the growth of autonomous ego functions. At this time, roughly until the first birthday, other developments are taking place which also must be considered.

Knobloch and Passamanick (1974) describe sequences of neuro-psychological development. Five fields of behavior are considered: gross motor, fine motor, language, personal-social, and adaptive, the latter being most important in their view. At the twenty-eighth week of life, the child is halfway to attaining an upright posture and upper body motor development is

superior (which may account for the vision-prehension schemas Piaget notes and also the choice of behaviors cited by Mahler). Language is developing but it serves little social function as yet but rather a neurological one (Knobloch and Passamanick, 1974). Control of lingual, labial and buccal musculature serve to prepare for the advent of speech which begins with a one word vocabulary at about forty weeks. Language is among other fine motor skills and depends on both motor production and receptive, encoding, association, and decoding processes. At the same time motor skill is developing (along with differentiation and secondary circular reactions), a beginning ability to delay motor discharge appears. Pribram (1976) has theorized that two specific motor systems come into play: a feedback, gamma loop which accommodates to the environment; and an inhibitory, alpha system which acts chiefly to prevent action rather than facilitate it. If, as it appears, this inhibitory development takes place at this time, the correlation between language as practice action and mediation is neurologically based much as separation and individuation depend on motility in space. Pribram suggests a "motor theory of meaning" for he holds that to mean is to intend in some way, and motor development is essentially necessary before symbolization can take place. Although he is uncertain as to the connections between them, he

believes that naming is a function of encoding processes while symbolization depends on contextualization in intentional motor processes. There is an aesthetically pleasing fit to Pribram's theory in terms of what is observed in six to twelve month old infants. Essential development in one direction requires equilibrated development of the opposite function. Naming appears as does motor control and delay, one assimilative and one accommodative. For example, the generalized assimilation of sucking schema interacts with recognitory differentiation between objects which feed and objects which gratify the need to suck. The convergence of separation-individuation, shifts from passive to active cognitive exploration, and the necessary neurological substrate for both leads to a parsimonious convergence among the necessary and sufficient transformations. Differential diagnosis in terms of a convergence theory would simplify what presently is overly confusing. Remediation might also then focus on teasing out which process had gone awry and enhance intact processes while remediating those which lag behind.

In discussing the first twelve months of life, I have tried to make a case for a view of infancy as a unicosmic period, or an age of unity, which is necessary to normal development, and the beginning transformations which occur in the second half-year of life. Life begins with almost no differentiation in affective,

cognitive, or neurological development. The first phase of cognitive growth depends on the existence of pre-existing reflexes, the autistic phase of normal development is narcissistic in a global way, and the neurological receiving mechanisms are crude and undifferentiated. What Mahler describes as "hatching" into a symbiotic matrix of mother and child remains unicosmic until cognitive and neurological development leads to forays into an outside world which begins to exist on its own. Visual, tactile and auditory modalities develop along with secondary circular reactions. The child is impelled on all levels to deal with a world in which he is differentiated from mother. For most children, this exploration is initially exciting and intriguing because a safe harbour exists for return. For others, it does not take place at all because the absence of a primary hatching process prevents its emergence. For still another group, life becomes a constant attempt to resolve the need for closeness and love and the fear that one will destroy that which one loves by such closeness. Precursors of intelligence appear but with only rudimentary suggestion that the outside world exists beyond the perceptual experience. A particularly important landmark was noted in which the infant transfers input to output via a postulated early "empathic identification," but, again, behavior is essentially conservative until motility in space makes object constancy, separation-individuation, and the tertiary

circular reaction possible. Cross-modal perception appears to be essential to cognitive and emotional growth, but I would argue that this cross-modality is the very essence of the beginning dicosmos. In that sense, the second six months of life can be described as a time when the child makes beginning forays into the world beyond the unicosmos but only if he can return to its safety as needs be. With the beginnings of language, which depend on relationship with mother, cognitive structuration, and neurological maturation, the child begins more and more to live in a dicosmic world with its specific and different rewards, frustrations, and satisfactions. Paradise lost is a construct of adults, not of children.

The rise of the dicosmos, or the age of differences (12-18 months)

The ability to make distinctions or even to evolve primitive classes is not a strictly human achievement. Various primate researchers have demonstrated that chimpanzees learn or can be taught problem solving and primary language functions (Kohler, 1926; Gardner and Gardner, 1969; van Lawick-Goodall, 1971). Therefore, the dicosmic universe and even early symbolic functioning are primate activities. Lower orders of animals achieve certain distinctions which appear instinctively determined and related to critical periods (Lorenz, 1937).

The differential importance of the dicosmos in human

development is that its outcome is less predetermined--it is a necessary but not sufficient condition for the construction of distinctly human reality. Massive disturbance during this period may prevent the child from achieving the socially given reality of his or her culture and it is interesting that van Lawick-Goodall found the same to be true of chimps. In human infants as in chimps, vision plays a most important role in early distinctions. With motor development and cross-modal transfer the child moves into a period of differentiation but it is not until language and development of the tightly packed, highly dendritic cells of the association cortex develop that distinctly human capabilities arise (Mattis, 1974).

Vygotsky describes the early dicosmic period as the "prelinguistic phase" in the development of thought and the "pre-intellectual phase" in the development of speech. He holds that thought and speech have different genetic roots and develop along different lines, independent of each other (Vygotsky, 1962). He compares the consolidation of secondary circular reactions noted by Piaget in the tenth to twelfth months to a "chimpanzoid" age described by Beuhler (1927). According to Beuhler, the child's first inventions at this period are very like those observed in apes. Actions pursue familiar goals in unfamiliar situations. There is now some capacity for delay which is cognitively important in the development of mobile schemata which can be generalized; from a direct response to sensory combinations the child is now

able to select schema of action. Symbolic functioning requires such delay and mediation. Developing ego defenses, in psychoanalytic terms, by their very nature delay discharge of primitive impulses and mediate between the id and action in the world.

In discussing the relationship between Piagetian theory and psychoanalytic understanding at this time of life, Wolff (1960) suggests that exploration of the world and cognitive growth occur when basic needs are satisfied while psychodynamic development is concerned with drives and drive discharge. An alternate explanation is that the affective dilemma posed by differentiated drives leads to the dialectic situation which is cognitively irresolvable. For example, the child who has distinguished "mother" from "not-mother" can no longer be pacified by any caretaker, but specifically recognizes the absence of "mother." This distinction leads to behavior which can be seen as keeping some representation of mother available (i.e., the transitional object) but also to practice on the child's part in gaining control over the presence-absence continuum: peek-a-boo and moving away and returning are such activities. The affective necessity of resolving "mother-not mother" would then be the foundation of cognitive growth which now revolves around following objects through apparent perceptual changes and loss to an anticipated goal. Another way of describing the same situation would be to say that the pleasure principle meets with

vicissitudes in drive discharge which are neurologically and cross-modally determined. The affective experience precipitated by neurological development leads to a dialectic, irresolvable situation--the world now exists "out there" and mother is perceived on some level as part of the "out there" world. Pre-existing assimilation-accommodation repetoires are expanded in attempts to finds new outlets for drives which are now specific and not diffuse. The affective experience of separateness (with a hypothesized goal of conserving closeness with mother even when she is perceived to be absent) leads to the tertiary circular reaction. The child is impelled to deal with separation, and active rather than passive behavior ensues which invents new means to achieve goals. The end result will be a logic of action, sensorimotor causality, and permanency of objects. Piaget (1962) holds that the child does not as yet imagine objects but can follow them through a series of displacements. When his attempts to find the object do not succeed, he falls back on the "magic" of the third stage. An important shift is that action is now directed toward the future and the unknown (the cognitive correlate of mother's disappearance and reappearance). Accommodation determines the direction of adaptation, Piaget says, and it is difficult to distinguish that fact from the affective one that at some level it is mother's presence and absence that make adaptive accommodation necessary. Accommodation also

becomes an end in itself in adapting to the real.

At this same period, Erikson (1952) holds that the child shifts from trust-mistrust issues (unicosmic) to issues related to autonomy (dicosmic). Hartmann (1939) describes a shift to ego autonomy, necessary for reality adaptation. Constancy of the environment prepares for exploration of the unknown. Wolff describes the same shift when he says that true autonomy consists of freedom from both internal forces and stimulus boundness, which gives rise, I believe, to symbolic functioning. A nascent ability to delay drive discharge fits equally well with Pribram's "motor theory of meaning" in which the ability to intend, or to mean, lays the groundwork for symbolic functioning and thought which mediates action.

A second dichotic milestone occurs at somewhere around the first birthday when the child begins to walk. Mahler (1968) and Weil (1953) have both described abnormal development which can follow premature mobility when the child is not yet ready to separate and individuate. At twelve months of age, the child moves into "the practising period proper, phenomenologically characterized by free, upright locomotion" (Mahler, Pine, and Bergman, 1975, p.65). The authors continue:

> At least three interrelated, yet discriminate developments contribute to the child's first steps toward awareness of separateness and toward individuation. These are rapid body differentiation from the mother, the establishment of a specific bond with

> her, and the growth and functioning of autonomous ego apparatuses in close proximity to the mother. (p. 65)

These developments lead to spill-over onto inanimate objects, one of which may become a transitional object. Several patterns emerge with motor maturation. Children who have had intense but uncomfortable symbiotic attachment fare well and seem to find increased distance more comfortable. Others, whose symbiosis was close and gratifying have difficulty when mother's tolerance of this separation is poor. As long as the mutual but distinct lines of development remain in relative equilibrium, however, the toddler's exploration of the world and return to mother are associated with a major period of exhihliaration and "the psychological birth experience" (Mahler, Pine, and Bergman, 1975, p. 74).

In object relations theory, Fairbairn's "love made angry" depressive position appears. In a more than metaphoric sense Guntrip describes the following:

> When you want love from a person who will not give it and so becomes a bad object to you, you can react in either of two ways. You may become angry and enraged at the frustration and want to make an aggressive attack on the bad object to force it to become good and stop frustrating you--like a small child who cannot get what he wants from the mother and who flies into a temper tantrum and hammers on her with his fists [italics mine]. It is an attack on a hostile, rejecting, actively refusing bad object. It leads to depression for it rouses the fear that one's hate will destroy the very person one needs and loves, a fear that grows into guilt. (1969, p. 24)

Guntrip, as already mentioned, sees the schizoid position

as a basically earlier reaction. He also says the depressive position is "later and more developed than the schizoid, for it is ambivalent" (Guntrip, 1969, p. 25), support for the hypothesis that dicosmic experience depends on differentiation and that dicosmic psychopathology is different in kind than that which appears during the unicosmic period.

In discussing Piaget's tertiary circular reaction within the same six months, several observations can be made and tied to the above. To begin with, like separation-individuation practicing, tertiary circular reaction depends on motor maturation. The child becomes curious about objects as objects (Ginsberg and Opper, 1969). Behavioral changes suggest that the unexpected is interesting (within previously described parameters). Assimilation of objects to a prior scheme of "dropping" with a sense that all objects do not "drop" in the same way can be seen as sequential to the experience that all people are not "mother" and have different qualities. At seven months, mother is experienced as unique and distinct, perhaps as less immediately available. At twelve months, the child becomes cognitively interested in "resistance"--he applies old schemes to new events and shows interest in the fact that they are not all equivalent, not mutually interchangeable. Another facet of cognitive growth centers in a new understanding that objects have powers and properties of their own, which again appears to follow early

exploration of strangers, cited by Mahler, in the same mode the child has experiences proprioceptively. As Brandt puts it, the mother first teaches the child that she is real, and on that base builds the experience that other objects are real and have their own symbolic meaning. At this same time, systematic imitation of new models appears which reproduces "the act of a model" (Ginsberg and Opper, 1969, p. 62). Mahler has demonstrated that the child begins to do this in the pre-practicing subphase of separation-individuation--here, somewhat later, Piaget finds the same behavior generalized to a cognitive approach to the world. Finally, in terms of object constancy, Ginsberg and Opper cite vacillation between object constancy and search for the object where it was last seen and the disappearance of object constancy when the child is unable to follow its movements visually. This seems to be equivalent to what Mahler describes as "low-keyed" behavior among children this age when they become aware that mother is absent. If some other person tries to comfort the child, he loses emotional balance and bursts into tears. The "toned-down" state visibly terminates "at the time of his reunion with the briefly absent mother" (Mahler, Pine, and Bergman, 1975, p. 75).

The third development of this period which has distinctly human and far-reaching implications is the development of language. Before the age of one, one or two word naming occurs (Knobloch and

Passamanick, 1974). Vygotsky holds that it is not until about the age of two that the "curves of development of thought and speech, until then separate, meet and join to initiate a new form of behavior" (1962, p. 431). Whorf (1941) holds that world view and language are mutually determinate and that first language consists of naming constituents of the world before combining them in a grammar which structures both reality and possibility. Although the child at this time responds to verbal communication, there is little reason to believe that language is associated with meaning beyond the simple, developing capacity to identify objects. Voyat (1972) says that language grows out of logic and is structured by it--the beginning interiorization of representation and use of language, therefore, coincide in this fifth sensorimotor period.

The dicosmos, or age of differences

At about eighteen months of life a critical transformation takes place. As Mahler, Pine, and Bergman (1975) put it,

> With the acquisition of upright, free locomotion and with the closely following attainment of that stage of cognitive development that Piaget (1936) regards as the beginning of representational intelligence (which will culminate in symbolic play and speech), the human being has emerged as a separate and autonomous person. These two powerful "organizers" (Spitz, 1965) constitute the midwives of psychological birth. In this final stage of the "hatching" process, the toddler reaches the first level of identity--that of being a separate individual entity. (p. 76)

From a Piagetian view, the symbolic function emerges at this moment and includes not only language but all activity which differentiates signifiers from signified. Language is a system of social signs and thus accommodative while play, dreams, and fantasy are idiosyncratic, assimilative symbolisms. With the rise of the semiotic function, accommodation and assimilation diverge and are not in necessary equilibrium again until they later reconverge at the formal operational level of thought. In this sixth sensorimotor period, invention of new means through mental methods occurs--schemata have become fully mobile and not specific to previous action. The object is freed from immediate perception and obeys laws of displacement--the child can invent itineraries to get him to his goal. Primitive cause-effect relationships are inferred and deduced, making this a particularly vulnerable period for faulty associations and lifelong neurotic ideation to develop.

Ego psychologists assume activity of a primary autonomous apparatus which organizes experience in relation to external reality (or its internal representation) and gives rise to thought independent of instinctual drives. The child can delay motor discharge, and use the energy of bound cathexes to search memory traces and plan future activity (Wolff, 1960). Thought is seen as having several distinct functions: hallucinatory

wish fulfilment, mental activity that neutralizes drive cathexis to mediate between inner needs and behavior, and a beginning ability to allow mental experimentation. Interaction between primary process and secondary process thought make possible solutions to problems which would be impossible if mental activity could only draw on past and immediate perception (very much like Piaget's mobile schemata). Regardless of the theoretical orientation, at this time normal children display inner-outer distinctions as well as intrapsychic differentiation. Piaget distinguishes between accommodation (imitation) and assimilation (ludic symbolism, dreams, and fantasy) which serves ego needs more than reality needs.

At this same moment, Erikson (1952) sees the central issue as centered in "holding on" and "letting go." Fraiberg (1959) calls eighteen months to three years the "magic years" in which the child is a magician and language is a magical "abracadabra," an incantation which brings about desired results. Wallon (1973) holds that walking and talking upset the primitive "communism" of infancy and permit the beginning of ego differentiation with development of a "self" system--thought is syncretic and diverse elements are merged into a hazy image based on chance impressions. Syncretism, magic, and lack of organizing principles all seem characteristic of thought at this earliest language period--actions are being internalized as cognitive

representations but this process takes a long time with language development crucial to increasingly social organization. There is a pseudo-contradiction implicit in these developments. The child becomes more and more egocentric, magical, and dominated by assimilative fantasy at the same time he or she is faced with increasing social demands and expectations of behaviors that the external world imposes--in terms of communication, socialization, and conformity the outside world is no longer as tolerant as heretofore, and mobility and individuation increase the outside world's concern with safety, socialization, and the like. Idiosyncratic symbolism collides with these demands and increases the differentiation dialectic. At this point, it appears that parallel needs develop to protect the individuated self by developing inner defenses and mechanisms to mediate with the externally perceived real. This would appear to be an underlying dilemma that promotes both cognitive and psychodynamic maturation.

A second characteristic of the eighteen month crisis is its ambivalence. Mahler calls this the "rapprochement period" because the child is now aware of separateness at the same time he needs the closeness and stability of his mother's accepting presence. During this time, two characteristic patterns highlight its ambivalence--the child clings to mother and then rushes away with the hope she will chase and catch him.

Mahler (1975) says this "indicate[s] both his wish for reunion with the love object and his fear of reengulfment by it" (p. 77). The ecstasy of the practicing subphase gives way to anxiety and, as Mahler says, the child who previously acted as though his "practicing" would lead to "conquest of the world," now understands that

> . . . the world is not his oyster, that he must cope with it more or less "on his own," very often as a relatively helpless, small and separate individual, unable to command relief and assistance merely by feeling the need for it, or even giving voice to that need. (1975, p. 78)

Individuation proceeds rapidly at this time along with mechanisms designed to resist and undo separateness, leading to a "rapprochement crisis" in which delusions of grandeur, parental omnipotence, and fusion must be abandoned. Danger signals in the rapprochement process, cited by Mahler, Pine, and Bergman (1975) are related to both the mother's ability to tolerate separation and individuation and the child's own developmental status. Early rapprochement can lead to excessive darting away behavior which the mother finds no way to successfully handle, and is sometimes connected with premature motor development. A second pattern seems more related to mother's inability to tolerate individuation and demandingness--exploratory behavior is subdued and the child returns quickly and demandingly to mother who seems unavailable. This perceived unavailability

can lead to "more desperate measures" always geared toward gaining mother's attention. Temper tantrums of great intensity constitute one such attempt. A third danger signal the Mahler group observed was related to early acquisition of language in a little girl whose mother communicated with her more readily on a verbal level. This child displayed marked separation anxiety and could not be comforted by anyone but mother, developed marked "shadowing" behavior and showed precursors of "serious developmental conflicts giving rise to marked ambivalence and the splitting of 'good' and 'bad' objects and probably also of self-representations" (Mahler, Pine, and Bergman, 1975, p. 82). In each instance, it appears that developmental disequilibrium was involved. The first and last situation clearly suggest that convergence between speech or motility and the appropriate separation-individuation subphase did not take place. Early rapprochement typically occurs from fifteen to eighteen months of age, while the rapprochement <u>crisis</u> extends from eighteen to twenty-four months, at the same moment that language as communication appears and the transformation from sensorimotor to preoperational intelligence is taking place. It is important to keep in mind that the differentiation between assimilation and accommodation Piaget cites at this time is also fragile and balanced in unequal degrees. The Janus-face of the affective experience of

of separateness is cognitive egocentricity in which the child cannot imagine a world in which he is not central nor see issues from any but his own point of view (Piaget, 1962). During this period of affective crisis, he is unable to perceive apparent contradictions which co-exist. Symbolic play which begins to develop is egocentric thought in its purest state--the child's needs and wishes create content and outcome without reality considerations. Propelled into a world without the protection of the symbiotic matrix, he comes to believe that the moon follows him, ears are there to hold up his glasses, that things are what he takes or makes them to be. Primary symbolism is such that the child assimilates one object to another but acknowledges that he is doing so--a seashell can be a cat, a box can be his potty chair. At the same time, however, secondary symbolism develops--usually centered in life issues that are causing him concern (and at this time, that issue is separation and individuation). Thought links both sets of symbols although the status of language determines whether they can be communicated.

A critical period for language acquisition begins at this eighteenth month according to Lennenberg (1967), who holds that biological maturation must take place before language can be produced. At eighteen months, motor skills include grasp, prehension and release, walking, and fair ability to sit in a chair or creep downstairs backward. Language includes more than

three but typically less than fifty words which are not used in sentences. By twenty-four months, the child can run, walk up and down stairs and join words together in phrases of his own construction. Communication via language is now of interest to him. Roger Brown (Brown, 1965; Brown and Fraser, 1963) studied both the grammar and meaning of early speech in two children. Very early language functions like a telegraphed form of adult speech and grows through mutual interaction between mother and child. The mother imitates and expands the child's sentence and teaches a world view as much as speech. Overgeneralization in speech, lack of functors, and grammar are observed. When Brown (1965) studied early meanings he found that the earliest tendency is to explain meaning in terms of action, consistent with Pribram's theory. Most of the observations of Lois Bloom (1972) confirm Brown's observations. Language is functional at first, but names link categories and help to create conceptions. Idiosyncratic meaning seems completely adequate. Later, language separates into sense, Brown says, which varies and remains personal and meaning which remains social and communicable. Until language is firmly established, it sppears to confuse reality as much as it begins to structure it. The evidence again supports the convergence theory of particular vulnerability because of extreme transformations and loss of the unicosmic world. The magical

nature of thought and language in this period is supported by Fraiberg's (1959) story of two and a half year old David who was going to travel to Europe by airplane with his parents. One day he burst into tears and confessed, "I can't go to Yurp. I don't know how to fly yet." His language was well advanced and he had seen airplanes; nonetheless, his magical parents were somehow going to take off in a way he couldn't manage. He and they were not really speaking the same language and would not be for some time to come.

In summing up the period from eighteen months to two years of age, several issues are clarified. Particularly important transformations appear in cognitive, affective, and neurological structure. If earlier development has been either premature or faulty, these transformations can be more than usually difficult, can, in fact, prevent the transformations from occurring. From this moment in life, language develops to both shape and mediate reality and the affective experience of separateness, achieved through resolution of the "rapprochement crisis," will lead to egocentric, magical thought observed in the preoperational child. It seems to be the case that many of the symptoms observed in psychotic and borderline patients translate best into incomplete developmental resolution of the crises of this time or the year and a half which precedes it. I have cited Fairbairn's concepts of the schizoid and depressive dilemmas, and Mahler's understandings of symbiotic and autistic

psychosis. A variety of other diagnostic categorizations could also be mentioned but each of them, I believe, can be understood within this framework, and will be dealt with later in the research on childhood psychosis. At this point, it seems clear that the vicissitudes of the period related to normal development are enormous. Their resolution seems to depend not only on "good enough mothering," to use Winnicott's phrase, in an "average predictable, environment," but also on the child's innate intactness and coincidence within varying maturational processes such that he can be said to be a "developmentally good enough" child.

