

THE RELATION OF CONCEPTUAL STYLES AND MODE  
OF PERCEPTION TO GRAPHIC EXPRESSION

by

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## CHAPTER 1

### THE PROBLEM AND DEFINITIONS OF TERMS USED

#### I. Introduction

Early research in cognition, perception and graphic expression attributes differences in the cognitive and graphic products of children of the same age to differences in the amount of knowledge, facility in reasoning, skills or biogenic determined developmental levels. More recent studies in cognition and perception seem to indicate stable intraindividual consistencies of patterning in coping with and relating verbal and visual information (26) (49). The possibility of an individual performing in a self-consistent manner when processing visual and/or cognitive information into graphic expression has not been studied.

#### II. Purpose

##### Statement of the Problem

The purpose of this study is to investigate the possible relationship of the findings of Witkin (49) on consistencies in mode of perceiving, and the findings of Kagan (22) on consistencies in mode of

cognition to the possible consistencies in the mode of graphic expression of boys at five grade levels.

This study attempts to determine whether (1) an individual's preference for an analytical mode of perceiving and conceptualizing will also be demonstrated in his graphic expression, and whether (2) an individual's preference for a global mode of perceiving and conceptualizing will also be demonstrated in his graphic expression. The general assumptions to be tested in this study are that (1) individuals perform in a self-consistent manner when processing visual and cognitive information, and that (2) this consistency is also evident in their graphic expressions.

#### Need for the Study

Literature in art education encompasses a wide range of subjects in the areas of human development and behavior related to behavior in art. One aspect of human behavior in art not evident in the literature is the possibility of intraindividual consistencies in mode of graphic expression as related to the same mode of consistency in patterning of perceptual and cognitive information.

Current theories of child art relate various aspects of psychological or biogenic factors to the art work of children. Child art theories currently in practice are (1) naive realism: assumes a one-to-one relationship between the physical object and its image perceived

by the mind; differences between child and adult are attributed to differences in motor control; (2) intellectualist theory: assumes that the child draws what he knows rather than what he objectively sees; (3) perceptual development: postulates that the child draws what he sees, starting with undifferentiated wholes and proceeding toward more detail; (4) haptic and visual: assumes that space-orientation is a biogenic factor and not modified by experience; (5) age-based concepts of developmental levels: assumes that developmental stages in art are age-based and that biogenic growth patterns can be identified; and (6) perception-delineation: uses a comprehensive framework with which to explain the complex processes and the variables involved in the child's creation of an art form (32). These theories differ in their basic assumptions and the implications for teaching art. Some child art theories have perceptual bases (either experiential or biogenic), another emphasizes conceptual aspects, whereas some focus on age-based developmental levels (32). The most recent theory is the perceptual-delineation (P-D) theory developed by June K. McFee. This theory is eclectic, assimilating recent research from the fields of psychology, cultural anthropology and art (32. 1).

With the exception of the P-D theory, other current child art theories focus on specific, limited aspects of creative expression resulting in the exclusion of important variables that affect human behavior.

Those who are concerned with the artistic development of children recognize that practical methods are affected by theory. Findings of new research in related fields reveal deficiencies in theories on child art that have had their origins in theoretical frameworks which were limited and limiting.

Any observable relationships of intraindividual consistencies in information processing in the domains of perception, cognition and graphic expression which are found as a result of this study would indicate a possible need for re-examination of the assumptions used in most of the current child art theories. If consistency is found to be a characteristic of human behavior in the domains considered, then this dimension would be relevant for curriculum development in art and for the assessment of individual art production.

### III, Definition of Terms

#### Cognition

As used in this study, cognition refers to three internal intellectual processes that are generally sequential; (1) the initial categorizing of external information, (2) the storage of encoded information, and (3) the imposing of transformations upon the encoded data (26, 1).

#### Perception

The term perception refers to the direct apprehension of objects

and of their relationships to situations and events that are physically present to the senses. In addition to the process of sensing there occurs some supplementing, interpreting, integrating and differentiating of sensory impressions (8). What a person perceives depends upon his habits of attending and thinking, early experiences in information processing, cultural influences, his own present circumstances as well as upon the object's background and context.

### Graphic Expression

The term graphic expression denotes the symbols children use to communicate visual and cognitive information in drawings as a result of interacting with their environment.

### Mode or Style

As used in this study, the terms mode and style are interchangeable. Mode of perceptual field approach and cognitive style are used to refer to relatively stable preferences in perceptual organization and conceptual categorizing of the external environment.

### Analytical

The term analytical is used in this study as defined by Kagan and Witkin to describe a mode of conceptualizing or perceiving in response to visually presented stimuli and body orientation.

Kagan defines the analytical mode of conceptualizing as the

ability to consider the total stimulus and search for sub-elements that have common characteristics. The analytical individual selects objective elements within a stimulus complex that are part of the total stimulus (22.4). Witkin's definition of analytical performance is essentially the same as Kagan's. He uses the term to describe the ability of an individual to experience items as discrete from an organized context (49.3).

### Global

The term global is also used in this study as defined by Kagan and Witkin in their respective research.

Kagan describes conceptual global performance as the tendency to attend initially to the total stimulus -- especially to the functional characteristics of objects (22.5). Perceptual global performance is defined by Witkin as the tendency to experience items as fused with the context of the total stimulus (49.3).

## CHAPTER II

### REVIEW OF THE LITERATURE

The research selected for review in this chapter pertains to the following areas: (1) cognitive style, (2) perceptual development, (3) cognitive development, and (4) graphic expression.

#### I. Cognitive Style

The recent research related to this study is that dealing with experimental work in cognitive style. In recent years a number of psychological tests have been developed and variables identified that are cognitive in nature but do not deal directly with intelligence. It was found that certain aspects of mental functioning can be reliably measured and grouped together as measures of perceptual or cognitive style (14) (15) (22) (49). Some of the behaviors studied for defining and measuring these dimensions of style are as follows: the way in which an individual organizes an amorphous perceptual field; the manner in which he deploys his attention in scanning a stimulus; the extent to which he is analytical rather than global in his approach to categorizing familiar objects; and the degree to which he can overcome embedded or conflicting perceptual cues in coping with a

specific problem (21).

Research by Witkin and Gardner and Kagan in dimensions of style in cognition and perception, though conducted independently with different constructs, show some commonality. A general review of the experimental work of these investigators reveals certain similarities in their theoretical concepts and research strategies.

The most extensive program of research in the field of perceptual style is the work by Herman Witkin and his colleagues (50). Originally Witkin was concerned with the problem of bodily orientation to the vertical dimension using conflicting visual and kinesthetic cues. In an experimental situation using a tilted room and tilted chair, Witkin found that individuals vary from each other in the extent to which they are able to ignore the conflicting visual cues while adjusting to an upright position. Witkin used the terms field-dependent and field-independent to describe these observed modes of perception. Field-dependence is the inability to separate an item from the field or to overcome an embedding context. Field-independence is the ability to perceive objects apart from the context in which they occur, or to overcome an embedding context, or to deal with a field analytically (47). More recently, these modes of perceiving were designated as global (field-dependent) and analytical (field-independent) (49, 11). A wide variety of perceptual and cognitive tasks as well as



a number of personality characteristics seemed to correlate with field dependency. Results from a number of related tasks conducted by Witkin showed that an individual is consistent in his ability to make a correct judgment or to overcome the influence of an embedding context. Self-consistency in the subjects used for these studies was evident despite variations in many specific features of the tasks involved.

The concept of field dependency was broadened in Witkin's more recent developmental studies to encompass the general concept of psychological differentiation (49, 11). The cognitive dimension first identified in perception may be defined broadly in terms of the extent to which the individual's experience, both of himself and the external environment tends to be more or less articulated (analytical) or more or less global.

Riley Gardner and his colleagues developed certain ideas from the psychoanalytical theory of ego functioning about cognitive organization (14) (15). The ideas were blended with Gestalt psychology and Piaget's work on cognitive development in the child. From this synthesis they formulated a set of cognitive control principles that characterize an individual's style of coping with his environment. Six fairly independent dimensions emerged in repeated factor analytical studies: field articulation, leveling-sharpening, conceptual differentiation,

extensiveness of scanning, tolerance for unrealistic experiences, and constricted-flexible control (14. 1). The dimension, field-articulation is essentially the same as Witkin's field dependence. Both Gardner and Witkin have stressed the relationship between performance on perceptual tasks and cognitive style.