The period from two to four years of life will not be examined as thoroughly as the first two years because the next major shifts in cognition and affect begin at that time. At the end of the rapprochement crisis, the child reaches an "important crossroads in personality development." He must give up symbiotic omnipotence, shifts in libidinal cathexis occur, and the child comes to question the mother's omnipotence. The crisis itself centers in the child's struggle to force the mother to function as his omnipotent extension alternating with signs of desperate clinging. Without full internalization of contrasting tendencies, the child may permanently split the world into "good" and "bad" objects and defend the good objects from aggressive impulses by projecting them onto the world. Mahler

continues:

> The clinical outcome of the rapprochement crisis will be determined by: (1) the development toward libidinal object constancy; (2) the quantity and quality of later disappointments (stress traumata); (3) possible shock traumata; (4) the degree of castration anxiety; (5) the fate of the oedipus complex and (6) the developmental crises of adolescence--all of which function within the context of the individual's own constitutional endowment. (Mahler, Pine, and Bergman, 1975, p. 108)

From the second to the fourth year, the child moves toward libidinal object constancy with parallel fear of loss of the object's love, a precursor of superego development. At this time a shift seems to occur in the sequence of cognitive and psychodynamic development. Piaget (1954) found that object constancy developed between eighteen and twenty months, whereas Pine (1974) found that representations of the libidinal object were present even before eighteen months but that the libidinally constant object was not consolidated before three to three and a half years. Pine relates the early representation to heightened learning which takes place under conditions of arousal which do not reach traumatic proportions. Previously, I have pointed to psychodynamic anlage of cognitive development (which fits Pine's description of early representation) but now two classes of objects are involved by the very nature of the dicosmic or differentiated world. The permanent object, cited by Piaget, is cognitively achieved almost two years before Pine's libidinally constant

object. There are several reasons that suggest themselves as to why this may be so. The first is the nature of the object itself. A ball or a rattle or a table retain stable characteristics even when displaced in space; therefore, signifying features may be enough to identify a particular object for the child. A second characteristic of this period that Piaget infers is that perception is more like a series of photographic slides than like the time-centered continuum of adult cognition--logical and infralogical categories do not exist which either combine discrete objects and events into classes or divide continua into measurable units. Therefore, although the object is permanent in some sense it is without the context in which it will later be embedded. Not only does the libidinal object displace itself in space, it also changes drastically in appearance: clothing, for one thing, differs. It also has less constant properties of which the child becomes aware--the angry mother and the joyous mother may well be two different people not only because of psychodynamic object splitting but because of the nature of perception itself. Even though enough continuity through change may exist for the object to be perceived as the same, Voyat (in Piaget, 1968) has demonstrated that the concept of identity through change is not available to young children. Again, it appears the problem of internalizing the libidinally constant object may promote cognitive growth.

At this period, object relations theorists hold that a variety of pre-Oedipal neurotic resolutions occure. According to Fairbairn (1952) all development is aimed at retaining relationships with significant others; therefore, the Oedipal situation is a variation of object relatedness but so too are obsessive, hysterical and other conditions. Guntrip (1969) describes the varieties of pre-Oedipal problems as "failure to maintain good-enough object relations" (p. 246) which result when "real life pressures. . . play upon pathological patterns of grown-up tensions in the unconscious" (p. 246). These include psycho-neurotic anxiety states, ambivalence, love-hate conflicts, guilt and depression, primitive ruthlessness, fear of destructiveness, and the transference neuroses, hysteria, obsessions, phobias, and paranoid attitudes. All are rooted in difficulties of this period of life.

At the same moment in development, preoperational intelligence appears which is characterized by egocentrism, magic and animism plus stimulus-boundness. The child now has symbols which serve the ego by allowing it to triumph over the environment whether reality permits or not (Piaget, 1963). Play is the most obvious example, but dreams also allow the ego to assimilate reality without any necessary, direct accommodative function. Affective schemas predominate all individual symbolism. Egocentrism, an unconscious process, becomes conscious when egocentric ideas incorporate images to pre-existing schemas.

Traumatic symbols which perseverate, as in the cases which opened this discussion, are schemas which have not been mastered. Vygotsky suggests that the inner stream of consciousness which appears now always remains private, personal and idiosyncratic while language which serves communicative functions is increasingly socialized (1962). If trauma is overwhelming, ego defenses permit it to be repressed and it only surfaces when one of the features of its syncretic composition is evoked. An alternate point of view is that the very nature of cognition itself as well as static perception make events not assimilated into ongoing schemas unavailable until the schema expands to include the event. During this period, Vygotsky describes a "chain of complexes" of association according to single features which change--bananas are like peaches because they are yellow, peach is like potato because it is round: the class inclusion of "food" or "fruit" is not available at this time. This chain suggests also that idiosyncratic associations of any kind are particularly apt to occur now which are elaborated in schemas which are pathological. Free association as a technique, then, has as its cognitive side attempts to trace faulty associations to their roots in this two year period. Contiguity in space and time are more potent determinants of cause-effect relationship than at any other time in life.

Over this two year period, as the child struggles with

curiosity and mastery, with libidinal object constancy, and with cognitive magical egocentrism, language develops apace. Grammar and syntax develop but Ervin-Tripp (1964) suggests that syntax is related to operational thought and not apparent in early language. Brown (1965) says that a major aspect of the development of syntax consists of progressive differentiation of morphemes and morpheme classes at the same time the linguistic structure of the language is being incorporated. Higher levels of linguistic structure and social structure are learned at the same time. Therefore, when the child is in almost complete command of the language, he knows his society as well. At the age of four, with understanding of some prepositions, comprehension of two stage commands and the ability to name some colors, the child is fairly well socialized into the culture (Knobloch and Passamanick, 1975).

The tricosmos, or period of interaction

As it has been a consistent argument that psychodynamic concerns promote cognitive growth, I will take the position that the achievement of libidinal object constancy in the third year of life and increased perception of father as a second libidinal object leads to the Oedipal conflict, the affective experience of triangularity. At this point, the child continues to be ambivalent but the ambivalence in normal development takes new directions. If the child's psychodynamic growth has gone well, he

is now ambivalent about objects which have good and bad aspects but which are perceived as one. His ambivalence shifts from coordinating good and bad into one construct, to having good and bad feelings about the other person which can be implied, because he lacks reversibility and transitivity in Piagetian terms, to be experienced as absolute. That is, there is no logical necessity which permits shifts in direction, reversibility or abstraction from the real. Magic and egocentrism persist. When faced with ambivalent feelings about mother and father, the child cognitively believes in his own magical power and egocentrically perceives their reactions as magically related to his behavior. When angry, he feels he has the power to destroy; when loving, he lacks mediation or the notion that he will feel another way another time. Therefore the combination of cognitive and affective concerns sets up another set of irresolvable conflicts which promote cognitive maturation and the transition to concrete operations.

Mullahy (1948) has reviewed major psychoanalytic theories of Oedipal development in such depth that I will not attempt to repeat his work here. Freud's theory holds that infantile sexuality reaches its height at the phallic period when, according to Mullahy (1948), "interest and pleasure in the penis become related to an external object" (p. 22). Mullahy describes shifts in sexual instinct from oral through anal to phallic cathexes which eventuate in the boy's erotic attachment to the mother.

which Freud assumes is by nature exclusive and jealous. At the same moment, the beginning of repression has begun and the boy is not conscious of his sexual aim; rather, he becomes annoyed and irritable not only with siblings but with his father when he claims mother's exclusive attention. Two dichotic possibilities emerge, one active and one passive. The boy wishes to put himself in his father's place and have intercourse with the mother but he may also want to supplant mother in father's affections, in accord with the theory of bisexuality. Freud distinguishes active, male elements from passive, female elements which are both present now. The ambivalence of earlier development (beginning with Erikson's oral taking stage) is now centered in phallic concerns. During this period, by and large, the feeling for the same sex parent is predominantly antagonistic and rivalrous, with erotic and possessive desires consistently thwarted. The Oedipal complex is resolved for two reasons: one is that it is sufficiently painful to cause repression of the affect involved and a second is that normal development occurs (in this case one might argue cognitive development) which resolves the conflict through a new structure of personality and cognition. At this same period, castration anxiety is profound: the boy comes to feel that possessing the mother might result in loss of the penis which precipitates the crisis that terminates the Oedipal longings and leads to identification with father. This identification, and

the capacity for sublimation, are outcomes of Oedipal resolution and such defenses as reaction-formation appear to act as barriers against later sexual expression. Mullahy describes the end of the Oedipal period and the beginning of latency as the time when infantile amnesias are established through profound repression. Sexual development slows and sexuality is repressed until it reappears at adolescence when, if development is adequate, it will reach its completion in adult, genital, procreative sexuality. It is also at the beginning of the latency period that the development of the super-ego, the observing, critical internalization of parental injunctions, takes place. Freud holds that in large part this occurs because in giving up the sexual object, the boy reinstates it within the ego. In giving up mother and father as sexual objects, the boy internalizes them and identifies with their values. At this point, a tripartite intrapsychic structure can be assumed to have been established.

In girls, the situation is somewhat less clear. However, Mullahy (1948) describes it as a time when the little girl gives up some of her active strivings and instead of expecting to have a penis, wishes to get it from the father. Later, she abandons the wish for a penis and substitutes the wish for father's child and at the same time, establishes a fully feminine orientation. In Freud's view, which can be considered to be the most culturally bound and thus somehow the

most inadequate of his formulations, the girl later marries and, if she has a son, at last acquires the longed-for penis, making her happiness complete. The girl is seen as more or less suspended in unresolved Oedipal longings for most of her life. Because there is no fear of castration, there is no impetus for resolution although there may be unconscious hatred of the mother who also has no penis. The poorly resolved crisis may end in identification with the phallic mother or father and avoidance of truly feminine identity. Although one could argue various points raised by Freud's formulations, the general direction of intrapsychic growth he describes seems to occur in Western civilization.

From my own point of view, this affective negotiation of triangles after the achievement of libidinal object constancy may well be the underlying, unconscious dilemma which leads to the rise of concrete operations. During this time, a major shift occurs in cognitive structure which is cognitively equivalent--the child moves from egocentric, magical thinking to cognitive operations which coordinate two dimensions of the external real in internal abstraction. At about the age of five or six, most children achieve the first concrete operational task, one-to-one correspondence. One-to-one correspondence consists of establishing the equivalence of two sets of objects and maintaining that equivalence through perceptual transformations. The child is

shown unequal numbers of two objects and asked to make them equal. The objects are then displaced, one line being lengthened, and the child is asked if there are still the same number of each object. This displacement is repeated three times, with equivalence re-established in between. One-to-one correspondence is said to have been achieved when the child knows that no matter how the objects are moved, if none are added and none removed, the number of objects remains the same. This first logical operation is soon followed by the logical ability to seriate sticks in such a way that increasing length is ordered appropriately. These two tasks are achieved during a transitional period coincident with the height of the Oedipal conflict and its resolution. The concept of number (one-to-one correspondence), which is usually achieved between the age of five and six, seems to me to follow on the heels of the child's perception of himself, father, and mother as distinct and to depend not only on libidinal object constancy and the inclusion of father as a libidinal object but also on the affective necessity to objectify perceptions in a more than egocentric way. Seriation, the next achieved task, relates objects according to varying lengths which can also be seen as a cognitive resolution of power and size issues raised by castration concerns in both sexes: in arriving at cognitive ability to abstract relations from objects, transformation in terms of relative, abstract relatedness

can be said to have taken place. Therefore, the affective predecessor of these two tasks appears, in normal children, to be related to necessities the child finds to relate himself to the father, mother, and siblings as well as to objectify and numerate objects in the world which have reality beyond his own egocentric perceptions of them.

The concrete operational period proper begins at about age seven or eight, at the moment in psychodynamic development when repression of Oedipal sexuality is taking place and when the tripartite personality is consolidating with growth of the superego. According to Voyat, McLaughlin, and Shackelford (in preparation) it is the time that logical and infralogical operations come to interplay. Here

> . . . logical operations, such as categorization of objects into classes and relations, and infralogical operations, such as spatial-temporal categorization emerge. Both develop in parallel and simultaneously although from a formal point of view they are antithetical. Logical operations can be defined as a progressive ability to structure continuity from discontinuity. For example, when a child is asked to classify he is, in effect, asked to abstract such features as shape and color in order to establish a shared continuity based on the abstract feature, a set-categorization. Until seven or eight, the child shifts the parameters of the set, first picking objects by color, then shape, and then size, such that the categorization has a fluid, associational quality. He lacks the ability to maintain the parameters of classification or seriation because he has no logical necessity, a proper of the concrete operational period of thought. Given a collection of horses, all animals, and two cows, also animals, the child will declare that there are more horses than animals because he is unable

> to co-ordinate "more" and "animals" into a two-dimensional category--therefore "more" remains one dimensional and must mean horses of which there are clearly "more" on the table. At this time, he is simply not able to impose on the perceived configuration the necessity that, no matter how many horses are in front of him, abstractly the set of animals is broader than any subset species. At the concrete operational period, classification has become an operation which introduces abstract continuity and discontinuity which includes several dimensions rather than simply one. The same holds for all logical operations, including relations of difference (seriation) and the concept of number (Inhelder, 1969). At the same time, infralogical operations dealing with space, time, movement and speed emerge which allow for inverse properties. Measuring time, for instance, consists of introducing to the continuum discrete, constant units which can be used as referents (Piaget, 1971). From a developmental point of view, these two types of operations are nascent during the pre-operational period and their duality is, from Piaget's perspective, an inherent source of cognitive conflict which is resolved at the moment of concrete operations through conservation and reversibility, two necessary conditions for coordinating the apparent disparity into a new structure of thought. Concrete operations can thus be understood as the construction by the child of logical necessities which persist despite apparent perceptual changes. (pp. 2-3)

The major task of the concrete operational period can thus be seen as the construction of reality external to the child which he achieves through observing relations between external objects and events. The massive repression of the post-Oedipal period and defenses which arise at that time for the first time very clearly demark inner and outer reality, to such an extent that amnesia for earlier events is the case. It is clear from Piaget's (1969) work that this distinction takes place in other ways as well. At five or six, the child thinks

that thought is in his mouth and identified with his voice; by age seven or eight thinking is in the head but not distinct from matter and it is only at eleven or twelve that thought is in the mind and distinct from matter. The same progression is true of dreams in the opposite direction: at five or six the dream is outside the self in the room; at seven or eight, its source is inside the head but the dream itself is external. At about nine or ten, the dream is a product of thought which takes place inside the head. It seems entirely possible to argue, therefore, that this construction of reality which has logical and infralogical laws is precisely possible because of the corresponding psychodynamic restructuring of personality which takes place at the same time. Although it is impossible to prove that the affective dilemma precipitates the crisis which results in cognitive transformations, in each case it has been possible to point to an affective, developmental crisis which precedes cognitive transformations and the total restructuring of personality in important ways.

As previously stated, the achievement of the dicosmos appears to be necessary but not sufficient to the construction of reality which is only complete at the end of the concrete operational period. As the children studied in this research had all been diagnosed as psychotic before the age of five, the relationship between their Piagetian developmental status

and that diagnosis is focal to my argument. Although I have indicated the relation between theories of development and abnormal outcomes throughout the discussion, some of the major literature on childhood psychosis should clarify the notion that its fundamental organization rests on an essentially unicosmic reality associated with lack of convergence among psychodynamic, cognitive, or neurological developmental processes.

Childhood Psychosis

The literature on childhood schizophrenia has been extensively analyzed by Goldfarb (Mussen, 1970) and by Ekstein *et al.* (Bellak and Benedict, 1958). As early as 1958, the search for a primary causal etiology for the varieties of childhood schizophrenia was in question. As Ekstein *et al.* point out, casual theories cover

> . . . a spectrum ranging from Kallman (1956), who has presented evidence for the hereditary basis for schizophrenia through Bender (1956) and her theory of dysmaturation; the psychoanalysts and their intensive researches into personality and ego function from a genetic and psychodynamic standpoint; Sackler (1952) and his coworkers on the effect of endocrine dysfunction on the devel development of schizophrenic behavior; Mahler (1952) and her studies on the effect of mother-child symbiosis on the development of ego identity with its special import for schizophrenia; to the work of Rank (1949, 1948, 1955, 1952, 1951, 1950) and her associates, Kanner (1951), Despert (1951), and many others who have stressed the etiological importance of the personalities and attitudes of the parents, the emotional quality of the parent-child relationship, and the noxious effect of early environmental influences on the development of the schizophrenic child. (1958, p. 656)

Although it was not clearly stated in quite that way, the lack of convergence of developmental processes figured strongly in Bergman and Escalona's (1949) observation of unusual sensitivities in very young children who later became psychotic, Weil's (1953) findings that delayed ego development was related to severe difficulty in impulse control but also that premature motor development sometimes occurred, as well as to the work of Bender (1947) regarding extreme plasticity and maturational lags at the embryonic level. Hartmann (1953) implies something similar when he suggests that the ego fails to develop a capacity for neutralization as the result of defective, inherited ego apparatus. Starr (1954), at the time, came closest to articulating the underlying hypothesis I am pursuing without, of course, including a Piagetian analysis. Ekstein (1958) summarizes Starr's work as follows:

> Starr (1954) regards the nuclear position of the symbiotic union of mother and infant for the psychoses as the analogue of the Oedipus complex in its nuclear role with regard to the neuroses. In his view, the vicissitudes of the development, consolidation, and resolution of the symbiosis determine the borderline disturbances, character disorders, and severe neuroses, as well as the psychoses. Congenital variations in infants as to the degree to which they actively seek for objects, and for physical autonomy, and in mothers as to their affective availability and attitudes toward autonomous development in the infant, determine the existence and nature of the childhood psychosis. Starr likens the whole process to a psycho-embryological developmental schedule, divided into pre-symbiotic and post-symbiotic phases, which, according to Erickson, must proceed at a proper rate and in normal sequence for a healthy outcome. (p. 588)

Diagnosis, then as now, depended in large part on the basic assumptions as to what constitutes the condition. By 1970, Goldfarb cited the criteria of the British Working Party on Childhood Psychosis (Creak et al., 1961) as describing the major behavioral manifestations found in schizophrenic children, whatever classification schema was used. The nine major disturbances include (I quote the summary statements):

1) gross and sustained impairment of emotional relationships with people

2) apparent unawareness of his own personal identity

3) pathological preoccupation with particular objects

4) sustained resistance to change in the environment

5) abnormal perceptual experience

6) acute, excessive and seemingly illogical anxiety

7) speech may have been lost or never acquired or may have failed to develop beyond a level appropriate to an earlier age

8) distortion in motility patterns

9) a background of serious retardation in which islets of normal, near normal or exceptional intellectual function may appear.

(Goldfarb, 1970, p. 780)

In discussing 48 children classified as psychotic at the Ittleson Center, Goldfarb says that all of the children showed at least five of the nine points mentioned.

In terms of the convergence theory I have outlined, each of these criteria can be seen as a defect in differentiation and

failure to achieve a dicosmic universe, or as a defense against it. Impairment of emotional relationships is apparent in either inability to achieve separation and individuation or in withdrawal from the world of persons, as in autism, and personal identity also quite clearly depends on being able to differentiate between self and other while acknowledging "otherness." Pathological preoccupation with objects or characteristics of them suggests that the child has developed recognitory schemas cited by Piaget late in the first year of life without moving beyond that to the stage of mobile schemata which are generalizable--the object thus can be cognitively seen as a transitional object which failed in becoming a facilitator of the transition: the object itself rather than its function of symbolic representation is cathected. Sustained resistance to change in the environment serves a similar function: it seeks to keep externally stable that constancy of objects the child should appropriately have internalized in the transition from sensorimotor to preoperational thought, from symbiosis to individuation.

Abnormal perceptual experience in the absence of discernible perceptual impairment can be understood in two ways: either neuropsychological impairment of later developing parietal lobe functions has not as yet been studied as related to childhood

psychosis (which seems to be true) or the lack of differentiation expected through the development of cross-modal transfer is interfered with. In discussing a hierarchical organization of sensory systems, Hermelin and O'Connor (1963, 1964, 1965) have described a sequence of sensory development in which normal infants are most responsive to interoceptive and visceral sensations which is followed by a gradual shift to tactile and kinesthetic sensations. Late in infancy, auditory and visual systems mature. According to Goldfarb, the authors found that

> When a state of sensory development has been reached, the meaning rather than the modality of stimulation determines its place in the hierarchy of sensory organization. At this point, language and meaning direct the organization of sensory processes. (1970, p. 791)

In comparing psychotic with normal children, Hermelin and O'Connor found that this hierarchy of sensory organization was deficient, and differed from that of mentally subnormal children as well. Psychotic children were most responsive to light stimuli (in paired combinations of light, touch, and sound) as were subnormal controls but following that, psychotic children responded to touch and controls to sound stimulation. Directional cues (related to parietal lobe functioning in adults) were difficult for psychotic children as were figure-ground discriminations. Therefore, Goldfarb (1970) concludes:

> Intensive clinical investigation and treatment of psychotic children has tended to contradict the commonly held notion that psychotic children are totally impervious to

> stimulation. Rather they would seem to be suffering from aberrations in sensory dominance and the hierarchical structuring of sensory processes. . . and from lack of techniques for schematizing and giving meaning to stimuli (Goldfarb, 1965). Thus they are not isolated from experience. Rather they orient themselves in aberrant fashion to stimulation and schematize those stimuli which do reach them in very ineffective fashion. (p. 791)

The importance of this deficit, in terms of the review of normal development is that cross-modal transfer, especially that which associates vision and tactile exploration, begins around the fourth month of life, during the transition to secondary circular reaction in cognitive growth. It was, indeed, seen as central to secondary circular reactions which develop until about nine months and coordinate vision and touch in search behavior. Without appropriate sensory development, it seems entirely likely that this early cognitive development would either not occur or be seriously delayed. Furth (1966) has indeed found such to be the case in the development of concrete operations in blind children. However, in psychotic children it is conceivable that the visual component may develop while the tactile or haptic perceptive one does not, again preventing dicosmic differentiation.

The British Working Party's sixth point, acute, excessive and seemingly illogical anxiety, can be viewed from a variety of positions: it is apparent in the children that Mahler saw who are previously described as perpetually panicked by

fear of loss of the object and fear of re-engulfment. It is also found in some of the children Erickson studied who were traumatized at the transition from the oral incorporative to the oral taking stage at six months of life. A second, supporting hypothesis is that motor development--which depends on delay of discharge as much as on fine motor skills--is proceeding at the same time: acute anxiety may thus have some relationship to inability to delay discharge as well as to later contextualization of intentionality in motor-meaning systems--the appropriate neurological development, in that case, is lacking. A final, cognitive element--with which Piaget would most likely disagree--is that sensorimotor schemata, especially those which coordinate action in anticipation of a goal simply do not occur because of neurological deficits and the child is perpetually suspended in stimulus bound schemas without either a logic of action or constant objects and interior representation. Speech loss, or lack of development, would be a concommitant situation. Voyat (1972) has stressed that speech grows out of logic and is dependent on it; therefore, symbolic functioning necessary to speech and to later speech meanings would be impossible if the transition to preoperational thought is prevented by lack of earlier, hierarchical sensory development. Speech, according to Lennenberg, is also a motor function which depends on motor maturation. Here again, along with observed disturbance of motility,

one can argue from cognitive, neurological or affective developmental points of view. The convergence among the three essential to normal growth has not occurred although the manifestations may be idiosyncratic from child to child.