The experimental work of Jerome Kagan and his colleagues represents a third main stream of research concerned with cognitive style variables. Like Witkin, their research indicates consistencies in coping with and relating information. Conceptual activities of children in two dimensions of categorization used to describe cognitive style, the analytical and relational or global were studied (22). Kagan devised the Conceptual Style Test to identify consistencies of response to visually presented stimuli that were constructed to elicit these two major classes of responses: the analytical and the relational. The analytical child attends initially to details that may have a common characteristic. The relational or global child attends initially to the total stimulus - the relational or functional characteristics of objects.

Results from a number of studies conducted by Kagan, Moss and Sigel (22) using a variety of visual, verbal and projective tests correlated significantly with analytical conceptual style. Stylistic differences in sorting (Figure Sorting Test) were found in many of the same kinds of tasks that have been described as differentiating field-dependent and

field-independent perceivers (44). Analytical sorters were clearer and more exact in their description of Rorschach ink blocks and better able to describe their experiences of inner feelings in an interview situation than global sorters. These individuals were more active and striving and less dependent (22. 10). Also, the behavioral correlates Kagan found characteristic of the analytical child are apparently similar to Witkin's analysis of his analytical dimension.

It appears that Witkin, Gardner and Kagan share the assumption that, with the possible exception of sex differences, stylistic consistency ought to manifest itself in somewhat similar ways in the behavior of all persons. These authors assume that behavioral correlates of individuals differ according to the preferred mode of cognitive style. Stylistic consistencies are considered applicable to all persons (44. 1).

#### Implications from Research on Cognitive Style

The research reviewed on cognitive style suggests the following implications: (1) that there is a pervasive self-consistency in cognitive and perceptual functioning; (2) that stability of cognitive style is evident through years of rapid growth and development; (3) that the categories describing cognitive styles are the global and analytical dimensions; and (4) that this cognitive dimension refers to the extent to which the individual's experience, both of himself and of the external

environment tends to be relatively articulated (analytical or relatively, global).

Prior to the recent research on cognitive style, differences between the cognitive products of children of the same age were attributed to differences in their amount of knowledge and facility in reasoning. The concept of individual consistencies of patterning in coping with and in relating information is a more feasible explanation of differences between cognitive products of children of the same age.

Implications from the research reviewed on cognitive styles suggests the following postulate: that differences between the graphic expressions of children of the same age reflect differences in their modes of information processing. Thus it is expected that a significant correlation will be found between an individual's preference for an analytical mode or global mode of experiencing in his drawings.

## II. Recent Research on Perceptual Development

An understanding of the early development of visual perception as related to effects of perceptual training, visual symbolization and early childhood experiences is necessary for developing directives for the study of individual consistencies in cognitive style. This section will present some of the recent research on the origins of visual perception.

The authors of the studies selected for discussion are probing questions based on the origins of several aspects of visual perception; form perception, visual acuity, complexity preference, depth perception and social perception. Despite their different areas of emphasis, these investigators share several basic concerns. Common among these authors is their concern for the building of a foundation for understanding broader aspects of visual development, such as the role of innate factors and the role of experience and learning in perceiving the size, form and arrangements of objects in the spatial world.

Studies conducted by researchers interested in the initial development of the human organism in the fetal stage, indicate early sensory and motor development (43). These findings plus research on the neonate indicate that the newborn infant is a highly differentiated organism with complex patterns of behavior (43).

Research on the premature infant's response to stimuli impinging on its specialized sensory receptors and anatomical structures demonstrates that these receptors are ready to function before actually needed by the organism. The newborn, therefore, appears to be in a state of sensory readiness at the time of his initial cry.

The following is a partial summary of the findings of research on the infant's initial responses to sensory stimuli (43.2):

1. Visual acuity is evident as early as six months of age (12).

2. Sustained fixation pattern occurs a few hours after birth and reaches a peak in four or five weeks (27).
3. There is rapid improvement of eye coordination during the first thirty-four hours of age as a result of practice, maturational and learning mechanism (43. 1).
4. Infants as young as two months show preference when pairs of patterns are presented (10).
5. It is probable that the newborn's ability to discriminate color is limited but improves with age so that by the end of his second year, four colors can be readily distinguished (42).
6. Infants (15 to 70 days old) respond to color rather than brightness (6).
7. The older fetus and the newborn infant respond to auditory stimuli of a fairly high intensity (43. 3).
8. Neonates appear to be more-disturbed by pure tones of high frequency than pure tones of lower frequency (19).
9. Findings seem to indicate that abrupt auditory stimuli tend to evoke greater movement in infants whereas continuous auditory stimuli of low pitch and moderate intensity tend to inhibit activity (45).
10. Newborns appear to react positively to sweet solutions and negatively to solutions that are highly saturated with salty, sour or bitter substances (37).