The last point raised by the British Working Party, serious retardation, has simply not been found at least as measured by traditional intelligence tests in large numbers of psychotic children. However, what our research group at Psychiatric Institute from 1973-1975 did find, on Piagetian tasks, was a vast heterogeneity in both the ability to perform the experiments and lack of hierarchical necessity among the children seen. There were several children who were transitional in all Piagetian tasks administered, whether they should have been achieved at six or eight or ten. Another child could perform specific tasks when she manipulated materials while she was unable to do so when the materials were manipulated by others. A third child, described at the beginning of the chapter, was able to perform at a twelve year-old level when the material was not evocative and unable to do a five year-old task when his own personal pathology was stirred up. Therefore, although traditional measures do not seem to distinguish among psychotic and normal children necessarily, our group did not find any child who could perform all Piagetian tasks in the hierarchical progression described by Piaget.

While the criteria defined by the British Working Party describe behaviors, observed in psychotic children, the literature on cognitive development among them is sparse. Rorschach studies have failed to consistently distinguish "thought disorder" in young children (Piotrowski and Lewis, 1950; Cobrinik and Popper, 1961; Des Lauriers and Halpern, 1947), although suggestive patterns of response have been observed. Des Lauriers and Halpern did find two subgroups of protocols which seemed identifiable: one set in which the pattern of response was like that seen in organically impaired children (short, poor form level, perseverative, impoverished) and another set in which rich and intellectually good responses were distinguished from those of neurotics by extreme variability of performance: cards which typically elicit stereotyped responses, populars, elicited instead confabulations and contaminations. In both groups, however, the approach to the task was distinctive. The organic-like children treated the card as an object to be tactilely, orally, and visually explored with little investment in the task while the neurotic-like group were extremely variable in response. For no predictable reason, they would go from adequate performance to a variety of inadequate strategies. In both instances, it would appear that the lack of object constancy or grasp of the social reality of the test situation was at issue.

In comparing TAT stories of psychotic and maladjusted

non-psychotic children, Leitch and Schafer (1947) found nine indicators I would interpret as failure to dichotomize the world appropriately or to suggest symbolic differentiation: in terms of language, they found incoherence, contradictions, queer verbalizations, nonsense rhyming and neologisms. Cognitively, lack of distinction is suggested by introduction of the examiner into the story and themes unrelated to the pictures. Meyer (in Ekstein, 1971, pp. 41-51) distinguished two groups of severely disturbed children on the Rorschach in terms of the adequacy of inner and outer reality testing. Form percepts which were distorted (e.g., "cat" for the commonly seen bat of Card V) is either a clang-association or suggests outer reality deficit. The response "a bat eating two people" to the same card is related to internally distorted experience of a correctly perceived external real. Thus the breakdown of organization seen in psychosis can come from either direction--distorted inner reality overwhelms ability to correctly perceive external reality or poor reality testing a priori prevents internalization of the social, consensual "real." Meyer says that psychosis results when the "continual commerce" between inner and outer reality dissolves.

While there is a vast and burgeoning literature on childhood psychosis, in most instances it depends on comparison with adult psychosis for its conceptual and clinical descriptions. As I have specifically argued that the genesis of thought dis-

order in early childhood is centered in lack of distinctions achieved during the transition from unicosmic to dicosmic experience, at a particularly vulnerable period of development, the nature of breakdown in adulthood is beyond the scope of this work. However, Arieti (1974) has cogently argued that adult psychotic patients teleologically regress to the last period in which cognitive conflicts were resolvable. Therefore, a short exegesis of his theory of paleologic seems in order.

Arieti describes a progressive loosening of association among schizophrenics which seems in some ways similar to the chain of complexes described by Vygotsky (1962). Ideas are connected but not by logic, simply by contiguous association. At this point, a single feature may be used to associate rather than the contextual classification observed in concrete operational children. Later, association is still through similarity but the similarity is among words rather than symbolic, internalized meanings. Clang-associations result. This associational ability disintegrates as the patient regresses until ideas that were <u>associated</u> by similarity are <u>identified</u> by similarity and "paleologic"--logic itself does not disappear but the underlying abstraction is replaced by identity; those things which are contiguous in time or space become the same. The patient may be asked who is the president and answer "the White House." Because the President lives in the White House, identity is assumed.

This identity by contiguity appears to be similar to a time in life before concrete operations which permit the construction of time, space and logical necessity but they also suggest that personal identity, the keystone on which separateness of other is also based, has dissolved or not been established. Finally, Arieti discusses identity by predicate and not by subject, an important distinction. A "subject" requires a personal identity, a distinct selfness which acts upon the world. A predicate is the indiscriminate object of action--subjects have properties of their own but predicates are random; that is, a subject can act on any object but predicates depend on the action of subjects. In this instance, Arieti discusses paleologic as identity of predicates. His classic example is as follows: "I am a virgin. Mary is a virgin. Therefore, I am the virgin Mary." Two important points are involved in this paleologic: the first is the patient's perception of being passive and acted upon (consistent with normal development in the "holding" stage described by Winnicott, the secondary circular reaction described by Piaget, the immature neurological system from birth to maturation of mobility). The second important dimension is that in paleological thought, identity is through attribute and not throuch coordination of several attributes, also consistent with this first six months of life. Earlier, I cited the cross-modal perception necessary to the beginning of dicosmic experience; here, in Arieti's description one attribute is enlarged to describe the whole and

thus the unidimensional experience of the adult schizophrenic, whatever its etiology, also has characteristics of the first few months of life.

There are several major theoreticians whose work has not been examined such as Bender (1944), Kanner (1942), Ekstein (1958, 1966, 1971), and Bettleheim (1967), who have made unique contributions to the understanding of childhood psychosis and schizophrenia. Reading their work has not brought about a major re-evaluation of the hypotheses I am advancing. The point is really that I have failed to find major exceptions which could not be included in the unicosmis-dicosmic taxonomy. Although the understanding of underlying causes may differ, there appears to be general agreement which can be understood in the framework I have proposed. Therefore, rather than completely analyze the literature in the depth it most assuredly deserves, I will move to the major hypotheses of the present research, all of which evolve from understanding of the critical and vulnerable transitions from unicosmic to dicosmic experience of the world and later transition to the tricosmos.

Hypotheses

Based on the framework I have developed, my hypotheses are as follows:

1) Psychotic children eight years old or older but diagnosed as psychotic before the age of vive may not display one-to-one

correspondence or class inclusion typical of children this age.

2) Within this group of children there will be

a) correlations between their ability to perform one-to-one correspondence and their ability to answer simple reality questions about location in time and space, identity, and family relationships regardless of age, I.Q., or diagnosis and

b) no necessary relationship between the achievement of class inclusion and one-to-one correspondence.

3) When psychotic children self-select a continuum of best-liked to least-liked objects, the children will handle the task more competently with objects they like or feel neutral toward and will perform poorly with best-liked objects paired with least-liked objects.

4) The total organization of cognitive functioning will consistently influence performance. Patterns of response will most often be transitional. That is, the pattern of response will be neither completely preoperational nor concrete operational.

5) Even when class inclusion is achieved, justifications will more often be concrete than abstract.

6) Within this population the structural hierarchical sequence of one-to-one correspondence prior to class inclusion will not necessarily be found.

CHAPTER II

EXPERIMENTAL DESIGN

The eleven subjects for study were drawn from a population of children in a public school, day treatment program funded by cooperating school districts for emotionally disturbed and/or learning disabled children. Their emotional problems were so severe as to prevent their being educable within local school systems. The surrounding communities are seen as sufficiently middle class to permit use of Voyat's norms (in press) as a baseline for comparison. The subjects were selected by psychologists within the school according to the following criteria:

1) Prior diagnosis of childhood psychosis and/or schizophrenia before the age of five. Children who were not seen as psychotic before that age were excluded to control for reactive or traumatic psychotic episodes after the achievement of one-to-one correspondence which might have contaminated the hypothesis that their cognitive maturation had been delayed before the transition to concrete operational thought. Autistic children without enough language to participate were also excluded.

2) The children were eight years old or older at the time of experimentation. At this age, normal children can be expected to function at the concrete operational level of thought. Thus

according to the Geneva norms (as representative of Western civilization's conceptual paradigm), there is a time delay demonstrated between the mastery of one-to-one correspondence between age five and six and achievement of class inclusion between age eight and nine. This variable was added to investigate the hypothesis that hierarchical development might not necessarily be found in psychotic children.

3) Traditional intelligence tests were excluded as criteria as the variable being investigated was cognitive development. It appeared that a wide range of traditional intelligence measures might shed light on the relation between Piagetian measures of cognitive development and psychotic thought processes. There was also no attempt to isolate specific diagnostic categories of childhood psychosis. Major interest was focused on the value of Piagetian tasks in distinguishing among psychotic children rather than on the differential criteria by which children come to be labeled as psychotic; therefore, psychosis in this instance was defined as having been established through

a) such diagnosis by a psychiatrist

b) confirmation of the diagnosis through psychological testing and/or by the psychologist responsible for the child within the school

c) placement in the school on the basis of diagnosis. While it can be argued that a clearer definition of psychosis would have been helpful or that diagnosis by specific criteria would have teased out significant variables, the literature itself is confusing and children treated as psychotic and labeled as such may share significant traits which are helpful in defining Piagetian criteria relevant to the diagnosis. A corollary of the argument against more stringent and/or highly refined diagnostic criteria is also practical rather than theoretical. These children were diagnosed as autistic, schizophrenic, mixed-organic psychotic and the diagnosis as given by the school was accepted. They were then treated as "psychotic" as an established fact, regardless of the orientation of the diagnostician, within a specific and consistent treatment setting. If there appear to be consistencies among the group selected on that basis, the qualitative and idiosyncratic consistencies and differences among them should further understanding of how such diagnoses are made--whether it depends on the diagnostician's orientation or whether there does, in fact, appear to be consistent symptomatology among the children.

Methodology

Based on the findings of the Piaget research group at Psychiatric Institute (1973-1975) that the affective importance of materials as well as individual coping styles influenced performance of Piagetian tasks, it was decided to present fourteen

objects representing a continuum from neutral inanimate objects through human beings to threatening animals to each child who would then self-select best to least liked objects. The inanimate objects were those which have been cited as appearing in psychotic children's fantasies (Ekstein, 1966; Bettleheim, 1967) while the animals included two small benign scale models of panda bears and kangaroos as well as two rather more menacing gorillas and polar bears. The objects were as follows:

1) two poker chips
2) a spaceship or rocket
3) a small telephone
4) a sewing machine
5) a mother
6) a father
7) a policeman
8) a fireman
9) an astronaut
10) a baby panda
11) a baby kangaroo
12) a gorilla
13) a polar bear

All human figures were gaily painted, wooden cutouts found in Fisher-Price children's puzzles. The animals were scale model reproductions, smaller than the human figures. The household

appliances were of dollhouse size and the spaceship was a plastic toy to be used with caps. Although none of the objects were of disproportionate size, they were sufficiently different that values attributed to them were seen as symbolic rather than realistic. This mixture of size and realistic representation appeared not to have interfered with its evocative meaning to the original group tested at Psychiatric Institute and was maintained.

Procedure

Each child was initially asked a series of reality (orienting) questions:

1) What is your name?
2) Last name?
3) How old are you?
4) When is your birthday (day and date)?
5) What year were you born?
6) Where are we now?
7) What month is it?
8) What year is it?
9) There's a vacation coming soon. What are you going to do?
10) What do you like to do best?
11) What do you like to do least?
12) Have you any brothers or sisters? Tell me about them.

Selection of best to least liked objects

Each child was then presented with the objects listed above and asked to rank order them from best to least liked. Least to best liked ranking was so upsetting to some of the children that the procedure was modified when necessary (and one child lost to the study because of her reaction to attempts to have her rank least to best liked objects).

One-to-one correspondence

(Task description will be found in Appendix A.)

After the child had rank ordered objects, one-to-one correspondence was presented in four ways:

1) best liked and next best liked objects paired
2) least liked and next least liked objects paired
3) best liked and least liked objects paired
4) neutral objects (middle ranks) paired

Again, dependent on the children's reactions, this order was not always followed. Some children appeared sufficiently anxious with the first presentation that class inclusion was presented next to get some measure of performance on each task. In other cases, the third presentation was disorganizing and class inclusion presented as the next task, with neutral objects presented in another session.

Class inclusion

(Task description will be found in Appendix A)

Class inclusion was presented first by asking the child to pick two things that "go together." If those objects constituted a class, the task was presented with them. If it did not, the task was presented in classes determined by the examiner with the best liked objects presented with a same class object, i.e., if mother was the best liked object it was presented with the figure that represented father. The classes as defined by the experimenter were:

1) two poker chips
2) mother and father
3) household objects (sewing machines and telephones)
4) policeman and fireman
5) panda and kangaroo (often seen as "cat")
6) gorilla and polar bear
7) astronaut and rocket

The child was also presented with least liked objects paired with a same class object. Spontaneous choice frequently coincided with best liked objects and the protocols of eight children fit that pattern. For two other children, best and least liked objects constituted a class but spontaneous choice differed and only one child was presented with the task in all three conditions. The last child paired mothers and telephones which did not constitute

a class. As statistical analysis of ability to achieve class inclusion related to evocative content was impossible because only four children achieved it under any condition, this relationship will be discussed in the qualitative analysis.

Data analysis

The data were evaluated for the following variables:

1) reality score

2) one-to-one correspondence in four presentations (Stage 1, Stage 2, or Stage 3, as below)

3) class inclusion in two or three presentations (Stage 1, Stage 2, or Stage 3, as below)

4) concreteness or abstractness of why two things "go together" in the spontaneous choice for class inclusion

5) justifications for class inclusion, when achieved, were rated for concreteness or abstractness.

Each protocol was independently scored by three raters on the above factors with inter-rater reliability on the Kappa statistic of percentage of agreement over chance among raters (Fleiss, 1973) ranging from .61 to 1.0. The criteria used for rating were the following:

One-to-one correspondence

Stage 1. The child does not seem able to understand the concept of equivalence. That is, he is unable to make the one-to-one correspondence. He may place the objects within the

given configuration without paying attention to the given correspondence.

Stage 2. The child is able to make the one-to-one correspondence, but when one row is transformed, either lengthened or shortened, the perceptual features of the configuration determine the child's response. He no longer believes in the equivalence of the two rows.

Stage 3. The child is able to establish the one-to-one correspondence and no matter how the configuration is changed perceptually, the child maintains the equivalence of the two rows.

Class inclusion

Stage 1. The child is unable to answer the question, "On the table do we have more [object] or more [class]?" In general, he does not seem able to understand theconcepts of "some" or "all" and his thinking is dominated by perceptual characteristics.

Stage 2. The child will be inconsistent in his response to the questions. Some he will succeed in, some he will miss. Often he will correctly answer questions concerning the subtraction of class correctly, "If I give you all the _____ what remains in my bunch?" Please rate whether the child

a) correctly classifies objects on the table but fails "in the world" or

b) incorrectly classifies objects on the table but correctly classifies "in the world."

Stage 3. The child achieves and maintains class/sub-class distinctions.

Follow-up study

As I was interested in the association between Piagetian tasks and diagnostic patterns, I did not look at the records of any children until an initial evaluation of their performance had been made. I then checked their records to gather data on I.Q., diagnosis, family composition, and the validity of answers to reality questions. Each had at least five of the eight criteria noted by Goldfarb (1970). At this time, it was decided not to run a control group of normal subjects. I.Q.'s ranged from 58 to 108 and ages ranged from 8-11 to 13-5. A child with an I.Q. of 58 to 70 is by definition not of normal intelligence and the present study was not one of comparing retarded and psychotic children. Similarly, had the control group been of normal I.Q., the age range suggests that the older children would have been at least transitional to the formal level of thought which would have also biased the data and precluded any meaningful comparison. Therefore, statistical analysis is limited largely to intragroup comparisons and nonparametric statistics although norms developed by Voyat (in press) serve as a baseline for reference for achievement of the task in normal children.

CHAPTER III

RESULTS

Quantitative Analysis

Hypothesis 1: Children eight years old or older but diganosed as psychotic before the age of five may not display one-to-one correspondence or class inclusion typical of children this age. With a mean age of 10-4, 55% of the children achieved one-to-one correspondence while 100% of normal children achieve one-to-one correspondence by age 10 (Voyat, in press). Thirty-seven percent achieved class inclusion while among normal children, 80% achieve class inclusion by age 9 (Voyat, in press). Only two children achieved both one-to-one correspondence and class inclusion, typical in nine year old children, while three children could not perform either task. Therefore, Hypothesis 1 appears to be supported by the discrepancy between the percentages and age lags and the fact that only two children (one age 9-6 and one age 12-3) could perform both tasks.

Hypothesis 2: a) Correlations between ability to achieve one-to-one correspondence and ability to answer simple reality questions about identity, family relationships, and location in time and space will be found regardless of age, I.Q., or diagnosis. The hypothesis is supported that the relationship

between reality testing and ability to achieve one-to-one correspondence is significant at the .05 level using Fisher's Exact Probability Test (See Table 1, page 93). There was no significant relationship between reality testing and IQ in ability to perform either one-to-one correspondence or class inclusion using Fisher's Exact Probability Test (see Appendix B, p. 190). Relationship between age and reality testing yielded an $\underline{r}$ of .478, $p > .10$ using Pearson's product moment correlation coefficient (see Appendix B, p. 192). Relationship between age and ability to do one-to-one correspondence, $t = 1.25$, $df = 9$, was not significant (see Appendix B, p. 194) although there is a sixteen month mean difference in age which might prove significant in a larger sample. Relationship between age and ability to do class inclusion was also not significant, $t = .27$, $df = 9$ (see Appendix B, p. 194), and may not have been a conclusive statistical result because of the discrepancy in number between those children who achieved class inclusion and those who did not ($N=4$ and $N=7$) (see Appendix B, p. 194). The following tables (p. 94) suggest that only the relationship between a diagnosis of autism and inability to do class inclusion was possibly strong in this population (Table 2).

TABLE 1

One-to-One Correspondence: Reality Testing

	Low reality	High reality	
Achieves 1:1	0	6	6
Does not achieve 1:1	5	0	5
	5	6	11

$p < .05$, using Fisher's Exact Probability Test, tabled values (Siegel, 1956).
High reality testing = score of 9-12 on reality questions.
Low reality = score of 7 or below on reality questions.

TABLE 2

One-to-One Correspondence and Diagnosis

	Schizophrenic	Autistic	Mixed Organic/ Psychotic
Achieved	3	1	2
Did not achieve	2	2	1

Class Inclusion and Diagnosis

	Schizophrenic	Autistic	Mixed Organic/ Psychotic
Achieved	2	0	2
Did not achieve	3	3	1

Hypothesis 2: b) No necessary relationship will be found between ability to achieve class inclusion and ability to achieve one-to-one correspondence presents the problem of proving a null hypothesis. Using Fisher's Exact Probability Test (see Appendix B), however, no significant relationship was found between the two abilities (Siegel, 1956) which suggests that the null hypothesis cannot be rejected and confirms the lack of relationship between the two abilities. The hypothesis as stated is also supported by the fact that two children achieved class inclusion without achieving one-to-one correspondence while four children could perform one-to-one correspondence and not class inclusion.

Hypothesis 3: Children will perform more competently with objects they like best or feel neutral toward and poorly with best-liked objects paired with least-liked objects was not supported using Cochran's Q test for repeated measures ($Q = 3$, $p > .10$) (see Appendix B). In fact, the two children who performed clss inclusion without being able to perform one-to-one correspondence, did so with least-liked objects paired. One of them was at Stage 1 when best- and least-liked objects were paired on one-to-one correspondence and transitional (Stage 2) in all other presentations while the other was at Stage 2 in all presentations of one-to-one correspondence. It appears that the evocative meaning of the material did not exert a statistically

significant effect on performance in these children. The hypothesis will be more fully explored in the qualitative analysis.

Hypothesis 4: Patterns of response will most often be transitional, was also not supported quantitatively and will be discussed qualitatively. However, the following structural patterns emerged:

1) Two children could perform both class inclusion and one-to-one correspondence

2) Four children could do one-to-one correspondence but not class inclusion

3) Two children could achieve class inclusion but not one-to-one correspondence

4) Three children could not perform either task

5) Stage 2 (transitional) performances were achieved on one-to-one correspondence by both children who could only do class inclusion and by two of the three children who could not do either task

6) Stage 2 (transitional) performance was achieved on class inclusion by one child who could not master one-to-one correspondence.

These points will be more fully discussed in the qualitative analysis. However, it is of interest that the reality scores of the children who could achieve class inclusion and were essentially transitional on one-to-one correspondence were below the median

for correct answers (7 and 5) while the reality score of the child who was transitional on both tasks was 4, the lowest score of any child tested.

Hypothesis 5: Even when class inclusion is achieved, the justifications will be concrete. Hypothesis 5 is supported by the fact that only one of the four children who achieved class inclusion gave a justification that could be considered abstract; the other three were concrete with all raters in agreement. When spontaneous choices of objects that "go together" were rated for the concreteness-abstractness of the reason, nine were judged concrete and two abstract, with all three raters in agreement.

Hypothesis 6: The necessary hierarchical achievement of one-to-one correspondence which Piagetian theory would predict prior to mastery of class inclusion will not be found in this population. Hypothesis 6 is supported in that two children did in fact achieve class inclusion without being able to perform one-to-one correspondence. In one case, two of the three raters agreed that class inclusion had been achieved while one held that Stage 2 had been achieved. In the second case, all three raters agreed.

Summary

The two most pertinent quantitative findings appear to be the relationship between reality testing and ability to perform one-to-one correspondence and the ability of two children whose reality scores are below the median to achieve class

inclusion without being able to perform one-to-one correspondence. A third child, with the lowest reality score of any child tested, was also transitional on both tasks. This does suggest that reality, as a social and logical construct, is related to cognitive development which depends on abstraction from real objects for concrete operational thought to be achieved. It also suggests that psychotic thought in children is substantively different in its organization such that a task which requires the inclusion of objects in a class (which has unifying properties) is in some situations possible for children who were unable to pair discrete objects and transcend perceptual displacements while maintaining the identity of the number of objects (a more differentiated task at its inception because of the pairing of discrete objects and also because it relates to the ability to numerate and distinguish). These results will be more fully explored in the qualitative analysis which follows.

Qualitative analysis

In qualitative analysis, four aspects of tasks and performances serve as points of reference. The first is the child's ability to perform the logical task. That is, to actualize inferred underlying cognitive structure in task performance. A second consideration, more related to the theoretical framework proposed, concerns the nature of the task itself. One-to-one

correspondence requires the child to equate discrete objects, exclude two, and maintain identity through transformations of each row of objects. In addition to having a strong perceptual loading, the task is also essentially dichotic, one of establishing identity through pairing and then maintaining it through different perceptual transformations. Class inclusion, on the other hand, has no initial pairing but presents perceptually distinct groups (of 2 and 10 objects) and asks the child to combine them in a class. While more abstract, its underlying properties imply the simultaneous coordination, possibly perceived by some of these children as merging, of two sets of objects in one entity. Thus, within my conceptual framework, it may also have more unicosmic qualities when presented to children who lack affective differentiation and whose language functioning, at the same time, is sufficiently advanced to allow them to participate in the experiment. While one would not expect this pattern in a normal child, it is possible that a psychotic child who, according to a convergence framework is already defined as being in severe disequilibrium, might find it easier to perform a task which is itself more unifying than dichotic. This might partially explain why a child who became seriously disorganized when asked to pair mothers and gorillas could include the same gorillas in a class with polar bears.

The affective importance of the materials themselves is also of interest. For some children, there seemed to be distinct maneuvers related to feelings about combinations of materials. When present, their reactions will be reported in the analysis. The use of language as related to the semiotic function in general as well as its role in shaping reality will also be mentioned. In this respect, two distinct groups of children (with subvariations) appeared: children for whom the structure and usage of language seemed disorganized and disorganizing and those in whom grammatical ability was present and whose underlying associational processes seemed not to be organized by the structure of language itself.

The sequence of analysis will be as follows: I will describe each child in terms of I.Q. scores, reality scores, family information and relevant events. I will then describe each child's handling of the rank ordering task. Next, I will describe performance on each of the Piagetian tasks and conclude with a brief conceptual consideration.

In addition, the section will be divided into four groupings, with general discussion reserved until the end of the chapter. The groupings are:

1) Children who were able to achieve both one-to-one correspondence and class inclusion.

2) Children who achieved only one-to-one correspondence

3) Children who could achieve neither task

4) Children who achieved class inclusion and not one-to-one correspondence. This performance is the one that Piagetian theory would not predict and deserves special attention.

Summary sheets for each child's performance are ranked in the order given above and will be found in Appendix C.

Group 1

Child 1. The most cognitively competent child in the study was age 12-3 when seen. His reality score was 10. Unfortunately, there were no I.Q. scores available for him as the school had found him to be untestable; however, he had a Grade 6 Word Recognition Score on the Wide Range Achievement Test and an Arithmetic Score of Grade 4.5 (4/74). He came from an intact family, had a younger brother age six. The family was seen as essentially fragile and unworkable by the school. His diagnosis is unknown as his records had been lost by the time of the follow-up study. However, the school psychologist reported that it had been of childhood schizophrenia with organic components. Although his reality score was 10, he did not know the year of his birth nor the current year.

He came readily for testing with me, smiled a good deal and finally laughed at the repeated presentations of one-to-one correspondence. Except for the gorilla--which he did not like--he essentially reproduced the order of presentation in selecting

best to least liked objects. He was unable to work from least to best liked and when questioned as to why he liked some objects and not others, he said, "I like all of these" but "I don't like this [gorilla]." It is of interest that, even though he didn't like the gorilla, he ranked the two poker chips as the least liked objects.

In performing one-to-one correspondence, he justified his response in each instance by saying,"They're still eight," a justification by identity, even though he had difficulty in explaining how he had arrived at this conclusion. For example, he said he understood it "because you put all these together and these are apart. . . these are far away from each other. . . that's all that's different." His least liked objects were relatively benign poker chips so no inferences seem valid as to his continued good performance with least liked or best and least liked objects paired.

Class inclusion produced an interesting choice of objects that can be paired. Mommies and telephones "go together" because "the mommies talk on the telephones," the only case in which spontaneously chosen objects did not constitute a class. When best liked objects were paired (mommies and daddies) his justification had an odd quality, although it was acceptable. There were more people than mommies or daddies because "People come from the world." His idiosyncratic thought processes be-

came apparent when he was asked if there were more people than mommies and he replied, "No, because daddies are bigger than mommies." He recovered to affirm that there were indeed more people than mommies and went on to say, "They're the same. . . because mommies are smaller and daddies are bigger" but both are people. When I asked, "As far as being people go, they're both the same?" he said, "No, because mommy is a lady and daddy is a man." When asked if there were more people than children, he at first said more children but then spontaneously reversed himself to more people "because, because they come out from the world."

Two things can be observed about this child's performance. The first is that the concept of number and differentiation among objects is present even though not at the level one would predict in a twelve year old. Furthermore, language does not help him mediate relations of difference. In class inclusion his justification is certainly not what one finds in a fully concrete operational child although he does suggest a set/subset distinction. The second inference that can be drawn is that he is interested in the differences between men and women and has internalized some of them. Yet it cannot be stated that he has resolved Oedipal conflicts, as one would expect at his age, although he does seem to be cognitively aware of size and sex which are associated with Oedipal concerns with power and libidinal cathexis.

Child 2. The second child who performed both tasks only achieved one-to-one correspondence using neutral objects. He was age 9-6 when tested and his reality score was 10. I.Q. scores ranged from a Full Scale I.Q. of 77 on the WISC (11/6/72) to a Peabody Picture Vocabulary I.Q. of 88 (12/26/74). This Black child lived with elderly foster parents. His mother was dead and his father alcoholic. He had one brother whose name he did not know and a cousin whose name he did. His diagnosis was schizophrenia or borderline autism. In 1973 he showed great sexual preoccupation, urinated in inappropriate places and in 1975 (after this study) exposed himself in school, stuttered, blinked and banged his head on metal cabinets which lead to inpatient treatment. On reality questions, he did not know his month of birth or the current year, as was the case with the first child.

This child liked the astronaut best "because it goes up to the moon. . . and it spies down, " and the rocket least because "it wobbles when it goes up in space." There was a hypervigilant quality to some of his responses--when he saw the policeman he asked, "How come he ain't got a gun?" When presented with the rocket he said, very suspiciously, "Who put the clay on the rocket?" (which had been added to give the rockets a stable base).

In performing one-to-one correspondence, when asked how

he knew each "astronaut had a fireman" (best liked objects paired) he said, "'Cause, um, the fire, the astro, the astronaut likes the fireman." He could establish perceptual equivalence but was unable to maintain the correspondence through perceptual transformation saying there were more astronauts because "the astronauts are longer than the fireman" at which point he began to chant the word "chief" in sing-song repetition.

With least liked objects paired (rockets and sewing machines) he continued to examine objects vigilantly and pointed to one that was broken. He then said, "You gonna give me a toy?" and when I said no, asked "How come you don't give away toys?" He established the equivalence of rockets and sewing machines but could not maintain it through transformations. There were more rockets because the sewing machines "are all closed up" but "these are open up, so we have more rockets." He resisted counter-suggestion and when the sewing machines were spread out, said there were more of them because "they're all over the town," which he repeated many, many times.

When best and least liked objects were paired (astronauts and rockets) the same pattern recurred. Only with kangaroos and pandas (neutral objects), which were same size scale models, could he achieve the task but with chanting verbalizations of "the panda" and then "I want a cat" repeated many times. He

could maintain the equivalence through transformations and said there were eight cats and eight pandas because it was "all the difference, it's all the same." Even though he had not counted in previous presentations, he now counted the objects and maintained "they all have the same amount." In the presentation where cats were bunched and pandas dispersed over the table, he whispered "you all beat the cats up," and then said they "could have a volley-ball game with the cats." He maintained his justification, however, that there were the same amount of each object on the table.

Class inclusion, spontaneous choice, was of the mother figure and the policeman because "they husbands and wife." He then began to chant "oh, shoot, oh, shoot" and arranged the figures so that the two mothers were in the middle of a semi-circle of policemen. When asked what would happen if we put all the mommies in a bunch and the policemen in another bunch, he put each of the mothers with a policeman and said, "I want to do something, I want to do something---kiss. They kissing. And now they're fighting." When questioned as to whose bunch was bigger, mommies or policemen, he said mommies even though that was incorrect and then launched into questioning about my own children, wanting first to know if he could beat up any of my sons, and then, "I beat up that girl?" He finally returned to the task

and when asked if there were more people on the table or more mommies, replied "more poor people," with no justification. He did, however, maintain class/subclass distinctions, always affirming that there were more people than either policemen or mommies. After a variety of diversionary tactics, including urgent bathroom needs and climbing on bookshelves, he continued to state that there were more people although his justification was inappropriate ("because I counted it").

When best and least liked objects were presented in class inclusion (because astronauts were best liked, rockets least liked) he picked up the astronauts and began to lick them. He correctly said there were more "things that go out in space" in the world although it was because "there's ten astronauts" and refused to answer further questions.

Here again, the underlying inference that some degree of differentiation has been achieved rests on his ability to establish equivalent sets of figures although remaining perceptually bound in transformations of all but one set of figures. His sexual preoccupations are evident in having the mother figures and the policemen kiss and then fight which also suggests concern with sexuality and power--the policemen without guns were disappointing to him. He is aware of interpersonal interaction, albeit with a paranoid flavor, both in

liking the astronaut who goes up in space and "then spies down," putting astronauts and firemen together because they like each other and in his questions about being able to beat up my children. Power and sexuality are also of concern to this child. Language is grammatically more advanced than in the first child, although not always correct, and chanting seemed to be used as an anti-ideational device rather than as communication. His level of differentiation is idiosyncratic and strange but was demonstrated to exist on some level.

In neither of the above cases could one argue that a fully tricosmic world exists or that concrete operations have been achieved. However, it is consistent with the theoretical framework advanced to say that both children demonstrated concern with inter-relatedness of the tricosmic period and that they have both achieved levels of differentiation which allows for performance of the cognitive tasks. By inference, this suggests underlying structures which are distorted but which can be actualized under some conditions. In that sense, both children appear to be transitional. One could only perform one-to-one correspondence in neutral conditions, the other gave the only spontaneous classification which could not be seen in terms of set and subset. Beyond that even when the task was performed, it elicited concrete justifications which prevent the performance

from being truly abstractive. The level of language functioning for child one is beyond that of a two year old but certainly not that of an operational child. The second child, while grammatically advanced, had specific problems linguistically with relations of difference and similarity as do many of the following children.

Group 2: Achieved only one-to-one correspondence

In the second group of four children, who achieved one-to-one correspondence without being able to perform class inclusion, three achieved it under all conditions and one with all but best liked-least liked paired (two raters put him at Stage 2). They are presented in the sequence suggested by their reality scores, from the first child's high of twelve to the last child's low of nine.

Child 3. The first child in this group was age 13-5 when seen. His reality score was 12 and his I.Q. scores ranged from a Full Scale WISC of 53 (2/71) to a Full Scale WISC of 61 (3/72). He was found starving on the street in Italy before he was a year old and sent to a girl's orphanage where he stayed until he was one. He was then sent to a boy's orphanage until he was age 3-9, when he was flown to the United States for adoption. He is presently in a foster home and his foster parents want to adopt him. He was diagnosed as a typical autistic child and has been in various day treatment programs since beginning school. When asked what he didn't like to do

he said, "I don't want to go shopping with my mommy." When asked about brothers and sisters, he replied, "I'm all alone in the family. I only have a dog named Rex."

When asked to rank order objects from "the one you don't like at all" to the one "you like best," he handled the task by selecting two objects he didn't like and then shifting to ones he liked best. Spaceman and rocket were his two first choices which he liked because "they go up on the moon, that's the explore." He liked the gorilla least because "He kill people."

When presented with one-to-one correspondence with best liked objects (rockets and spaceman), this boy had difficulty establishing equivalence which he handled by saying that two of the rockets "broke down, right, these two. We borrow these." He excluded them from the set on that basis. When asked how he knew that each spaceman had a rocket, he said, "Because every space could go up to the moon." His first attempt to deal with displacement led to there being more rockets "Because we got, we push 'em down. . . yeah, nice landing." He then counted the rockets and spacemen and concluded, "So it's the same one." When asked why, he said, "Because it's eight." He maintained this set throughout the task, remarking, "No matter how you turn around, they still eight."

When presented with gorillas and kangaroos (least liked objects) he said, "It's gonna be the same one. . . They gonna

fight?" When I asked if he thought they would, he replied, "Kangaroo can't go there anyway." When I then asked if the gorilla scared the kangaroo, he said, "Yeah, you could see the teeth." He established equivalence although he felt that "Gorilla is a very bad guy, a very bad animal" because "they wreck things, they break things up, tear everything up." He handled the task in all presentations maintaining that there were always eight but idiosyncratic association intruded, as when he said, "No, there's still eight because if this had a twin, another baby, it would be nine. . . but he don't have a baby so it's still eight." He ended the task by asking, "Did I get a A, a hundred percent?"

When presented with spacemen and gorillas (best liked and least liked paired) he quickly put each spaceman behind the gorilla and said, "It's safer. . . you don't want him to die." He then asked the time. Instaed of saying the same number of objects remained, he this time said, "the same, no one go away." He resisted counter-suggestion again "because that's the same amount," and then asked, "You got a son?" He continued to ask personal questions which was seen as both as an attempt to gain distance from the material and a desire to establishing a mothering quality in the examiner.

This distancing preoccupation continued when I presented his neutral object choices of mother and pandas--he picked up

the workman-father figure and asked, "This is the guy that's your husband?" He handled the task competently but was tiring and asked when he could go back to class. His justifications consisted of "No matter what you gonna do, it's still the same."

On class inclusion, his spontaneous choice was rockets and spacemen "because they travel up for they want to go to the moon." He then wanted to know if my son played with the rockets. He correctly determined that there were more rockets than spacemen on the table "because this is less and this is more," but maintained that we had more rockets than other things "that go into space." He resisted the counter-suggestions that both astronauts and rockets to into space and we thus might have more things that go into space than rockets. When asked whether, in the world, there are more things that go in space or more rockets, he replied, "More people. . . because we made the rockets."

On class inclusion with least liked objects (polar bears and gorillas), he was able to see that there were more animals than the smaller group, gorillas, but unable to transcend the perceptual "moreness" of polar bears on the table. He vacillated between more animals and more polar bears in the world, ultimately saying that there were more polar bears because "There's more good animals than bad ones" and polar bears are good animals but animals "fight and kill people, and they shoot, and the polar bear you could trade him through. . . That's why you got more

polar bears than animals."

Unlike the previous two children, this child's tricosmic or interrelated interests seemed focused on distancing from material that was upsetting rather than specifically related to interactional concerns. His questions about me and my children seemed to be of this nature. He was concerned with violence and power and equated them with goodness and badness, but at an early level of oral sadism rather than a post-Oedipal superego one. This was highlighted, for example, when the gorilla frightened the kangaroo because "you could see the teeth." He does not strongly indicate in the protocol that sexuality or phallic libidinal concerns are of much importance, except perhaps by inference from his interest in rockets which "broke down." Although he distinguishes between "good" and "bad" animals, suggesting differentiation, and asked if the workman-father figure was "the guy that's your husband," there is little evidence that he is at the level of Oedipal resolution but rather psychodynamically at a younger period. Language development, in terms of symbolic mediation, is concrete and grammatically dubious. Although the statistical analysis suggests a significant relationship between reality testing and the achievement of one-to-one correspondence, the protocol suggests that this earliest concrete operational task in psychotic children may grow out of differentiations achieved by a two year old without the necessary libidinal shifts to phallic concerns Mullahy (1948) described in relation to other people. That may

be, in fact, a distinguishing feature of psychosis in childhood in that the psychodynamic structural changes one infers in normal children are precluded while rudimentary cognitive development occurs in extreme disequilibrium.

Child 4. The second child who could master one-to-one correspondence but not class inclusion achieved the task in all four presentations. Her age was 9-2 when tested and her reality score was 10. She did not know what year she was born and said she was born on "Sunday, March 10" as if that satisfied the year requirement. She also did not know the current year. Her I.Q. scores ranged from a Full Scale WISC of 73 (1/27/75) to a Peabody Picture Vocabulary Score of 95 (2/16/72). She lived with her father who has remarried a woman twenty years younger than himself and has two step-sisters who also live with him. It is suggested in the history that her father may have beaten her when she was young because her behavior angered him so much and he is also reported to have discussed "urges to kill." She slept in her parents' bedroom until she was seven and is reported to have been unduly concerned for many years with anatomical differences. She described her step-sisters as follows: "I have two sisters. . . one's eighteen and one's twenty-one. (What are their names?) Well, Patty's aging, she's getting much older. . . she's eighteen. And Rose is twenty-one. She's the one with long hair but Ro got short hair. (Can you

tell me something about them?) Well, I never hit my sisters." This child is diagnosed as a childhood schizophrenic.

In ordering least liked to best liked objects, she called the astronaut a "moon man" and liked him least. She put the gorilla next, then the polar bear and the rocket. At this point she switched to a "best" category and said, "Everything is all nice here. . . everything is beautiful," and asked to listen to herself on the tape recorder. She then resumed the worst to best ordering, ending up with mommy and working man as best liked objects.

In the presentation of one-to-one correspondence, she counted the best liked objects, mommies, as they were presented and said with some delight, "All those mommies!" When asked why she liked the daddies and the mommies she said, "I liked the daddies and all the mommies," but did not like the moom men "because they looked terrible. . . they're just terrible." She was able to establish perceptual correspondence and suggested we put the extras in the plastic bag they had come from. When the perceptual set was broken, she lay the daddies in a pile on top of each other and said,"here's eight and 1, 2, 3, 4, 5, 6, 7, 8. So that makes 8 plus 8. . . mommies plus daddies, 12, 16, so there's 8." She maintained the 8 plus 8 justification throughout and said they're the "same amount" because there were "1, 2,

3, 4, 5, 6, 7, 8 mommies" and "there's 1, 2, 3, 4, 5, 6, 7, 8 daddies. . . so there's 16." When asked if there were the same amount of mommies and daddies, she said there were more mommies and more daddies but that that was the same. She continued to count on each presentation of objects although numbers seemed to have more than numerative value for her with an obsessional quality--she said that "8 plus 8 is 16" prior to each acknowledgement that there were the same number of objects regardless of presentation.

When least liked objects (gorilla and spaceman) were presented, more diversionary tactics appeared. She discussed lessons in writing in script, having her picture taken when she was eight, but still said, "There's still gonna be 8, I'm telling you." After correctly counting the objects on the table and saying, "So there's 16 things, 8 plus 8 is 16," she proceeded to add equal numbers through 17 and 17 is 34. We could not agree on whether 18 and 18 were 36 or 37 and returned to spacemen and gorillas. She vacillated between more spacemen and more gorillas and then said, "If you take 8 away, there will be 7. 4 plus 3 is 7" before returning to counting the objects correctly and deciding that transformation of the perceptual set did not change the number. Her last attempt at avoiding the task was by asking several times if we could listen to ourselves on the tape.

When spacemen were paired with mommies (best liked-least liked paired) she went off into a discussion of how many letters there were in her name (7) and then said, "Look, B, look--1, 2, 3, 4, 5, 6, 7. So Barbara plus Barbara is 14." She asked how many letters were in my name and added them and said, "You plus you is 6." This continued through several names but ultimately, she handled the task satisfactorily although with frequent, diversionary intrusions. She successfully dealt with counter-suggestions and then wanted to discuss my age, her mother's age and her own age. She also referred to what we had done in a previous session by saying, "You said that something's bad that goes over here," referring to the early ranking task.

When class inclusion was presented, the girl chose the mommy and daddy "'cause they, because the father and the mother, that's why." When pressed, she replied," They make, they, they get married" and then asked my husband's name. When I said I was not married, she questioned, "I wonder why you're not married?" and then, "Who's home with you?" After further digression we got back to talking about mommies and daddies and why they go together. Her answer this time was "because they got married and had a baby and a kid," then, "Look they're kissing." She correctly said there were more mommies on the table than daddies but when asked what would happen if I gave her the mommies, replied, "Well, if you have mommies, 10 mommies and 2 daddies, that would make 12 family." When asked if there were more

daddies or more people on the table, she said, "There's less daddies and more mommies" (incorrect). When asked if there were more mommies or more people in the world, she responded, "Wow! Well, I have lots of white people on my street." She was unable to sort out the concept of mommies, daddies, and people and ended by saying, "There's 12 families here. . . like 10 and 2 is 12." Fianlly, she described role functions--mommies go together because "I know, mommies cook. . . and fathers go to work." and then said, "I'm doing super good." It became apparent that the concept was beyond her.

Class inclusion with least liked objects paired was presented with rockets and spacemen. Again the concept of class eluded her and finally, to the question of whether there are more things that to into space or more rockets in the world, she replied, "Like in the night time, there's lots of moons out and stars. . . like if you have wooden stars like those, right, we'd be talking about this, this and that, and everything." She was unable to achieve class inclusion under any condition.

She was presented last with one-to-one correspondence with neutral objects (firemen and poker chips). She correctly justified throughout although at one point she seemed to grow tired of explaining and simply put one fireman on each poker chip "so they can skate." We ended as we had begun, listening to the tape, which seemed to please her very much.

For this child, it seemed that being able to deal with discrete objects through numbering served an obsessive need in isolating the affective components except when she was presented with mommies and daddies simultaneously. This suggests differentiation at the level of isolation with distancing devices important to her cognitive functioning. An overview of the protocol was reminiscent of the magical abracadabra Fraiberg (1959) cites but here it seems to serve as a defense against Oedipal ideation. One can infer, perhaps, that the unconscious dilemma posed by Oedipal concerns is operative and that her ability to do one-to-one correspondence has features of numeration as a distancing mechanism. Combining objects in a class, on the other hand, appeared to overwhelm her capacity to keep objects separate and she could not combine either male and female representations or spaceman and gorillas in any kind of classification. At this point, the retreat into numbering was maladaptive and prevented achievement of the task. Language also seems to be immature with relations of difference especially difficult.

Child 5. The third child who could do one-to-one correspondence but not class inclusion was age 12-7 when seen. Her reality score was 9--she did not know the year of her birth, nor the current month or year. Her Full Scale WISC I.Q. was 58 (2/73). She was a Black child, placed in group residence with a diagnosis of childhood schizophrenia. At the time of placement,

she was seen as decompensating. There was no developmental history available but she was hoping to go home to live with her father and attend a special school, which did happen between the time of testing and the follow-up study.

She had no particular difficulty in ranking best to least liked objects: mother and fireman were best and "white chip" and telephone least liked. She also seemed well socialized in many ways--she talked about her family easily, liked to play with friends, watch TV and listen to records and most disliked doing her dorm chores at the group residence.

When one-to-one correspondence was presented with best liked objects, she excluded the extra fireman and said, "let this one be the boss." She had difficulty mentally excluding him, however, and at one point said, "there are nine except the mothers." She finally said "there are the same number" but was unable to explain how she had come to that conclusion. When the counter-suggestion was made that the perceptually longer group might be more, she first agreed that it had to be right and then said, "No, like they're the same amount. . . uh, uh. . . because they have no, no children and their milk." In the second and third displacements, she consistently affirmed equality of the sets.

When least liked objects (telephone and poker chip) were presented in one-to-one correspondence, she established equi-

valence, she replied, "'Cause they had 10 mothers and 8 telephones. It wasn't enough. . . I count all the mothers. . . there was 10 mothers and 8 telephones and 2 was left." She correctly maintained equivalence but this pairing led to a story about "the mother had to get to the telephone so they could call up their friends. If they don't they have to borrow a telephone. They have to go to their friend's house." Throughout the task, inner preoccupation with using telephones, which seemed related to her social background, persisted. She ended with "No, you got the different. You got 8 and 8 are it, but the reason, you got different people."

When we switched to neutral objects (polar bear and sewing machine) she said, "The bears can't talk on the telephone," and then placed the bears in a semicircle with a sewing machine in front of each one. However, she was able to handle the task and correctly maintained that there were eight of each object.