When we consider the results of the above studies on sensory and motor response of the newborn it becomes more apparent that the "neonate is not a neophyte" (25). The following discussion focuses more specifically on research findings in visual perception. The optical system, although not fully mature, is functional at birth and maturation

is rapid. Visual resolving power increases rapidly with maturation of the visual system; therefore, the newborn's ability to distinguish detail in patterns increases with age (11). Patterns seem to be more intrinsically interesting than color to the infant (11). A preference for form over color appears to be dominant at three to four months of age to about three years: the preference for color dominates to about six years, and then form dominates again (41). Infants, as well as adults seem to prefer shapes of intermediate complexity (20).

There is some indication that the infant's selectivity of visual stimuli has order and meaning, especially in regards to social perception. Infants, four days to six months, consistently selected in order of preference, a face pattern, followed by printing and bulls-eye patterns. Least preferred were three solid colored circles (11).

Thus far, most of the conclusions cited imply that some degree of form perception is innate and that maturation of sensory structures proceeds rapidly shortly after birth. However, social perception, a phenomena usually equated with learning - or experiencing - seems to be operative in some examples of the infant's selectivity. Innate capacity, maturation and learning are also important factors in visual deprivation studies which demonstrate impairment of visual response (11). We are confronted with a complex interplay between learning, innate capacities and maturation. The primacy of one does not necessarily

negate the influence of the others.

Depth perception is considered essentially or initially innate. Infants showed preference for three-dimensional shapes (9). Others demonstrated that action in space is not necessary for the discrimination of depth (3). "Visual Cliff" experiments indicate that infants can discriminate depth as soon as they can crawl -- relying more on visual cues rather than tactile sensations (17). The perception of depth develops more rapidly than locomotor abilities.

The pre-school child is sensitive to the spatial positions of form showing remarkable consistency in preference for a particular orientation of non-realistic figures as right side up. Six year olds hesitated with non-realistic forms, they were reluctant to make a choice (16).

The above cited studies on the origins of visual perception in the human organism indicate a complex interplay between learning-experiencing, innate capacities and maturation. The definitive role of each of these factors has yet to be discovered. As more extensive research is conducted on moderator variables influencing visual perception a more composite picture may emerge juxtaposing nature and nurture factors.

Lending support to the empiricist's point of view is Allport's statement on the importance of past experiences.

In the process of perceiving [an object], the past experience of the organism plays an important part.



Basic to the [perceptua] process. . . is the fact that the organism has built up certain assumptions about the world in which it lives. These assumptions, which are usually unconscious [result in the] attaching of significances to indications, or cues from the environment (1).

Implied in this statement is the influence of culture on perceiving.

Segal, Campbell and Herskovits' cross-cultural studies on the influence of culture and environments on visual perception revealed significant differences across cultures in susceptibility to several geometric or optical illusions. These differences were attributed to differences in experiences. Segal, Campbell and Herskovits concluded "that to a substantial extent we learn to perceive; that in spite of the phenominally absolute character of our perceptions, they are determined by perceptual inference habits" (39). These inference habits are culturally influenced and differ in dissimilar societies. The authors postulate that for all mankind, the basic process of perception is the same -- only the contents differ because they reflect different perceptual inference habits. Built into the process of perception are learned organizations, delineations and interpretations.

Through an extensive series of developmental and longitudinal studies, Witkin approached the problem of experiential influences on perception, first, through a series of tests on bodily orientation in space, and later, in terms of self-differentiation and articulation of experience.

The way in which each person orients himself in space is an expression of a more general preferred mode of perceiving which, in turn, is linked to a broad and varied array of personal characteristics involving a great many areas of psychological functioning (49. 2).