Her spontaneous choice for class inclusion were mother (best liked object) and father who "go together" because "they're grown up, grown up." She correctly identified that there were more mothers on the table, but when asked if you put together all the grown-ups in the world and all the fathers, which bunch would be bigger she said, "two children." She then asserted, "all the fa, all the fathers, all the fa, all the fathers do

the dance. . . same dance." She could not transcend the perceptual set of more mothers on the table; when asked about whether we had more grown-ups or mothers on the table, she said, "the two fathers is sticking together." When I asked if that was why there were more mothers than fathers, she replied, "They take turns sticking together," and later, "There are more people. . . all the people stick together. . . some downtown, and some in jail and some in Brooklyn, some in Ossining, down south, some people in New Jersey." She was, however, unable to stay with this justification and finally ended with the notion that there were both more people and more fathers.

In class inclusion with least liked objects (telephones and sewing machines) she correctly identified the larger group on the table, telephones, but could not go beyond the immediate larger group to classify both objects as machines. She ended by saying there were more of both.

The confabulatory quality of the story evoked by pairing mothers and telephones in this protocol suggests that the child is preoccupied internally with earlier memories in which "fathers dance" and "stick together," one has to go next door to use the telephone and also verify the location of important people in one's life. She has made distinctions about the world and in some sense is concerned with family and role distinctions, interactional concerns albeit at the level of a young child. She

is very concrete and it is difficult to know whether that is a function of preoccupation with early life events or of idiosyncratic associational processes. The necessity of doing the task when human figures were involved was more disorganizing than when machines were used and suggests that interpersonal confusion is a more potent concern. Here again, language is functional and does not serve to mediate abstraction, especially when relations of difference are involved.

Child 6. The last child among this group of children able to achieve one-to-one correspondence and not class inclusion could not achieve one-to-one when best liked and least liked objects were paired. He was age 9-9 when tested and his reality score was 9, lowest of any of these first five children. He thought he was born in 1972, did not know what he liked to do best or least and thought we were in "Row 4." His I.Q. on the Columbia Mental Maturity Scale was 74 (11/73). His diagnosis was of disturbance of ego development of severe degree "with roots at or before birth." Tearfulness, echolalia, and depersonalization were noted and he had always had symptoms suggestive of autism. His diagnosis was mixed organic/psychotic. His mother was seen as very dependent and passive and his father as overintellectual and fragile. He was the second of three boys in the family. He also talked in a near whisper most of the time and found the testing very trying.

This youngster had great difficulty in ranking least liked to best liked objects. He identified the gorilla as "the worst one," but then picked up all the other objects and said, "He's not the worst one." He ended with all objects ranked as "good ones," except the gorilla which was isolated to one side. Rank ordering took a very long time. The gorilla was "worst. . . he scares people." I asked if he was scared, which he denied. When I then commented that he was very brave, he replied, "I'm not brave. . . I'm not allergic."

When one-to-one correspondence was presented with best liked objects paired, he correctly established equivalence and throughout maintained that there were "more cats" (kangaroos) and "more polar bears" which meant that there were "more of both." He was able to maintain that there were "the same amount of each" on the first two transformations but quickly re-established the equivalence such that each figure was touching another, and his hand trembled as he did so. In the last presentation, with cats bunched and polar bears spread out, he was so agitated that I attempted to calm him by suggesting that the cats were having a party. He could not tolerate the polar bears being alone but put them in a circle while saying, "They're having a good time, too," and again, "They're having a good time. . . they're comfortable. . . When I finish this, we'll put them away and go back."

The second presentation (the following day) was of class inclusion, in part because I wanted one measure of each task and was afraid I would lose this child to the study because of his anxiety. He had difficulty with spontaneous choice but finally selected panda bears and polar bears because "they only sit and talk to each other." He was able to establish that there were more panda bears on the table and then switched to polar bears because "these are big, the polar bears are big and the panda bears are little." He was unable to go beyond his confusion between size and number and switched back and forth between there being more polar bears and panda bears, both on the table and in the world. He ended the task by saying, "They liked going together. . . they're sitting down together."

Class inclusion was then presented with least liked objects paired (polar bears and gorillas). At this point, he lined up ten polar bears in two rows of five so they could talk to each other and put the gorillas on one side, also talking to each other. The gorillas (two) were again called the bigger bunch, but when I pointed out that we only had two gorillas but ten polar bears, he affirmed that there were more polar bears on the table. He also said there are more polar bears in the world but could not maintain that set. When I asked him to name some animals in an attempt to establish the class of animals, he said, "I think it's time for me to go back to the party,"

and left for a class picnic scheduled for that afternoon.

On the third day, when best liked objects were presented for class inclusion (cats and panda bears) he again paired the animals and maintained there are more cats in the world: "they're talking to each other. . . they have to get along." We then talked about the party the previous day and he became more and more inaudible until he brightened and said, "we had watermelon and I said, no seconds, no thirds." I asked if he had had seconds and he responded, "Yes, but no thirds. Thirds in soda."

At this point, one-to-one correspondence was presented with least liked objects and he became visibly agitated and shook when gorillas and telephones were paired. He established the perceptual equivalence by having the gorillas call each other on the telephone and maintained that there were "more gorillas and more telephones." He knew that if he put the objects back together, each gorilla would have a telephone. He also held that there were "more gorillas and more telephones" because "they stay in one place. . . they share it, they share it." He found it hard to tolerate the gorillas being moved away from the telephones but did seem to maintain the equality.

When best liked and least liked objects were presented for one-to-one correspondence (cats and gorillas) diversionary tactics increased. He wanted to unplug the tape recorder or

leave. He finally established equivalence by putting a cat behind each gorilla with its face touching the gorilla's back. He was upset throughout and said we had "more cats and more gorillas." The task was finally abandoned as too distressing to continue.

After an interlude, during which we listened to the tape which seemed to have a calming effect, neutral objects were presented in one-to-one correspondence (fireman and astronaut). He established perceptual equivalence easily and then leaned over the protocol sheets and read aloud "spread out" and "squeeze back" which he proceeded to do with the extended row of figures. He then said we had "more firemen and more spacemen" which were the "same" and counted the number of objects, for the first time, as part of his justification.

In this protocol, the use of pairing and social interaction as a defense against anxiety and fears of violence are extraordinary. The lack of distinction observed in the boy's inability to differentiate between inner and outer reality is counterbalanced by fragile attempts to immobilize the perceived threat of the gorillas by keeping them next to the telephones, putting the smaller animals behind them and having animals have a party. However, enough differentiation has taken place for him to be concerned with overcoming the anxiety in a dicosmic

way and there is suggestion that socialization processes are useful to him in helping "everyone get along," as a major defusing device for violence. Language was generally grammatically correct and advanced but exposed underlying symbolic distortion rather than structural inadequacy, relativity excepted.

The first five children presented all achieved one-to-one correspondence and two of the three also achieved class inclusion. Their reality scores were 9 or above. The next two groups, with reality scores from 4 to 7 did not achieve the one-to-one correspondence and therefore the distribution of one-to-one correspondence:reality score level appears to be bimodal in the whole sample.

Group 3: Achieved neither task

The three children who achieved neither class inclusion nor one-to-one correspondence will be presented next, again from highest to lowest reality score.

Child 7. This child was age 9-11 when examined and his reality score was 7. I.Q. on the Columbia Mental Maturity Scale was 81 (10/72) and a previous Stanford Binet I.Q. was 70 (1/71). His family was intact although his father is alcoholic. He is the youngest of five living children although an older brother, with the same first name, died two days after birth. His diagnosis was of chronic schizophrenic process. He makes bizarre, peculiar noises often and at age eight, mastrubated in public

frequently. When asked the year of his birth, the child replied, "White Plains." He did not know the current month or year or what he liked to do best or least. When asked if he had brothers or sisters, he replied, "I'm the brother."

The boy was extremely labile in identifying and ranking the objects. When asked what he liked best, he did the task quickly, ranking sewing machine and father first. During the ranking, however, he shoved all the objects together in a pile and pushed them around chanting "Timber! Timber! Timber!" and then "they're all dead." He could not say why he liked the objects he liked or didn't but switched to wanting to do his own tape and then said, "Hey, honey, you're cool, your man. Oh. One, two, buckle my shoe; three, four, close that door; five, six, you have sticks; seven, eight, have my gate; nine, ten, lay a hen." During this recitation, he was impervious to interruption and only quieted down when we listened to the tape.

When one-to-one correspondence was presented with the two best liked objects (father and sewing machine) he threw a sewing machine in front of a father and yelled "Timber!" again, and then repeated "wackydo" over and over. It was difficult to return him to the task and he only cooperated when promised he could tape record his own story at the end. He counted eight daddies and eight sewing machines but became increasingly disorganized, banged the daddies on the table and said, "and ten

daddies and daddies, patties," which I interrupted. When asked if there were the same amount of sewing machines as daddies, he responded, "Uh, I think an eleven track tape goes to . . . yup . . . hey, what's this . . . it looks like some kind of gadget . . . I don't know." When returned to the task again, he began to sing the song, "Daddy don't you walk so fast," to which he returned several times. After a long period of attempting to present the task, without success, he concentrated for a minute and said "more daddies" and then yelled, "'Cause I, I can figure it out in my brain."

His promised tape recording of his own story was made which was a melding of the TV Flintstones and their new neighbors, the Gruesomes who "just burrowed over to have some red ants" with "Mr. Wierdly." He described a decidedly peculiar meal together, and had one character ask another ("Repella") if he could "hold your scrawny hand." The story continued at great length but ended happily with Wilma telling Fred to apologize to their new neighbors and that led to singing "For he's a jolly good Gruesome [repeated three times], which nobody can deny."

After finally establishing that the reward had been completed, one-to-one correspondence was presented with least liked objects paired (telephones and poker chips). He was uninvolved with the task and when telephones were extended said, "they ain't the same but the poker chips are." He could not

establish equivalence or do the task.

When class inclusion was introduced, the boy sang, "Tell me this was just a bad dream," and then said, "and you ain't got no cat." When asked to choose two things that go together, he selected astronauts and spaceships because "astronauts always go in the spaceship." I asked if I put all the astronauts together, how many would there be. His response was, "Fred, Ted, Ned, Herman and Dave, that's their names . . . Cart, Stupid and Fart." He finally counted astronauts and spaceships and affirmed that there were more astronauts on the table. He knew that the bigger bunch on the table would be "astercocks" but could not answer whether we had more of either group on the table or more things that went into space. His preoccupation with television programs and cartoons perpetually intruded, and the task was ended.

Class inclusion was then presented with best and least liked objects paired (telephones and sewing machines) which constituted a class. His responses became increasingly bizarre and dissociated and he finally said there were more telephones than appliances on the table and in the world "'cause there's only two television." I repeated the question and he began to sing, "Good night, kitty, good night, kitty, good night, kitty, I'm going to hit the hay." However, he did not want to stop for the day and taped another story which connected going to bed and "good night, kitty" to not being able to go to sleep, eating "a fish called crow," variations on counting sheep and "bye, bye baby." The story ended with a reprise

of "good night, kitty."

One-to-one correspondence was presented with best and least liked objects paired and was rejected: "That's horrid because I already did . . . dp . . . dp . . . dp . . . dp," etc. He did not respond to any part of the task but simply made odd noises and refused to cooperate.

One-to-one correspondence presented with neutral objects (firemen and pandas) also produced little response, other than a repeat of "good night, kitty" and singing of a television commercial for C & C cola. He finally had a fireman hold each panda but "these two are lost . . . ooh, oooh . . . wild . . . I don't know here. I have no fireman, we have no fireman." He then said the firemen "go to sleep" and when I asked if they were going to sleep, he said "Kill . . . kill . . . kill." When the firemen were displaced, he said we had "more firemen, suzycool, suzycool," and then, "they got to learn to lie on top of each other. Why don't they lie in each other . . . they're fighting." At this point he picked up all the objects and flung them across the room. I told him he could not listen to the tape if he did not finish at which point he said, "they're all sleeping, they're asleep . . . they go like this with their heads, like this, they can see the back of their own, the back." He finally said he thought there were more pandas but it was clear we had reached the end of mutual endurance and the task was discontinued.

What is clear from this child's protocol is that his inner reality is disorganized and bizarre and overwhelms very tenuous

contact with the outer world. He is preoccupied with sexuality and aggression and seems to use television characters and commercials (which he watches a great deal) to provide him with distancing mechanisms. His singing of songs also seemed to serve the same function and appeared also to communicate on some level ("Daddy don't you walk too fast") when my pressures and the father figure merged and evoked the song. "Good night, kitty," was interpreted to be an attempt to tell me he was too tired to continue -- which he denied -- but his underlying confusion and disorganization increased. Language is distorted and not communicative in any socially adapted way, although grammar and syntax are present. This boy more than any other, exemplified what Meyer (Ekstein, 1971) describes when the continual commerce between inner and outer reality does not exist because inner reality floods the ability to distinguish between them. The use of distancing devices in this case suggests a constant attempt to distance from cognitive conflict which cannot be resolved and is thus avoided.

Child 8. The next child was age 9-11 when tested and had a reality score of 6-1/2. He did not know his last name, the month or year of birth, the month or year it was, and thought we were "at the birthday." When asked about his brothers and sisters, he said, "I had two brothers. I want to buy a sister." He was not testable on the Peabody Picture Vocabulary Test, but his I.Q. was estimated at equivalent to 60 (1/75). On the WISC Performance subtests (2/70) he obtained a Performance I.Q. of 93. He comes from an intact family

with both parents teachers and father 12 years older than mother. He has an older brother and is one of twin boys. His diagnosis was of autism. There is a history of early developmental deviation and language delay and he had been in day treatment since starting school.

When asked to rank order best to least liked objects, he liked the rocket best but when asked why, replied, "Well, I had to go back to sleep." He liked the polar bear least but could not say why but said, "Well, I want to go back to my school."

One-to-one correspondence (rockets and spacemen) with best liked objects was unsuccessful. He became disorganized when asked if there were more spacemen or rockets and asked to go back to class, to the bathroom or to watch "Chicken Licken." When I tried to continue the presentation, he said there were always more rockets without offering any justification, and the task was discontinued.

Class inclusion was presented next, again because I wanted to get a measure of performance on each measure and was unsure he would return. His spontaneous choice was of rockets and spacemen because rockets go to "and the space, in the moon." There were two rockets on the table but he said we had more rockets on the table than spacemen without being able to explain why. When asked what I would have left if he took the rockets, he said "Nothing but a zoo." His preoccupation with rockets led to blasting off, "lift off, lift off . . . zoom, zoom, zoom, zoom." He maintained that there were more rockets than things that go to the moon and seemed lost in his own inner space and unable to return. When I suggested we move on to

another task, he answered, "I have to go with Mr. Welsch." He did remain, however, and a class inclusion was presented with least liked objects (gorillas and polar bears). Part of the tape is unclear, but he vacillated between more animals, gorillas and polar bears, finally saying there are more gorillas than animals in the world. We then terminated for the day.

In a second session, one-to-one correspondence was presented with least liked objects paired (cat and polar bear). He could not establish perceptual equivalence but, as I was interested in his cognitive ability, the task was continued. His performance was dominated by the perceptual configurations and during the task, at one point, he turned away and began to write with his finger in the air. During the last presentation, with cats bunched in the middle and polar bears spread out, there were more cats (the smaller configuration always being more for him) but it is unclear why he thought so.

One-to-one correspondence was then presented with best liked and least liked objects paired (rockets and polar bears). He arranged the figures so that rockets and polar bears alternated in two lines with the extra rockets paired at one end. He could not establish equivalence and when I asked about the extra ones, replied "Extra ones . . . (can you make it so that each polar bear has a rocket) It's stuck in the mud . . . it won't move." I removed the two extra rockets at which point he said, "I'm growing up to be a man." He maintained that we had more rockets or more polar bears, according to the perceptual set.

One-to-one correspondence was then presented with neutral figures (policemen and firemen) and he again failed to establish perceptual equality between the two groups. He did not remove the extra firemen and broke into laughter of unknown cause. He finally said, "You look so funny . . . here are some pills that will fix you up," and dropped the figures on the table, saying "They all fall down." He again vacillated between more police and more firemen and was impermeable to questioning about his choices.

Here it was difficult to get a sense of developmental status because this boy moved readily into an inner world which excluded the experimenter. His choice of best liked objects supports the notion that he wants to move away from the world he experiences, similar to Ekstein's "space child." (1966) There is little suggestion that interpersonal relatedness is of interest and unlike some of the other children, whatever his preoccupations are, they are not communicated. Language itself is grammatical most of the time but content was often peculiar. There is some suggestion of early differentiation but instead of being conflictual, it appears to be retreated from.

Child 9. The next boy seen was age 9-3 when tested and had the lowest reality score, 4, of any child in the population. He also had the highest WISC I.Q. (V I.Q. 104, P I.Q. 108) in 12/70. His performance was the most variable of any and he appeared transitional on both one-to-one correspondence and class inclusion (with spontaneous choice). Beyond that, he was very appealing and throughout the time I was at the school, often appeared at my side and took my hand

in his. He is from an intact family and his father is a college graduate while his mother graduated from high school. He has one older brother and two older sisters. He was diagnosed as autistic with bizarre behavior, echolalia and little to no peer contact. He did not know his last name, age, birth year, the current year, what he liked to do best or least, or his family composition. A teacher's aide reported that, although he could not tell time, he often appeared at her side when it was time to go home with his jacket in his hand as well as her coat.

When presented with objects to be ranked, he quickly identified the human figures as having come from Fisher-Price children's puzzles. Throughout testing he returned to the theme of Fisher-Price toys and also frequently lapsed into a sing-song reverie, repeating whatever phrase he had been saying. When asked what he liked best, he said "This one is best and this one is best and this one is best and this one is best." When we came to the telephone, he insisted on talking into it (although it was tiny) and then said, "I want to count all the rings. This has to ring me. Come on you smart aleck telephone. Ring, ring, ring, ring! It can't ring." A little later in ranking he said politely, "And now you may get me something to play with," which I declined to do, and then, "And now you may get, I would like then something to eat." A lollipop satisfied this need. He had said he didn't like the telephone and when I asked why, responded, "Now where is the most charming telephone." His final ordering had the policeman and work-

man as best liked objects and the sewing machine and telephone as least liked (even though he had talked to me on the telephone and played with it a good deal).

One-to-one correspondence, presented with best liked objects (policemen and workmen) launched him into sing-song counting from one to eighteen. He established equivalence and dealt with the extra two by saying "These two guys have to out in out state, pop." When I pressed him about what we should do with the extras, he pleasantly said, "These are sidewalks . . . So I want you to look at these germs of things. These are the sidewalks." He finally put the extra workmen in front of his equivalent rows but had difficulty excluding them: "I will put them on the beginning . . . I can't put them away . . . more . . . let's play more." I removed the extra men and he sang through the first transformation of squeezing the front row together. He promptly re-established perceptual equality and said there were more policemen (when I spread out the back row) "because there are." At this point, he began to wander around the room. He did finally seem to acknowledge that there were the same amount of each group in one instance and immediately turned off the light because he wanted to be in the dark. Finally, he gave up singing "they're the same, the same, the same" and said, "there are more policeman." It had been a long session and we terminated for the day.

In the second session, least liked objects were presented in one-to-one correspondence and he sang his way through counting telephones and sewing machines. He then ordered the configuration

by putting telephones on sewing machines and sewing machines on telephones and said "I, I, I will take the string off, ok? (referring to scotch tape on the telephones.) Go and answer the telephones." He fluctuated between more telephones, more sewing machines and more machines, but had also managed to get under the table at this point. When asked how we could make it so that each telephone had its own sewing machine, he answered, "I would say that I could have all these." He slipped off into his own world and sang various phrases without ever returning to the task.

One-to-one correspondence with best liked and least liked objects paired (telephone and policeman) led us back to his asking for the Fisher-Price puzzles. Again, he counted in sing-song and then said, "Ok, I am free. Am I ready to go?" He made two rows of policemen and telephones, with a policeman behind each telephone. After many inquiries interrupted by his desire to be finished and sing-song chanting, he said there were more policemen and more telephones followed by, "now they will talk to you about the numbers." He decided he was through for the day and left.

During the third session, he grabbed a handful of lollipops (which he had done in every session) and we negotiated how many he could have and also that he could take one back for each person in his class. Class inclusion was presented with his spontaneous choice of policemen and firemen (best liked objects) which went together because "two of them have hats." He then took all the animals and said they went together too, but returned to his first choice. Even

though there were two firemen on the table and ten policemen, he held that there were more policemen than firemen on the table without justifying his answer, and also maintained that there were more policemen than people on the table. When asked if there were more people or firemen in the world, he said, "More people, Ok, I'm finished, goodby," and started to laugh. As he did not achieve the task of abstracting the set/subset distinction that there were more people on the table, his performance was rated as second stage transitional. It is unclear whether his performance is related to lack of underlying competence or disinclination to do the task.

When class inclusion was presented with least liked objects paired (sewing machines and telephones) he wanted to talk on the telephone and then break it. When I asked him not to do that because it would make me angry, he looked at me in amazement and said, "It can't work." He accepted that it was a pretend telephone for a dollhouse. He could not decide who would have the bigger bunch if the two telephones and nine sewing machines were divided between us but thought it might be sewing machines. When pressed, he responded, "Uh, I would say, uh, and dat ma, ah, um, lady, lady, I would like to look at the spade or the heart or the diamond. Ya see now?" He finally established that there were more sewing machines but when asked if there were more machines or more sewing machines in the world, replied, "a gorilla machine, a panda machine, a polar bear machine, a cat machine." He maintained that there were more sewing machines on the table and in the world and the task was concluded.

When one-to-one correspondence was presented with neutral objects (pandas and cats) he counted and correctly placed a cat in front of each panda. When asked what we should do with the extra cats, he said, "oh, you mean on the table . . . that everybody likes?" He then dived into the other materials and took out the checkers but could be brought back to the task. He did not exclude the extra cats and I removed them. He knew there were the same number of cats and pandas. When the back row was extended, he said "uh, more . . . I would think . . . right where . . . uh, I can't remember," and became interested in the tape recorder. Under pressure, he said, "This is very important. Now if I like to have you, if they're Looney Tunes and I like to hear . . . there's always something that we have, cats! Or kittens! Or pussycats." When I bunched the cats and spread the pandas and asked if we had more kittens, he said, "You know what number they're going to make? 'Cause this, now look at this, they're gonna make a big number . . . I would like to eat . . . I don't know what number they're going to make . . . they're letters, the letter. And you know what the letter's going to be like? Here is the letter that everyone likes." This set of associations continued while he made a letter "j" with the pandas. . . "the letter is finished and we're going to make two letters in a minute, with all the cats." He then made letters with both cats and pandas but would not return to one-to-one correspondence. His final soliloquy was, "We're not through yet. We have to make all the other letters. Then we will be finished. First we take this one and we

put it over here and there you go, there it goes, see? and we have it right there, beautiful, and now the letter is finished and the letter 'e'. And you have done, always, done marvellously." At this point, he turned off the tape recorder and declared himself finished although he did seek me out several times and come back to the office to play with the toys.

There are several intriguing features to this protocol. Unlike Child 7, whose inner reality was full of violence, or Child 8 who seemed alternately angry and empty, in this case inner reality had a fey and appealing quality. The child was able to retreat into an inner world almost gently and to relate occasionally to the examiner at the same time he denied the task. His oral needs were strong and outspoken -- when pressed, he wanted to be fed and wanted endless lollipops in every session, which may not be clear from the discussion. There was little suggestion of violence or aggression, even when he wanted to break the telephone, and little engagement with external reality which appears much less enchanting than his inner world. At the same time, there was no sense of interpersonal anger but rather simple withdrawal into another symbolic system when he could not or did not want to perform the tasks. He appeared to be at a period of pre-differentiation and oral gratification psychodynamically and certainly not overtly troubled by his detachment. His ability to perform more competently on class inclusion is unclear. His spontaneous category (because they both "had hats") was concrete but not illogical and his exploration of all the animals as a

potential class also suggests inclusive distinctions. What is clear is that he essentially lives in his own unicosmic world which has many unusual associations but the relation between this psychological feature and his cognitive ability to perform transitionally on class inclusion remains difficult to analyze. Yet what seems equally apparent is that the dilemma separation and individuation presents is not part of his preoccupation, nor is any concern with differentiation observed: one rather sees a flowing from one level of symbolization to another which distances but does not resolve the cognitive demands of the task. What may be suggested is a variation on the performance of the child mentioned in the first chapter -- there a clear regression took place, whereas here one sees ability to glide from presented material to making letters of animals which is also symbolic but distant from the cognitive realm in question. This seems to sufficiently remove him from any affective impact of the material or the task, and preserves the unicosmos he is most comfortable within. His variability also shows up in language usage. At its highest level it is expressive and at least age appropriate: "you have done, always, done marvellously." At its lowest level, it merges incompatible concepts as "gorilla machine," even though grammar is good throughout.

Group 4: Achieved class inclusion but not one-to-one correspondence

The last two children, who could do class inclusion but not one-to-one correspondence, are of a crucial theoretical interest as

I will analyze more fully later.

Child 10. The first child in this group was the only child under nine years of age, although he was 8-11. His reality score was 7 as he didn't know his year of birth, location, the current month or year, what he would do on his coming vacation. His Full Scale WISC I.Q. was 72 (1/21/74) although he achieved a Full Scale I.Q. of 103 on the Columbia Mental Maturity Scale (date unknown). His father and mother were divorced when he was 18 months old and he was living with his father, stepmother and a brother. His diagnosis was of schizophrenia. There is unconfirmed suggestion of central nervous system involvement. He was psychiatrically hospitalized in Florida for several months in 1973 where he was sexually molested. When asked what he least liked to do, he said "I wish I didn't have to, er, you know, get up in the morning . . . and then they call you and my clothes are cold . . . and you gotta warm them up . . . I put it under my blanket or I gotta put it under my arm and keep it warm." This response was given on a warm, June day.

When asked to rank order objects from best to least liked, he chose the rocket first. When he got to the sewing machine, he said "I like to sew, fix it up when he rips." His least liked object was the gorilla. When asked to describe why he liked some objects best, he spoke of his neutral objects: "Well, the telephone I can talk on, the sewing machine I could sew." He disliked the gorilla because "It's mean, it could hurt you." The second to least liked object, a man, was disliked because "Well, he always wears, he wears a hat."

When one-to-one correspondence was presented with best liked objects (rocket and kangaroo) paired, he placed a kangaroo between each pair of rockets but was amenable to putting them one in front of the other. Asked about the left over objects, he said, "We could leave them just for extras." However, he was unable to handle displacement and said "There's a lot of rockets . . . there's not very much kangaroos." In the second displacement, when kangaroos were spread, he said we had more kangaroos "'cause they're oldest." He accepted the counter-suggestion that they might be the same because we hadn't added any or taken any away, but returned to perceptual dominance when the kangaroos were spread out and rockets bunched. There were more kangaroos "because . . . there's all in a line."

Class inclusion, spontaneous choice, was mother and father who go together "because they're both younger people." He correctly identified that there were more mommies than daddies on the table and also that there were "more" people on the table than "more" daddies. However, he said that there were more mommies on the table than people (and was perceptually bound), but was able to transcend the perceptual configuration when asked if there were more people in the world than mommies or daddies. When asked if there were more people in the world than children, he held there were more children. When pressed, he said there were more of both.

Class inclusion with least liked objects was then presented with polar bears and gorillas. He correctly said there were more polar bears than gorillas but "because they're longer." In every

instance, he justified that there were more animals in the world than either subset as well as affirming that there were more animals on the table than either subset.

As his spontaneous choice had not coincided with his best liked object, the task was presented again with rockets and spacemen, the rocket being the best liked object. He held that there were more rockets than things that go into space throughout, which was the larger perceptual group, but that there were more things that go into space than astronauts. When pressed, he said there were more rockets in the world than things that go out in space because "There's not very much people on the moon."

When one-to-one correspondence was presented with least liked objects paired (gorillas and men) he established equivalence readily but had difficulty with the first transformation "because there are more gorillas, more men here. And you put them all together and there's more men." I asked how we could "figure that out" and he said, "I don't know how I could figure it out." In each transformation, he said there were more of the longer line and then, "Yeah, I'd rather have this big line because this line doesn't have very much." He also said "They're spread out further and the men are bigger than the gorillas" (which was true). He seemed confused by the task at this point and unable to understand my attempts at clarification.

We then moved to best liked and least liked objects paired (gorillas and rockets) for one-to-one correspondence, and he continued to maintain that there were more of the longer line. He did not

grasp the counter-suggestion that we might have the same amount of each because none had been added and none taken away, and said he really didn't know whether we had more rockets or more gorillas. The record is very sparse but he did seem slightly afraid of the gorillas, a fact about which he did not elaborate.

The last presentation of one-to-one correspondence, with policemen and poker chips (neutral objects) paired showed a repetition of the process with each longer displacement being "more." However, at the end of the presentation, he said, "Yeah, if they were both a whole pile, they'd be the same," but could not justify why that would be true. He said he couldn't count the objects either because "It wouldn't take me that fast to count."

For this child, the class inclusion task was simpler as he did not have to transcend a changed perceptual set to achieve the abstraction. However, the record is scanty and not informative as to the affective or cognitive experience -- when the answer could be a one word "this," "Uhuh," or "yeah" he gave little more than that. An analysis of the language, however, shows that it is distorted by improper pronouns, wrong verb tenses and inability to express relativity -- a pre-operational level. It does seem clear that there is an organic component to this performance in visual-spatial integration and he remains perceptually bound in one-to-one correspondence while being more abstract when the organization of the perceptual set is not changed. He also seems confused about distinctions among people and may have found the class inclusion with gorillas and polar bears

easier because they are most distant from his experience.

Child 11. The last child was age 10-4 when tested, with a reality score of 5. She did not know her last name, the month, day or year of her birth, our location, the current year or month or what she liked to do best or least. Her family consists of "three girls and one boy" but she did not know their names. Her Stanford Binet I.Q. ranged from a low of 50 (5/9/75) to a high of 57 in 1967. Her best score, on the Columbia Mental Maturity Scale, was 61 (1974), although the neurology department at Columbia Presbyterian Hospital had estimated I.Q. at 70. This child had been diagnosed as having Cornelia de Lange syndrome at birth (a congenital anomaly) as well as symptoms of early childhood autism. She has a brother in an institution for the retarded. There is also a history of epileptic seizures, now under control, and slow language development. She is the second of five children and her parents were separated. She had moved ten times by the age of seven. Her father, a chronic alcoholic, had two years of college while her mother attended business school.

When asked to rank order objects, she took a piece of paper lying on the table and used it as a field for arranging objects. She called the kangaroo a cat and said, "Meow. I'm a squirrel. I eat nuts. Squirrels eat nuts. He go up in the trees." When asked to pick the one she liked best, she chose the mommy as best liked and telephone as next best because "telephone goes at mommy." The least liked object was the gorilla. When asked if he was scary, she replied "Purnday, purnday, what day is it?"

Best liked objects were presented in one-to-one correspondence with mommies and telephones. She established equivalence and excluded the extra telephones but then went off into "I want to go home phone . . . my phone . . . ah phone." When telephones were squeezed together, she said there were more telephones but then she repaired the figures and re-established equivalence. After we had counted mommies and telephones, she would not answer questions about whether there were more mommies or telephones but restructured the perceptual equivalence by putting a telephone at each mother's head. She said there were more mommies and when pressed, said, "It's a secret . . . it's a secret . . . what is this and what is this . . . hoo, hoo, hoo, hoo." In each presentation she rebuilt the original perceptual set and finally began to bang objects on the table.

Class inclusion was presented next and her spontaneous choice of two things that go together was first the policeman and the father, and then father and mother who were "the same . . . because they're married." Mother was the best liked object. She began to sing and counted to eight mommies twice. There were two daddies and ten mommies on the table but she said there were "more daddies than more mommies . . . mommies bigger than daddies, mommies bigger than daddies." She could identify the larger bunch and also knew that there were more people on the table than daddies. When asked about mommies. (which were painted figures of a woman holding a baby with a small child standing at her feet), she counted the mommies, the babies and the children. She first held that there were more mommies than

people on the table but then switched to more people. When asked if there were more daddies in the world than people, she responded, "I don't know. Daddies are bigger than mommies," and there are "more daddies." Finally, at the end, she sang "Heh, heh, heh, look at the mama, icky at the mama . . . see the mommies go boom and the daddies go boom" at which point she started to laugh.

In performing class inclusion with least liked objects paired (gorilla and polar bears) she adopted the strategy of lining the polar bears up on the edge of the piece of paper. There were more polar bears on the table (correct) because "bears . . . bears starts with 'b', bears starts with 'b'." She identified the larger group on the table and said that nine bears were more than two gorillas "they go in a zoo . . . in the viggery, grrrrr." She then said there were more gorillas on the table and then, "Here he go pee-wee. Can I go to the bathroom?" After she returned, we moved to whether there were more animals than either subclass both on the table or in the world, which she correctly but concretely answered by saying, "they go in the zoo." When questioned about gorillas, she said, "He goes in the dark . . . he goes pee-wee in the dark" and hid her face in her hands over the gorilla, saying, "I want to see him in the dark. He's not going in the dark."

When one-to-one correspondence was presented with gorillas and polar bears (least liked objects) she correctly paired eight objects and then said, "There two not the same." She also said we had the same number of polar bears and gorillas. When gorillas were

bunched, she thought we had more gorillas but knew they were the same when equivalence was re-established. I asked how she knew and she responded, "Both got the same . . . just a brack over them . . . ooohy, jewy." Her ability to perform lessened until she was babbling and banging objects on the table and the task was discontinued.

When one-to-one correspondence was presented with best liked and least liked objects paired (mother and gorillas), her hand began to shake and she sat in absolute silence. When asked if she could make it so that each mommy had a gorilla, she said "You can't do it . . . you need two mommies" (the smaller group). She then said mommies were "more" (while nodding that they were the same) and "Mommies bigger than gorillas." She did not establish equivalence but said, "They (gorillas) supposed to be taking a nap . . . oooh, oooh, that, I'm going to kill you." During the first displacement, she said there were more mommies than gorillas and when the gorillas were bunched, more gorillas. At this point she began to whimper and then said "7, 8, 9, 10." When pressed as to whether there were more mommies or gorillas her answer was "The pee-pee. The peep with the monkey. No, he bigger than him." When the question was asked again she replied, "More mommies. We don't want to play with the gorillas anymore." We put the gorillas away and she said, "They scary" and left to go to the bathroom, "to make poopy." When she returned, we put the gorillas back in "their cage" and we talked about her class trip to McDonald's which was scheduled for lunchtime.

One-to-one correspondence was then presented with neutral objects, firemen and poker chips. To establish equivalence, she

put a poker chip on each fireman and said of the extra ones, "They're not the same." After putting chips on the firemen, she exclaimed, "He can't see. He can't see." We removed the extra poker chips but in the first displacement, she felt there were more poker chips. She began to bang the firemen on the table and during the next two presentations, restructured equivalence each time without speaking by putting a poker chip on each fireman. She refused to speak any more and the session was ended.

In this girl's protocol, inability to transcend perceptual transformations is clear as is her desire to re-establish equivalence in performing one-to-one correspondence. That is, she wanted to return the objects to their original configurations immediately and did not answer correctly when one row or the other was displaced. Language was sometimes grammatical, sometimes incantational. Relativity was poorly expressed and language again seemed neither to shape or mediate symbolic functioning. Her justification for class inclusion is concrete rather than abstract, but acceptable. It is of interest that both of these last two children were able to perform class inclusion with least liked objects paired and in both cases it appears that it was easier for them because perceptual transformations were not involved. Even though one didn't like gorillas and the other was frightened by them when they were paired with mother figures, both were able to include them in a class with equally powerful but less menacing polar bears--there is a sense in which it may have been more syntonic to include both in a group "out there" which had less

affective, immediate meaning or valence.

Both children seemed preoccupied with relations but in terms of length, size and distance ratherthan interpersonally. However, the last child was clearly distressed when mothers were paired with gorillas: in this combination she was frightened of them. Her level of interest in bathroom functions suggests that she is at a very primitive level psychodynamically while the first child's description of getting up in the morning with cold clothes also suggests that bodily concerns on a comfort-discomfort continuum are predominant. In neither child does sexual concern appear, even though the boy had been sexually molested a year before the study. This does not explain, beyond the already suggested notion that unifying tasks might be simpler for unicosmic children, how they come to be able to achieve class inclusion. In addition, as organic impairment is clearly documented in one child and suggested in the other, their inability to overcome the perceptual transformation has visual-spatial elements which interplay with cognitive and psychodynamic immaturity.

On the next page, a table will be found which presents the results of all the children in task presentation according to the sequence presented in this section, along with reality score and highest level of I.Q. measured on traditional tests. It should be noted that the two groups who achieved one-to-one correspondence are separated from those that did not as their reality scores are bimodally distributed according to these abilities. On the page after that, discussion of the intra-group comparisons begins.

TABLE 3

Summary of reality scores, achievement of tasks and highest traditional intelligence measures

Child & age	Reality score	1:1 Correspondence	Class Inclusion	I.Q. or other measure
1. 12-3	10	yes	yes	Rdg. Gr. 6 Arith. Gr. 4.5
2. 9-6	10	yes	yes	PPVT 88
3. 13-5	12	yes	no	WISC P.I.Q. 67
4. 9-2	10	yes	no	PPVT 95
5. 12-7	9	yes	no	WISC P.I.Q. 67
6. 9-9	9	yes	no	CMMS 74
7. 9-11	7	no	no	CMMS 81
8. 9-11	6.5	no	no	WISC P.I.Q. 93
9. 9-3	4	no	no	WISC P.I.Q. 108
10. 8-11	7	no	yes	CMMS 103
11. 10-4	5	no	yes	CMMS 61

The bimodal distribution of the ability to achieve one-to-one correspondence and reality score should be noted in the above table.

Comparison of the groups

In comparing the four groups of children, the first two youngsters achieved one-to-one correspondence and class inclusion and also demonstrated some degree of tricosmic structure and intrapsychic conflict without being concrete operational overall. They also appeared to be in the early Oedipal or late phallic periods psychodynamically. The second group, which Piagetian theory also accounts for, are delayed but not distorted in being able to perform one-to-one correspondence but not class inclusion. They also demonstrate intrapsychic concern with aggression, sexuality and interrelatedness, although as precursors of rather than propers of a tricosmic period. In the third group of children who could do neither task, distinct distancing devices were seen which removed them from the situation rather than suggesting any dialectic process. There was little evidence that any elaborated structure exists to resolve conflicts but rather that they are distanced from and never resolved, albeit in idiosyncratic, distinctive patterns which differed for each child.

The last two children who are not accounted for in a hierarchical theory of cognitive development, both had visual-spatial integration deficits which seemed to prevent them from transcending perceptual transformations in one-to-one correspon-ence. It was also true, however, that these seemed to be very unicosmic children and the unifying nature of class inclusion

may be more consistent with their psychodynamic, predifferentiated level when the affective nature of the material does not impinge on affective concerns. Both were able to perform class inclusion with least liked objects and it may have been emotionally syntonic to combine those objects in a class "out there" which did not intrude into psychic life space.

Another frequent feature of the protocols was that nine children did not know their year of birth, seven did not know the current year, and four did not know the month they were born, the present month or our location (i.e., the school). In the same set of protocols, five children had difficulty expressing concepts of relativity, of "more" or "less," "best" or "least" and that was true of both children who could perform both tasks. Although one could argue that these are later developing cognitive functions than dichotomies, there may well be a neurological factor in that such concepts also depend on later maturing parietal lobe and secondary visual cortex areas and such deficits are often found in children this age who have parietal lobe involvement. While not a sufficient condition to account for their difficulties, it appears that it may make a significant contribution to them.

Finally, Voyat (1972) has discussed the role of language in thought. He says,

> Language as an instrument of thought and communication is a part of overall intellectual activity. The child does not develop language in isolation. Intelligence is not simply a set of linguistic structures. Through the symbolic function and its application to reality, the child develops abstractions that are not simple extensions of the verbal code. If the first form of intellectual development is the period in which the child does not yet manifest any language and yet builds all the necessary foundations for the construction of reality, then all aspects of symbolic function should be promoted in a well-oriented school system. (pp. 250-51)

In evaluating the role of language in these children, two differing groups were found. For the first group, language itself was at an early childhood level with little grammar, confusion of pronouns and verb tenses and serious difficulty in structuring concepts. A second group displayed adequate grammatical structures which allowed underlying bizarre, incoherent associational processes to be observed. Here linguistic development served to communicate the symbolic level but the symbolic level itself seems not to have been elaborated and shaped by the acquisition of language. Thus language, too, can be demonstrated to demand equilibrium between its grammatical properties and the level of symbolism it expresses to be simultaneously fully expressive and fully communicative and thus fully human.

It is time to return to the hypotheses which statistical analysis failed to clarify completely. Hypothesis 3: Children will perform more competently with objects they like best or feel neutral toward and poorly with best liked objects paired with least liked objects. This hypothesis is better assessed when the

protocols are examined individually. It is clear that those children whose best liked object represented a significant figure in their lives had difficulty when that object was paired with a menacing animal or when it evoked idiosyncratic memories. However, not all children chose such objects as best liked but rather chose impersonal ones, which appeared to be a function of their individual adaptive styles. There also seemed to be some level of relationship between the child's reality testing and relating to the symbolic meaning of the object, although this is less clear and primarily a function of defensive or distancing structures and underlying psychopathology. From a structural point of view and independent of the original diagnosis, those children who most strongly distanced from the material and who clinically appeared to be at the autistic end of the continuum seemed least affected by specific meaning of the material (with the exception of the last child who was afraid when mother and gorilla were paired), while the more cognitively advanced and reality-connected children had a more difficult time with the potential symbolic properties of the material.

Hypothesis 4: Patterns of response will most often be transitional. This hypothesis is supported by the behaviors observed in the first two groups of children in that they were not fully operational in their abstractions even when cognitively able to perform the task. The second two groups deviated by

either not being able to perform the task at all or by only being able to do class inclusion; it is of vast interest, and not explained, why the last two children gave adequate and correct justifications on class inclusion when children who did better in the traditional pattern were concrete. Overall, all but the children who could do neither task are transitional either in performance or justification, and one of this last group was transitional on both tasks. None of the children observed were fully concrete operational.

It can be seen that a Piagetian analysis allows for diagnostic distinctions along structural lines. When one adopts the point of view presented here, performance of Piagetian tasks brings to light a variety of developmental disequilibriums both in cognitive performance and language functioning. In this context, one can more readily see the spectrum of childhood psychotic disorders as related to unicosmic, dicosmic and tri-cosmic distinctions as well as observe the strategies individual children evolve to cope with their distortions.

CHAPTER IV

DISCUSSION OF THE RESULTS AND IMPLICATIONS FOR FURTHER RESEARCH

Educational (general) implications

The conceptual framework advanced is that reality, as a social and logical construct, is related to interaction among affective, cognitive and neurological maturational processes. Those psychotic children who had internalized a level of consensual reality in terms of identity, time, location, and perception of their interpersonal world were those who were able to perform best on Piagetian tasks according to the hierarchy he describes. Even though reality questions were of the simplest sort, and even though no child could be described as completely concrete operational, the children who were ablest cognitively demonstrated better ability to make distinctions and affective concerns with interactions at an early tricosmic level. Three other children were seen as essentially distancing themselves from dialectic conflict by means of various distancing devices and essentially unicosmic. The two children whose performances could not be accounted for in a hierarchical developmental theory demonstrated serious difficulties in transcending a perceptual set, which may be related to neurological dysmaturation but also had low reality scores,

poor language development, and little suggestion that emotional experience beyond a primitive body comfort level was of concern to them. Even though the both were able to correctly classify animals, it appears that the underlying tasks of class inclusion was more syntonic than the pairing of one of those animals with a representation of mother, a dichotic, distressing experience. Cognition, affect, and neurological status influenced performance and reality scores were demonstrated to have the only significant statistical correlation with ability to perform the earliest concrete operational task.

It has been the tradition in clinical psychology and psychoanalysis to infer normality from psychopathology as the nature of the enterprise is to provide therapeutic interventions for people whose functioning is impaired. Here, I have attempted to proceed from the opposite pole and to describe psychopathology as it relates to normal development and to use answers and performances given by normal children as a baseline for comparison with deviations in children whose psychopathology is extreme. The implications of the performances of these children in understanding their difficulties developmentally seems important. If it is the total organization of personality that permits normative development, psychological and social understanding of early childhood is impelled to move to multi-determinate models of education and enrichment, especially of the symbolic function which emerges with

the advent of language. Most children achieve a dicosmic world, a world of differences, and those who do are not psychotic and will be discussed later. In early childhood education, however, as well as child rearing practices, it is often the case that one set of underlying presuppositions determine the method of approach. Verbal interaction, for example, is often a major goal of middle class families' child rearing practices with less concern for sensory stimulation or egocentric, assimilative play. Too early emphasis on accommodation without sufficient provision for egocentric, assimilative needs may distort personality development regardless of socio-economic status, as may imbalance in the other direction when children are raised in isolation. If one accepts the desirability of libidinal object constancy, the practices of the very poor and the very rich in providing multiple caretakers, from a convergence point of view, may also interfere with normative growth. Another pattern with more neuropsychological implications is seen in children who lack opportunity for motoric expression and fail to develop impulse control and fine and gross motor skills, all of which require exercise of motor functions. The list could continue but the major thrust of the argument should be clear.

In discussing the psychotic children studied, and by implication psychotic children in general, several points should be made. The first is that these children were by no means among the most severely disturbed. All of them functioned well enough

to be in-day treatment programs rather than institutions and all had enough language to participate. Mayer (1976) has described her attempts to present Piagetian tasks to severely autistic children. She reports that, when presented with conservation of matter with clay, the children she was attempting to assess simply sat and ate the clay. Furthermore, the children in this research were cooperative enough to come to the examiner's office, sometimes over several days, and to remain physically present in trying circumstances. One child who was originally included had to be dropped as she could not tolerate rank ordering objects or being alone in the office with the examiner. Even though approached repeatedly, she grew more and more remote and finally screamed, "Don't touch me" when I approached her on the playground.

A second point is that these children although only in day treatment did not approach the task as one could expect in latency age children. Normal children of the age I observed have usually repressed their early fantasy or acquired enough socially appropriate behavior to handle test situations without allowing inner fantasy life to intrude. Even though the material was designed to evoke affect, the normal child at latency is at an age when secrets, peer interaction and task mastery are important. As any parent will recognize, they are not always terribly interested in sharing their concerns with adults. The spillover into the testing situation, then of levels of preoccupation with

aggression and/or sexuality in a formal task is in itself diagnostic. A second factor that seems diagnostic--and which replicates findings of the research group at Psychiatric Institute--is the transitional nature of cognitive performance. Even the child who could perform class inclusion and one-to-one correspondence in all conditions chose a class of "mommies and telephones" when asked to choose two things that go together, and justified concretely rather than abstractly. Therefore, it can be assumed that disequilibrium and variability in cognitive performance will be seen in psychotic children when they are presented with Piagetian tasks. The nature of the variation will, of course, be related to the degree of disturbance as well to the loadings of affective, neurological and cognitive dysmaturation, to the level and nature of symbolic elaboration, and to the ability of the child to express his or her perceptions in communicative language. For this reason, Piagetian studies serve a distinct function in understanding cognition in a truly different way than the traditional intelligence test permits. The child with the highest intelligence scores in this study (in the Average Range), while linguistically able in some circumstances and charming, could perform neither task. To treat him, then, as a child of normal intelligence would be to misinterpret both the nature of his difficulties and the potentialities he presently has insufficient structure to actualize. If the goal of education and remediation is to permit

the child to live in a "real" world and function in the community at large, treating his emotional problems as highly deviant and his intellectual functioning as essentially normal is to do him a real disservice.

Symbolic functioning

The importance of language as an expressive extension of semiotic functioning in general also became increasingly apparent. I have previously described the children whose grammar and use of pronouns and verb tenses differed from another group whose linguistic usage was adequate but whose underlying associational processes were distorted. Traditionally language therapy has been used with some of the first group, but if Voyat (1972) is correct that language is a subset of symbolization as well as the outgrowth of a logic of actions in the sensorimotor period, any enhancement or enrichment of overall semiotic functioning should be actualized in the language area as well. This may not be as true for those children whose language disorders have a neurological base but, as I have argued elsewhere (McLaughlin, 1975), the use of art as a therapeutic intervention for adult aphasic patients ia a modality which deserves serious consideration. As Alajouanine (1948) comments,

> Everyone's language is the expression of a complex whole that goes beyond language itself and expresses to totality and individuality. Aphasia more or less respects that personality so far as it remains unaltered by psychic troubles. (p. 237)

Later in the same article he says,

> This [painting] is not the use of language made up of symbols, it is the case of a plastic reality more or less transposed by a specific technique into a climate which, in the painter, is the exact equivalent of language . . . the most intellectual part of pictorial composition--the choice of theme, disposition of the subject and the appreciation of values, i.e., everything that requires judgment, is not disturbed either. (p. 240)

From the opposite end of the continuum (development rather than remediation of cerebral insult) two notions seem worth exploring. One such example would be the use of coloring books with psychotic children, selected to embody the Dick-Jane level of socialization or other such prefabricated art materials. In that case, art (if coloring books can possibly be called art) would be a modality for accommodation, for exercise of fine motor skills and a mediator of a social, consensual real, at the pole of accommodation rather than assimilation. The second idea is that embodied in art therapy but which most often, educationally, has been seen as "fun" rather than an educational activity of great importance. I would argue that it should be seen as an important remedial tool and structured more tightly into the basic skills areas as an important developmental medium. Whatever form of symbolic or artistic expression the child can use or develop seems to me to be potentially and generalizably important in promoting affective and cognitive growth.

Neuropsychological implications

The neuropsychological importance of the present research

is that it opens a vast and unexplored domain. Although the neuropsychologist has often been consulted for differential diagnosis, once a primary diagnosis of psychosis or schizophrenia has been made, the child is referred back to psychology or psychiatry for therapy. Multi-modal intervention would include the neuropsychologist, both as diagnostician and remediator of those higher cortical functions which seem delayed or interfered with. Many of the children in the study displayed symptoms which would suggest parietal lobe involvement if seen in an adult and which support Hermelin and O'Connor's (1963, 1964, 1965) findings of aberrant somato-sensory organization. As far as I know, neuropsychological evaluation of psychotic children has not been attempted yet it does appear that either language or visual-spatial orientation is severely impaired in many of them, and might be amenable to remediation techniques being developed within the realm of neuropsychology. However, it should also be pointed out that in none of the children was neurological dysfunction sufficient to account for the performances--the interplay among factors related to development was preponent.

Psychodynamic considerations

The affective factors of early traumatization and/or their interplay with neurological deficits are those which seem most often addressed. Those factors are certainly important and should be a focus of therapeutic intervention, especially if one accepts one-to-one relationship as crucial to

differentiation for the symbiotic or autistic child. Guntrip (1969) articulates the same idea when he holds that therapy with adult schizoid patients requires the analyst to develop strong enough interpersonal bonds with the patient to allow the patient to regress to the early period when "love made hungry" became a central developmental issue. The same theme runs through the writings of Mahler and Ekstein in working with psychotic or borderline children. However, it also seems to be the case that combining other modalities of treatment with that therapy in multi-modal milieus might externally structure reality for the unstructured child and facilitate the process of moving the child toward being able to construct a reality more consistent with that of the culture.

Finally, before moving to a discussion of therapy understood in the framework I have proposed, a final word should be said in terms of Piagetian theory of assimilation and accommodation. In psychotic children, at least those studied here and at Psychiatric Institute, the disequilibrium between assimilation and accommodation is disruptive of cognitive performances. As I have argued that the interplay between the three realms of development is crucial, especially in transition from the unicosmos to the dicosmos, I will also assert that interplay between assimilation and accommodation is also crucial in moving from a dicosmic to a tricosmic world. It is at this moment in development that socialization and/or interrelatedness must occur on some level if the child is to negotiate structural transformations implicit in resolution

of the Oedipal conflict and the rise of concrete operational thought. The overly assimilative child may be propelled back into preoperational fixation simply because enough accommodative ability does not exist to allow for adaptation to the world of school or peers. The overly accommodative child, conversely, may come to lack the necessary inner symbolic elaboration to move to an abstractive level which will develop capacity for resolving intrapsychic contradictions. The child described in the first chapter who moved from a fear of convertible tops to a fear of guillotines had also symbolically developed to an Oedipal level with castration anxieties apparent. She was able to function successfully in school and to a lesser extent with peers and it seemed that these abilities were as much related to symbolic development as to inately superior intellect. This hypothesis is supported by the performance of the institutionalized child whose intellect was, if anything, even better abstractively. His overly developed abstraction, in a convergence theory, became maladaptive for him in that it distanced him from dealing with and resolving emotional conflicts at a dialectic level. He had no symbolic elaboration at an Oedipal or post-Oedipal level and thus regressed under the impact of the evocation to the ability of a preoperational, pre-Oedipal child.

Psychotherapeutic implications

The convergence theory and its three subphases also bring

into focus a way of looking at the essence of psychotherapy in developmental terms. In neurotic patients, whether the therapy is verbal or assimilative, symbolic play, elaboration of the symbolic system with less egocentric and more adaptive schemas occurs. As Piaget has said (1963), the preoperational child is egocentric and cannot imagine a world where he is not central. Symbolic play is egocentric thought in its purest form and two levels of symbolism are operative at this moment--primary symbolism, in which pretense is acknowledged and secondary symbolism, which is largely unconscious and centered in life concerns. Egocentrism is an unconscious process which only becomes conscious when egocentric ideas incorporate images to pre-existing schemas and traumatic symbols, which perseverate, can be described when such schemas have not been mastered. Thus, in Piagetian terms, free association or symbolic play can both be seen as evoking egocentric unconscious schemas and elaborating them in a social inter-relational setting such that they become conscious and available. Psychoanalytic therapy with adults also replicates on some level early mother-child interactions when language is developing: the patient or child speaks and the mother or analyst reflects back and expands the linguistic and symbolic structure. New dimensions are added to the perceived possibilities which, again, permits structural transformations in symbolic functioning. A third factor, not clearly stated above, is the interpersonal interaction

whether it be an intrapsychic representation as in orthodox psychoanalysis or real collaboration and interplay between patient and therapist as in Rogerian or interpersonal psychotherapy, which seems to promote achievement of tricosmic functioning. In neurotic patients, of course, a dicosmic world is assumed but the issues which have interfered with tricosmic resolution in selective areas have common underlying features in the equivalence to the experience of the preoperational child.

With borderline and psychotic patients, it also seems clear that the issues are related to either lifelong tensions between merging and abandonment, as in the "in-out" program described by Guntrip (1969) or in the panic described by Mahler (1968) in symbiotic psychotic children around issues of fusion and engulfment. Ekstein (1971) in talking of his patient "Theresa Esperanza," describes the difficulty of shifting from secondary to primary symbolism to continually maintain contact with the patient at whatever level is possible. These are but three of many examples that could be used to suggest that psychotherapy with psychotic children is centered in entering the unicosmic world with the child until he or she is able to differentiate or individuate. Bergman (1976) has suggested that two criteria for assuming structural change in psychotic children are the proper use of pronouns and the child's increased ability to use the therapist. "Use" in this sense implies dichotomy. Therefore, in developmental terms, whatever

intervention is possible with psychotic children must assume that a unicosmic world exists with differentiation as a goal of therapy. The establishment of ego defenses which differentiate the child from some "outer" reality must occur before development can proceed. It is, of course, quite true for some children that the structural transformations will never occur. However, a multi-disciplinary approach to treatment would over time demonstrate whether intervention from these separate directions would facilitate the process.

In summary, then, it does seem that a convergence theory of normal and abnormal development offers possibilities which help to create a context of dialogue among proponents of various theoretical points of view. Psychopathology has also been demonstrated to have qualities consistent with unicosmic, dicosmic, and tricosmic distinctions. In expanding the theory and its implications, several reserach possibilities come to mind which would both confirm or disconfirm such a formulation as well as combine for study developmental deviations which have been by and large studied within the framework of one or the other subdisciplines.

Implications for further research

The most obvious and immediate area of research could consist of the extension of Piagetian studies to large numbers of psychotic children with closer attention to the criteria by which they are diagnosed. Under such conditions it would be possible to better understand if variations in task performance are related

to specific diagnostic criteria as well as whether the performances observed are further influenced by other important factors. Another study could also be devised in which selected tasks would be presented with materials which have measurable evoked responses: mothers and gorillas, for example, could be routinely presented along with traditional animals or flowers. It would also be important, in such a study, to examine the affective meanings of materials standardly used as to their possible affective evocative components. For example, conservation of matter is traditionally presented with clay and the child is asked, in extension, whether the person with the clay "pie" or the clay "sausage" will have more to eat. For an orally fixated child, the task becomes loaded with oral symbolism beyond the logical components of task performance.

A second research project concerns the neuropsychological evaluation of psychotic children in relationship to Piagetian tasks. Again, interesting patterns of response would most likely be found related to higher cortical systems. The present designation of "organic" or "non-organic" does not seem sufficiently precise to focus some of the remedial efforts which might be related to specific deficits. Remediation techniques could also be adapted to the psychodynamic level of the child and promote both neurological maturation and emotional development.

A third research area would deal with the extension of

Piagetian studies to various categories of neurotic children to see if certain neurotic structural patterns are related to task performance. The middle ground between "good enough" and psychotic adjustment would tease out factors that may, at this time, have only been seen in the performances of psychotic children and add to the value of Piagetian tasks as diagnostic tools. A complementary research to the above would be attempting Piagetian experimentation with retarded children when materials are affectively loaded as in my study. As many of the children had very low I.Q. scores, the relationship between retardation per se and psychosis (if they can be differentiated by the tasks) would be of interest.

Many questions remain to be answered as to what constitutes psychosis as well as what forces structural changes in normal development. On the basis of the research that has been done, however, Piagetian studies of psychopathology add a rich dimension to what has previously been known about psychotic states. With the inclusion of the three realms of psychoanalytic theory, neuropsychological developmental progression and Piagetian cognitive maturation in research and theoretical formulations, a new understanding as well as new suggestions for remediation may develop which will facilitate the growth of children who most often do not do, as one child said, "marvelously well."

Conclusions

In terms of normal cognitive development, one sees a

logic of actions developed in the sensorimotor unicosmic period which is transformed into beginning distinctions between thought and action in the early preoperational, dichotic period. The preoperational child develops distinctive characteristics related to disequilibrated poles of assimilation and accommodation. The semiotic function includes assimilative, symbolic play and associations along with adaptive, accommodative language which develop at the same time but not in necessary relation to each other. At the age of five or six, the first concrete operation--one-to-one correspondence--is mastered and the tricosmic concrete operational period is ushered in. From this time on, in normal children, logic and infralogic develop which serve to abstract a "logic of necessity" from real objects with invariant abstractive laws related to identity, transitivity and reversibility. Conservation consists of correlation of various identities through perceptual transformations and the abstraction, logically, of invariant laws which transcend the perceptual given. The concept of number is one such law in which one apple is equal to one gorilla is equal to one tree. Infralogic develops at the same time in which discrete units are introduced into a continuum--when one straight stick and one equally long but fragmented stick are presented, an elephant walking "down the pathway" will have the same distance to walk no matter which path he chooses. Only at the formal level of thought is the combination

of ideas with other ideas found without reference to objects from which the abstraction can be made. At this point, cognition has been achieved which can be considered fully abstract, fully capable of generating all possible combinations of ideas from other ideas.

In distinction from the above, the children seen in this study, although at an age when concrete operations should have been achieved, were unable to separate the psychological meanings of the materials from the logical demands of the task. They also demonstrated lack of differentiation between interior, symbolic representation and adaptive, accommodative abstraction--the semiotic function did not serve its usual purpose of differentiated elaboration but appeared to fuse thought and action, sign and symbol. Whether this implies lack of structure necessary to perform the task (as I would argue) or interference with its actualization in performance remains unclear and subject to further research. The underlying logic of the psychotic child as related to the formal logical requirements of the tasks is equally unclear but reminiscent of a logic of identity rather than a logic of external necessity. That distortion appears to prevent performance of the tasks in a fully concrete operational way. The transitional patterns observed, or the retreat from dealing with the logical necessity of performance, suggest that the child is perpetually suspended in a cognitive situation which does not

allow for resolution through increasing abstraction of external invariants but rather leads to a variety of devices which exclude situations so far as possible that present irresolvable cognitive conflict. Without time, without logic, without identity and without differentiation between inner and outer events, reality must seem to have its own set of operative laws but their logical construction among these children remains unclear from a formal point of view.

The psychological subject, as described above, differs from the epistemic subject Piaget described. As Voyat, McLaughlin and Shackelford point out,

> Piaget builds his argument from an abstract, formal observation of the status of intellectual operations in a particular setting, and not from a global view of the real subject. In effect, the primary goal is understanding the genesis of logical operations which has determined Piaget's epistemic concerns. (in preparation, p. 4)

Here, the logic of the task requires the child to assimilate not to his own egocentric actions but to the concrete operations as general coordinations of action external to himself and not affected by either the materials or by symbolisms. The concept of number, as distinct from counting which can have other functions, results when the child can ignore differences and render each element equivalent to every other element, a synthesis of seriation and inclusion, which logically requires that he or she understand that one of any object equals one of any other. It also requires the child to understand that the displacement of the objects does

not affect the original equality. In normal development the logical properties of the object are distinguished from its psychological properties during the construction of a reality which has invariant laws and properties of identity, reversibility and reciprocal relationship.

By contrast, the children studied who had the best reality testing and the best performances, in some instances found the logical requirement overwhelmed by psychological meaning which had to be dealt with before the task itself could be achieved, as when a child put the spacemen behind the gorillas because "it's safer" and then went on to perform the one-to-one correspondence. In this sense, although the logic of the underlying abstraction did not disappear, identity was assumed not only in terms of numerical equality but on another level was transmuted such that a scale model gorilla had properties of a real gorilla while a wooden cutout of an astronaut had those same qualities. This fusion of the dimensions of identity characterized performances throughout, and it should be noted that every correct justification was one of identity. The degree of distinction between inner and outer reality seems to be crucial to the ability to separate the two aspects of identity and to proceed to deal with the logic of the task. Externalization thus appears to be related to ability to separate symbolic identity from logical identity and to promote the construction of categorizations which have properties

and laws of their own.

Class inclusion--as a general grouping task--is related to both identity and seriation (of class/subclass distinctions). The child must combine discrete objects and subsume each to a larger grouping which is abstractly understood to be greater than either subset. Here again, performance mediated by abstraction was, in general, not observed. The justifications for both spontaneous choice and task achievement suggest that immediate experience rather than invariant, external distinctions determined the class, as when animals constituted a class because "they go in the zoo" or people a class because "they come out from the world." Thus, whatever the logic of the task, for the psychotic child another logic exists: identity appears fused with inner symbolism, reversibility most often seemed related to primitive notions of socialization and aggression and reciprocal relationships were perceived in psychological rather than logical terms. Although it remains to be determined what the underlying logic of childhood psychosis is, which is beyond the scope of this research, or whether such a creature as the "epistemic psychotic" child exists, it is clear that the logical requirements of the tasks themselves are perceived very differently and almost invariably in concrete rather than abstract terms. I do not intend to make argument from a formal point of view as that evaluation more properly belongs to logic than psychology. However, extension

of this research which opens for exploration the evaluation of psychotic children in relation to normal development should clarify the parameters within which the logic of the psychotic child is like that of earlier developmental stages even as it illuminates new avenues for intervention related to cognitive organization

APPENDIX A:1

ONE-TO-ONE CORRESPONDENCE (original version presented here with self-selected objects)

Material:

9 horses (presented with 8 objects)
12 of another animal (for example, lions) (presented with 10 objects)

Presentation:

(1) The experimenter asks the child how many horses there are.

(2) He then arranges or orders the horses in front of the child, such that they are side by side with a 4 cm interval between each horse. The lions are put in disorder in front of the child.

Part 1:

The investigator says to the child, "Take enough lions for these horses. Put one lion in front of each horse. Put them together so that we have only one lion for each horse."

Part 2:

The experimenter leaves the horses as they are, but extends the lions in space. Whereas in Part 1 the rows should be arranged like this:

.....Horses
.....Lions (Part 1)

For Part 2, the configuration is as follows:

.....Horses
. . . . . .Lions

He then asks: "Is there still one horse for each lion?" "Are there more horses, more lions? How do you know?"

Part 3:

The investigator asks the child: "If we put them as before, would we now have one horse for each lion?" Then he arranges them as in Part 1.

Part 4:

He leaves the lions, and extends the horses in space as in Part 2, then he asks the same questions as above.

Ref: J. Piaget, The Child's Conception of Number
Routledge and Kegan, Paul, London, 2nd Edition, 1961

APPENDIX A:2

CLASS INCLUSION: ANIMALS OR FLOWERS (original version:presented here with self-selected objects)

Material:

12 horses (presented with 10 objects)
2 lions (presented with 2 objects)
(or 6 daisies, 2 roses (plastic))

Presentation:

Ask child to name the animals. One must first be assured that the child has some notion of the class "animals." Ask him to name some animals.

Part 1:

Ask child: "How many horses are there?" "How many lions are there?" (As above, it is not necessary that he give the correct number, merely that he recognize that there are more horses than lions.) "Are the horses animals?" "Are the lions animals?"

Part 2:

"On this table, do we have more horses or animals?" "Why?"

Part 3:

"There are two children who would like to put together animals. One would like to put together all the horses, the other would like to put together all the lions. Which bunch will be greater?"

Part 4:

"If I give you the horses, what remains in my bunch?" "If I give you the animals, what remains in my bunch?"

Part 5:

"On this table, do we have more animals or horses?" "In the world, do we have more animals or horses?"

Ref: J. Piaget & B. Inhelder, The Early Growth of Logic in The Child: Classification and Variation, Harper, N.Y., 1964

APPENDIX B:1

CONTINGENCY TABLES OF INTER-RATER RELIABILITY

The statistical method used is the Kappa ratio of the percentage of agreement over chance between raters of the child's performance on the various Piagetian tasks. (Fleiss, 1973)

One-to-one correspondence

Best liked object

		Rater 1			
		1	2	3	
Rater 2	1	1	0	0	1
	2	1	4	0	5
	3	0	0	5	5
		2	4	5	11

K = .85

		Rater 1			
		1	2	3	
Rater 3	1	1	0	0	1
	2	1	4	0	5
	3	0	1	4	5
		2	5	4	11

K = .70

		Rater 2			
		1	2	3	
Rater 3	1	1	0	0	1
	2	0	5	0	5
	3	0	0	5	5
		1	5	5	11

K = 1.0

On one-to-one correspondence performed with best liked objects:
K = .85; .70; 1.0

Least liked object

		Rater 1			
		1	2	3	
Rater 2	1	1	0	0	1
	2	1	4	0	5
	3	0	0	5	5
		2	4	5	11

K = .85

		Rater 1			
		1	2	3	
Rater 3	1	2	0	0	2
	2	0	4	0	4
	3	0	0	5	5
		2	4	5	11

K = .86

		Rater 3			
		1	2	3	
Rater 2	1	1	1	0	2
	2	0	4	0	4
	3	0	0	5	5
		1	5	5	11

K = .85

On one-to-one correspondence performed with least liked objects, K = .85; .86; .85

Best liked objects paired with least liked objects

		Rater 1			
		1	2	3	
Rater 2	1	3	1	0	4
	2	0	3	0	3
	3	0	0	4	4
		3	4	4	11

K = .87

		Rater 1			
		1	2	3	
Rater 3	1	4	0	0	4
	2	0	2	0	2
	3	0	1	4	5
		4	3	4	11

K = .86

Best liked objects paired with least liked objects (cont.)

		Rater 2			
		1	2	3	
	1	3	1	0	4
Rater 3	2	0	1	0	1
	3	0	1	5	6
		3	3	5	11

K = .72

One-to-one correspondence with best liked and least liked objects paired, K = .87; .86; .72

One-to-one correspondence with neutral objects paired

		Rater 1			
		1	2	3	
	1	1	0	0	1
Rater 2	2	0	1	0	1
	3	0	1	8	9
		1	2	8	11

K = .62

		Rater 1			
		1	2	3	
	1	1	1	0	2
Rater 3	2	0	2	0	2
	3	0	0	7	7
		1	3	7	11

K = .83

		Rater 2			
		1	2	3	
	1	1	0	1	2
Rater 3	2	0	3	0	3
	3	0	0	6	6
		1	3	7	11

K = .84

On one-to-one correspondence with neutral objects paired, K = .62 ; .83; .84

Class Inclusion

Class inclusion was measured under three conditions: spontaneous choice, best liked objects paired, and least liked objects paired. In analyzing the data, however, spontaneous choice frequently coincided with the best liked object and constituted a class; the ratings of 9 subjects fit that category. In the other two instances, best and least liked objects constituted a class. In these same two instances, spontaneous choice differed from either best or least liked objects. Therefore, the ratings are subdivided into two groups: best liked and/or spontaneous choice and least liked object for nine subjects, and spontaneous choice and best liked/least liked objects. For statistical purposes, least liked objects constituted one condition and either spontaneous choice or best liked object the other.

Best liked objects (where best liked object - spontaneous choice; also where spontaneous choice did not constitute a class)

		Rater 1			
		1	2	3	
Rater 2	1	5	0	0	5
	2	1	2	0	3
	3	0	0	1	1
		6	2	1	9

K = .78

		Rater 1			
		1	2	3	
Rater 3	1	6	0	0	6
	2	1	1	0	2
	3	0	0	1	1
		7	1	1	9

K = .72

		Rater 3			
		1	2	3	
Rater 2	1	4	1	0	5
	2	1	2	0	3
	3	0	0	1	1
		5	3	1	9

K = .61

For class inclusion performed with best liked objects (as defined above), K = .78; .72; .61

Class inclusion performed with least liked objects, best-least liked paired, when spontaneous choice of objects differed.

		Rater 1			
		1	2	3	
Rater 2	1	7	0	0	7
	2	0	1	1	2
	3	0	1	1	2
		7	2	2	11

K = .66

		Rater 1			
		1	2	3	
Rater 3	1	7	0	0	7
	2	0	2	0	2
	3	0	0	2	2
		7	2	2	11

K = 1.0

		Rater 3			
		1	2	3	
Rater 2	1	7	0	0	7
	2	0	1	1	2
	3	0	1	1	2
		7	2	2	11

K = .66

For class inclusion with least liked objects, least-best liked paired when spontaneous choice differed from either of the above, K = .66; 1.0; .66

SUMMARY OF CONTINGENCY TABLE "K" STATISTICS

Best liked objects, one-to-one correspondence

Rater 1 / Rater 2: K = .85
Rater 1 / Rater 3: K = .70
Rater 2 / Rater 3: K = 1.0

Least liked objects, one-to-one correspondence

Rater 1 / Rater 2: K = .85
Rater 1 / Rater 3: K = 1.0
Rater 2 / Rater 3: K = .85

Best liked and least liked objects, one-to-one correspondence

Rater 1 / Rater 2: K = .87
Rater 1 / Rater 3: K = .86
Rater 2 / Rater 3: K = .72

Neutral objects, one-to-one correspondence

Rater 1 / Rater 2: K = .62
Rater 1 / Rater 3: K = .83
Rater 2 / Rater 3: K = .84

Class inclusion, best liked objects and/or spontaneous choice

Rater 1 / Rater 2: K = .78
Rater 1 / Rater 3: K = .72
Rater 2 / Rater 3: K = .61

Class inclusion, least liked and/or best-least paired when spontaneous choice was another class

Rater 1 / Rater 2: K = .66
Rater 1 / Rater 3: K = 1.0
Rater 2 / Rater 3: K = .66

APPENDIX B:2

Correlations among various factors in performance of one-to-one correspondence and class inclusion using Fisher's Exact Test.

> Values for significance levels are taken from tabled values for Fisher's Exact Test in Non-Parametric Statistics, Sidney Seigel, McGraw Hill, 1956.

One-to-one Correspondence: Reality Testing

High reality testing = score of 8 to 12 on reality questions
Low reality testing = score of 7 or below on reality questions

	Low reality	High reality	
Achieves 1:1	0	6	6
Does not achieve	5	0	5
	5	6	11

$p < .05$

Class Inclusion: Reality Testing

	Low reality	High reality	
Achieves cl.incl.	2	2	4
Does not achieve	3	4	7
	5	6	11

$p > .10$

Reality Testing: I.Q. in Achieving One-to-one Correspondence

	Low reality	High reality	
Dull normal Normal I.Q.	3	4	7
Borderline IQ or Below	1	3	4
	4	7	11

$p > .10$

Reality Testing: I.Q. in Achieving Class Inclusion

	Low Reality	High Reality	
Dull Normal Normal I.Q.	3	4	7
Borderline I.Q. or below	3	1	4
	6	5	11

$p > .10$

Ability to Achieve One-to-one Correspondence: Ability to Achieve Class Inclusion

1:1		Class Inclusion Yes	Class Inclusion No	
	Yes	2	4	6
	No	2	3	5
		4	7	11

$p > .10$

APPENDIX B:2B

TABLES FOR COMPUTATION OF PEARSON'S CORRELATION COEFFICIENT BETWEEN REALITY TESTING AND AGE

N = 11

Ss	Age in Months X	Reality Score Y	X^2	Y^2	XY
1.	161	12	25921	144	1932
2.	147	10	21609	100	1470
3.	115	10	13225	100	1150
4.	110	10	21200	100	1100
5.	150	9	22500	81	1350
6.	114	9	12996	81	1026
7.	119	7	14161	49	833
8.	119	7	14161	49	833
9.	111	4	12321	16	444
10.	124	5	15376	25	620
11.	107	7	11449	49	749
	$\lesssim X=1377$	$\lesssim Y=90$	$\lesssim X^2=175819$	$\lesssim Y^2=810$	$\lesssim XY=11507$

$(\lesssim X)^2=1896129$

r = .478, 9 df.

p $>$ .05, 9 df., r = .6021

(Basic Statistical Methods, N. M. Downie, R. W. Heath, Harper and Row, New York, 1970)

APPENDIX B:2C

COCHRAN'S Q TEST FOR SIGNIFICANCE OF THE RELATIONSHIP BETWEEN THE EVOCATIVE QUALITY OF THE MATERIALS AND ABILITY TO PERFORM THE TASK OF ONE-TO-ONE CORRESPONDENCE

Child	Best Liked	Least Liked	Best Least	Neutral	L_1	L_1^2
01	1	1	1	1	4	16
02	1	1	1	1	4	16
03	0	0	0	1	1	1
04	1	1	1	1	4	16
05	1	1	1	1	4	16
06	1	1	1	1	4	16
07	0	0	0	0	0	0
08	0	0	0	0	0	0
09	0	0	0	0	0	0
10	0	0	0	0	0	0
11	0	0	0	0	0	0

0 = did not perform on one-to-one correspondence
1 = did perform on one-to-one correspondence

$$Q = \frac{(k-1)\left[k\sum_{j=1}^{R} Gj^2 - \left(\sum_{j=1}^{R} Gj\right)^2\right]}{k\sum_{j=1}^{N} L_1 - \sum_{j=1}^{N} L_1^2}$$

$Q = 3$

for significance at .05, Q must equal 7.82
therefore, Q is not significant at .05

APPENDIX B:3

TABLES FOR COMPUTATION OF THE t-TEST OF RELATION BETWEEN AGE AND ABILITY TO DO ONE-TO-ONE CORRESPONDENCE

	Achieves 1:1 Correspondence	
N=6	Age in Months X	X^2
	161	25921
	147	21609
	110	12100
	150	22500
	114	12996
	115	13225
	$\Sigma X=797$	$\Sigma X^2=108351$
	$\bar{X}=132.8$	

	Does not achieve 1:1 Correspondence	
N=5	Age in Months X	X^2
	119	14161
	124	15376
	119	14161
	111	12321
	107	11449
	$\Sigma X=580$	$\Sigma X^2=67468$
	$\bar{X}=116$	

$t = 1.25$, 9 df.

$p > .05 = 2.262$, 9 df.

(Downie, N. M., Heath, R. W., Basic Statistical Methods, Harper and Row, New York, 1970)

t-TEST OF RELATION BETWEEN AGE AND ABILITY TO DO CLASS INCLUSION

Achieves class inclusion			Does not achieve class inclusion		
N=4	Age in Months X	X^2	N=7	Age in Months X	X^2
	124	15376		119	14161
	147	21609		161	25921
	107	11449		110	12100
	115	13225		150	22500
				114	12996
	$\Sigma X=484$	$\Sigma X^2=61659$		119	14161
				111	12321
	$\bar{X}=121$			$\Sigma X=884$	$\Sigma X^2=114160$
				$\bar{X}=126.28$	

$t = .27$, 9 df.

$p > .05 = 2.262$, 9 df.

(Downie, N. M., Heath, R. W., Basic Statistical Methods, Harper and Row, New York, 1970)

APPENDIX C:1

Individual Summary Sheet

Child: 01 Reality score: 10
Age: 12-3 Unknown items: date of birth
I.Q.: Unknown; Reading Gr. 6 WRAT current year
Arithmetic Gr. 4.5 WRAT (6/74)

Wrong answers: none

Diagnosis: Unknown from records: school psychologist reports childhood schizophrenia with organic components.

Rankings of objects: best liked to least liked

1) mommy	6) policeman	11) gorilla
2) kangaroo	7) spaceman	12) rocket
3) panda	8) sewing machine	13) blue poker chip
4) telephone	9) bear	14) white poker chip
5) fireman	10) working man	

Scores are those given by three raters

One-to-one correspondence:	Stage 1	Stage 2	Stage 3
Best liked-next best liked: mommy:kangaroo			3
Least liked-next least liked: poker chip+poker chip			3
Best liked-least liked: mommy:poker chip			3
Neutral: spaceman:sewing machine			3

Class inclusion:	Stage 1	Stage 2	Stage 3
Spontaneous choice: "mommies talk on telephones": not a class			
Best liked object: mommie and daddies			3
Least liked object: poker chips		3	

Reason for spontaneous choice: concrete
Nature of justification: no justification (2), concrete (1)

Family data: Father, mother, younger brother, age 6. Family seen as essentially unworkable. Records were lost by the time of follow-up study.

APPENDIX C:2

Individual Summary Sheet

Child: 02 Reality score: 10
Age: 9-6 Unknown items: current year
I.Q.: WISC (11/6/72) V. I.Q. 79,
P. I.Q. 80, F.S. I.Q. 77; PPVT
(12/26/74) I.Q. 88 SB (9/13/71)
F.S. I.Q. 72 Wrong answers: month of birth
Diagnosis: borderline autistic or schizophrenic

Rankings of objects: best liked to least liked

1) astronaut	6) gorilla	11) blue chip
2) fireman	7) cat (kangaroo)	12) polar bear
3) workman	8) panda	13) sewing machine
4) policeman	9) telephone	14) rocket
5) mommy	10) white chip	

Scores are those given by three raters

One-to-one correspondence:	Stage 1	Stage 2	Stage 3
Best liked-next best liked: astronaut+fireman		3	
Least liked-next least liked: rocket:sewing machine		3	
Best liked-least liked: astronaut:rocket		3	
Neutral: panda:cat			3

Class inclusion:	Stage 1	Stage 2	Stage 3
Spontaneous choice: mommies and policemen: "they're married"			3
Best liked object: astronaut:rocket (best/least paired)		2	1
Least liked object:			

Reason for spontaneous choice: abstract (1), concrete (2)
Nature of justification: concrete (3)

Family data: Foster child; father alcoholic, mother dead. Says he has one brother whose age he can't remember and a cousin.

APPENDIX C:3

Individual Summary Sheet

Child: 03 Reality score: 12
Age: 13-5 Unknown items: none
I.Q.: WISC (3/72) V. I.Q. 62, P. I.Q. 67, F.S. I.Q. 61; WISC (2/71) V. I.Q. 53, P. I.Q. 61, F.S. I.Q. 53.
Wrong answers: none
Diagnosis: Autistic or childhood schizophrenic

Rankings of objects: best liked to least liked

1) spaceman	6) telephone	11) fireman
2) rocket	7) panda	12) polar bear
3) blue chip	8) mommy	13) kangaroo
4) white chip	9) workman	14) gorilla
5) sewing machine	10) policeman	

Scores are those given by three raters

One-to-one correspondence:	Stage 1	Stage 2	Stage 3
Best liked-next best liked: spaceman:rocket			3
Least liked-next least liked: kangaroo:gorilla			3
Best liked-least liked: gorilla:spaceman			3
Neutral: panda:mommy			3

Class inclusion:	Stage 1	Stage 2	Stage 3
Spontaneous: rocket:spaceman (best liked Best liked object: paired)	3		
least liked object: polar bears:gorillas	3		

Reason for spontaneous choice: concrete (3)
Nature of justification: none

Family data: Found starving on street in Italy under age one, sent to an orphanage for girls until age one. Transferred to boys' orphanage until age 3-9. Came to U.S. for adoption at age 3-9. Now in foster home, foster parents willing to adopt. Only child in family.

APPENDIX C:4

Individual Summary Sheet

Child: 04
Age: 9-2
I.Q.: WISC-R (1/27/75) V. I.Q. 74, P. I.Q. 77, F.S. I.Q. 73; S.B. (12/70) P. I.Q. 77, PPVT (2/16/72) F.S. I.Q. 95
Diagnosis: childhood schizophrenia

Reality score: 10
Unknown items: current year
Wrong answers: year of birth

Rankings of objects: best liked to least liked

1) mommy	6) panda	11) rocket
2) working man	7) fireman	12) polar bear
3) policeman	8) chip	13) gorilla
4) cat (kangaroo)	9) chip	14) spaceman
5) telephone	10) sewing machine	

Scores are those given by three raters

One-to-one correspondence:	Stage 1	Stage 2	Stage 3
Best liked-next best liked: mommy+working man			3
Least liked-next least liked: gorilla:spaceman			3
Best liked-least liked: mommy:spaceman			3
Neutral: fireman:chip			3

Class inclusion:	Stage 1	Stage 2	Stage 3
Spontaneous choice: mommies and daddies:because" they got married"	3		
Best liked object: same as spontaneous choice			
Least liked object: spaceman:rocket	3		

Reason for spontaneous choice: concrete (3)
Nature of justification: no justification

Family data: Lives with her father who has remarried. He is 20 years older than her step-mother. She has two step-sisters from his previous marriage and is reported to have beaten her when she was young because her behavior angered him. Slept with parents until age seven and concerned with anatomical differences for a long time.

APPENDIX C:5

Individual Summary Sheet

Child: 05
Age: 12-7
I.Q.: WISC (2/73) V. I.Q. 57,
P. I.Q. 67, F.S. I.Q. 58

Reality score: 9
Unknown items: year of birth
current month
current year

Wrong answers: none

Diagnosis: childhood schizophrenia

Rankings of objects: best liked to least liked

1) mother	6) spaceman	11) panda
2) fireman	7) bear	12) blue chip
3) rocket	8) sewing machine	13) white chip
4) policeman	9) kangaroo	14) telephone
5) father	10) gorilla	

Scores are those given by three raters

One-to-one correspondence:	Stage 1	Stage 2	Stage 3
Best liked-next best liked: fireman:mother			3
Least liked-next least liked: white chip:telephone			3
Best liked-least liked: telephone:mother			3
Neutral: bear:sewing machine			3

Class inclusion:	Stage 1	Stage 2	Stage 3
Spontaneous choice: mothers;fathers:because "they are	2	1	
Best liked object: grownups" same as spontaneous choice	3		
Least liked object: telephone:sewing machine	3		

Reason for spontaneous choice: concrete (2), abstract (1)
Nature of justification: none

Family data: Black child in group residence. Father alive and one brother, mother deceased. Has relatives in the South whomshe visits. Returned home between the experimentation and follow-up study.

APPENDIX C:6

Individual Summary Sheet

Child: 06
Age: 9-9
I.Q.: CMMS (11/73) F.S. 74

Reality score: 9
Unknown items: what he liked to do least

Wrong answers: current year
location ("Row 4")

Diagnosis: mixed organic/psychotic

Rankings of objects: best liked to least liked

1) cat	6) daddy	11) blue plate (chip)
2) polar bear	7) fireman	12) white plate (chip)
3) panda	8) astronaut	13) telephone
4) mommy	9) rocket	14) gorilla
5) policeman	10) sewing machine	

Scores are those given by three raters

One-to-one correspondence:	Stage 1	Stage 2	Stage 3
Best liked-next best liked: cat:polar bear			3
Least liked-next least liked: telephone:gorilla			3
Best liked-least liked: cat:gorilla		2	1
Neutral: fireman:astronaut			3

Class inclusion:	Stage 1	Stage 2	Stage 3
Spontaneous choice: panda bear:polar bear:"they're both bears"	3		
Best liked object: cat:panda	3		
Least liked object: gorillas:polar bears	3		

Reason for spontaneous choice: concrete (3)
Nature of justification: none

Family data: Intact family, father biology teacher described as "over-intellectual, fragile." Mother seen as passive, dependent. Parents seen as "not having ego strength for therapy." Second of three boys in family. Speech delayed, disinterested in environment, poor gross motor coordination. Mother exposed to rubella.

APPENDIX C:7

Individual Summary Sheet

Child: 07
Age: 9-11
I.Q.: CMMS (10/72) F.S. 81
SB (1/71) F.S. I.Q. 70

Diagnosis: schizophrenic process

Reality score: 7
Unknown items: year of birth, current month or year, what he likes to do best or least
Wrong answers: year of birth ("White Plains")

Rankings of objects: best liked to least liked

1) sewing machine	6) rocket	11) gorilla
2) father	7) fireman	12) circle (blue)
3) mother	8) panda	13) circle (white)
4) astronaut	9) kangaroo	14) telephone
5) policeman	10) polar bear	

Scores are those given by three raters

One-to-one correspondence:	Stage 1	Stage 2	Stage 3
Best liked-next best liked: sewing machine:daddy		3	
Least liked-next least liked: telephone:circle		3	
Best liked-least liked: telephone: sewing machine	3		
Neutral: fireman:panda		3	

Class inclusion:	Stage 1	Stage 2	Stage 3
Spontaneous choice: astronaut:rocket:"astronauts go in spaceship"	3		
Best liked object: sewing machine:telephone	3		
Least liked object: (as above)			

Reason for spontaneous choice: concrete (3)
Nature of justification: none

Family data: Youngest of five living children, one brother died at two days old; all siblings are sisters. Intact family with father alcoholic. Youngest child in family. precipitate delivery, language development slow.

APPENDIX C:8

Individual Summary Sheet

Child: 08
Age: 9-11
I.Q.: PPVT (1/75) not testable, I.Q. estimated at 60; WISC (2/70) P. I.Q. 93

Diagnosis: autistic

Reality score: 6 1/2
Unknown items: current year
like to do least
last name

Wrong answers: month of birth
location "at the birthday"
current month, day of birth

Rankings of objects: best liked to least liked

1) rocket	6) blue plate	11) baby bear
2) spaceman	7) fireman	12) gorilla
3) workman	8) policeman	13) cat
4) white plate	9) telephone	14) polar bear
5) mommy	10) sewing machine	

Scores are those given by three raters

One-to-one correspondence:	Stage 1	Stage 2	Stage 3
Best liked-next best liked: rocket:spaceman	3		
Least liked-next least liked: cat:polar bear	3		
Best liked-least liked: rocket:polar bear	3		
Neutral: fireman:policeman	3		

Class inclusion:	Stage 1	Stage 2	Stage 3
Spontaneous choice: rocket:spaceman:"and the space	3		
Best liked object: and the moon" same as spontaneous choice	3		
Least liked object: gorilla:polar bear	3		

Reason for spontaneous choice: concrete (2), abstract (1)
Nature of justification: none

Family data: Both parents teachers, one older brother, one twin brother. (Older brother five months old at conception of twins). Father's younger brother institutionalized schizophrenic.

APPENDIX C:9

Individual Summary Sheet

Child: 09
Age: 9-3
I.Q.: PPVT (12/2/74) 100
WISC (1/15/74) P. IQ. 97
WISC (12/70) P. I.Q. 108,
V. I.Q. 104

Diagnosis: autism

Reality score: 4
Unknown items: last name, year of birth, like to do best, like to do least, family composition
Wrong answers: age, location ("the playground"), current year

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Rankings of objects: best liked to least liked

1) policeman	6) gorilla	11) checker
2) workman	7) panda	12) rocket
3) fireman	8) cat (kangaroo)	13) sewing machine
4) spaceman	9) polar bear	14) telephone
5) mommy	10) checker	

Scores are those given by three raters

One-to-one correspondence:	Stage 1	Stage 2	Stage 3
Best liked-next best liked: policeman:workman	1	2	
Least liked-next least liked: sewing machine:telephone	2	1	
Best liked-least liked: policeman:telephone	2	1	
Neutral: panda:cat	1	1	1

Class inclusion:	Stage 1	Stage 2	Stage 3
Spontaneous choice: policeman:fireman:"because they have hats"		3	
Best liked object: same as spontaneous choice			
Least liked object: sewing machine:telephone	3		

Reason for spontaneous choice: concrete (3)
Nature of justification: none

Family data: Intact family, father college graduate, mother high school graduate. Youngest of four children with two older brothers, one older sister. Delayed motor and speech development.

APPENDIX C:10

Individual Summary Sheet

Child: 10
Age: 8-11
I.Q.: WISC (1/21/74) V. I.Q. 69, P. I.Q. 80, F.S. I.Q. 72; CMMS (date unknown) Lang I.Q. 98, F.S. 103, Non-Lang 105
Diagnosis: schizophrenic

Reality score: 7
Unknown items: year of birth, current month of year, plans for vacation

Wrong answers: location

Rankings of objects: best liked to least liked

1) rocket	6) sewing machine	11) mommy
2) kangaroo	7) policeman	12) spaceman
3) panda	8) poker chip	13) man
4) polar bear	9) poker chip	14) gorilla
5) telephone	10) fireman	

Scores are those given by three raters

One-to-one correspondence:	Stage 1	Stage 2	Stage 3
Best liked-next best liked: rocket:kangaroo		3	
Least liked-next least liked: man:gorilla		3	
Best liked-least liked: rocket:gorilla		3	
Neutral: policeman:chip		3	

Class inclusion:	Stage 1	Stage 2	Stage 3
Spontaneous choice: mommy:daddy:"both younger people"		3	
Best liked object: rocket:spaceman	3		
Least liked object: polar bear:gorilla			3

Reason for spontaneous choice: concrete (1), abstract (2)
Nature of justification: abstract

Family data: Father and mother divorced when child 18 months old, mother remarried and divorced twice. Lives with father and step-mother plus one brother, 11.

APPENDIX C:11

Individual Summary Sheet

Child: 11
Age: 10-4
I.Q.: SB (1967) 57
SB (3/72) 52
CMMS (75) F.S. 61
Neurologist's est: I.Q. 70
Diagnosis: Cornelia de Lange syndrome, early childhood autism

Reality score: 5
Unknown items: last name, day or year of birth, location, current month or year, liked to do least.
Wrong answers: month of birth

Rankings of objects: best liked to least liked

1) mommy	6) spaceman	11) sewing machine
2) telephone	7) fireman	12) blue chip
3) daddy	8) white chip	13) bear
4) policeman	9) cat	14) gorilla
5) panda	10) rocket	

Scores are those given by three raters

One-to-one correspondence:	Stage 1	Stage 2	Stage 3
Best liked-next best liked: mommy:telephone		3	
Least liked-next least liked: bear:gorilla		3	
Best liked-least liked: mommy:gorilla	3		
Neutral: fireman: chip		3	

Class inclusion:	Stage 1	Stage 2	Stage 3
Spontaneous choice: mother:father:"cause they're married"	2	1	
Best liked object: same as above			
Least liked object: gorillas:polar bears		1	2

Reason for spontaneous choice: concrete (3)
Nature of justification: concrete

Family data: Parents separated. Second of five children, one brother in institution for retarded. Moved 10 times before age 7. Father, 2 years of college, mother business school, father chronic alcoholic.

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