Witkin's concept of field dependence emerged initially from studies of perception of the upright in space. His Body Adjustment Test (BAT), Rod and Frame Test (RFT) and Room Adjustment Test (RAT) "demonstrated striking individual differences in the extent to which location of the perceived upright is determined with reference to the axes of the prevailing visual field"(49. 12). The Embedded Figures Test (EFT), was found to be highly related to the BAT and RFT. Witkin concluded that the ability to overcome an embedding context is central to the field dependence dimension.

Further studies by Witkin show that field-dependence-independence was not an adequate label to encompass other related observed behaviors. The terms analytical (field-independence) vs global (field-dependent) field approach was adopted to describe cognitive style. What has been called "field-dependence" is in effect the perceptual component of a general cognitive style (49. 13).

Three major areas studied by Witkin are: (1) self-consistency in individual functioning as an expression of the extent of differentiation, (2) the stability of individual patterns of functioning during development, and (3) the contribution of life experiences and

characteristics present in early infancy to pace of development of differentiation (49. 9). The concept of differentiation refers to the complexity of a system's structure. A less differentiated system is in a relatively homogeneous structural state (global); a more differentiated system is in a relatively heterogeneous structural state (analytical). Witkin's use of the developmental concept of differentiation in his research was based on three significant reasons: (1) the concept of differentiation refers to formal rather than content characteristics of the personality, (2) the concept of differentiation is dynamic rather than static in its essence, permitting "the study of ways of experiencing and behavioral patterning in terms of process rather than achievement" (49. 1), and (3) the concept allows for the integration of present experiential and behavioral characteristics of the individual with those of the past (49, 1).

Evaluation of individuals as more or less differentiated was based on an interrelated cluster of such discriminating attributes as articulation of body image; method of impulse control and extent of definition of self-concept (49. 10).

Formation of the self-concept involves the more or less simultaneous development of an inner core of experience and the segregation of this core from the field. The movement is from an initial relatively unstructured state to a more structured state with

greater segregation of self. "The self becomes more differentiated as it develops" (49.6). An important feature of the development of differentiation is the movement away from the initial unity with the mother to a more defined self identity. Correlations between a number of measures reflecting the extent of differentiation in mothers and their children were found to be significant. Children of mothers who were rated as relatively differentiated tended to show analytical ability in perceptual and intellectual situations. Other tendencies found were as follows: a high degree of cognitive clarity in interviews; the ability to structure ambiguous stimuli; a well-articulated concept of body; the ability to perform a task without reliance on the examiner for definition or guidance; and the ability to handle aggressive impulses (49.19). Children of mothers who were rated as less differentiated tended to show global characteristics in perceptual and intellectual functioning. They appeared to have the following characteristics: poorly developed sense of identity; more reliance on others for a definition of attitudes; less able to articulate experiences; more impulse control problems; and a lower level of differentiation in overall development than children with an analytical field approach (49.18).

Early life experiences were found to be one major determinant of individual differences. Variations in constitutional characteristics are also crucial in determining individual differences. However, the

nature of these constitutional characteristics is unknown. Differences in rate of progress toward greater differentiation are the result of differences in patterns of constitutional characteristics and particular life experiences (49.7). Both of these sources of differences in extent of differentiation lead to the question of stability in pace of development of differentiation during growth. The differentiation hypothesis postulated by Witkin and used in his extensive studies was based on the formal aspects of psychological functioning of an organism.\* These formal aspects are considered to be stable in individual behavior. Witkin's longitudinal studies of psychological functioning reveal that the child who shows greater differentiation than his peers at one stage of his development will also show it at later stages (49.8).

Longitudinal studies of stability in mode of field approach during growth of children in the eight to thirteen and ten to seventeen year period confirms the differentiation hypotheses. In the context of vast

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\*Formal aspects of psychological functioning are . . . characteristic ways of functioning based on given structural arrangements in personality. How an individual satisfied his needs, resolved his conflicts, handled aggressions and formed his attitudes are results of formal structures of his personality. The what is a content feature. (What the individual wants, what he is in conflict about, angry over, believed in, etc.).

Definition is taken from Witkin, et al, Psychological Differentiation, p. 8.

psychological change, children who at the age of ten, relative to their group, gave evidence of a more developed differentiation, tended to have the same relative standing in the group at age seventeen.

. . . evidence of stability provided by the results is particularly impressive since it covers a period when the child is entering many new areas of life, when important new needs within himself are merging and when ways of coping with these new life circumstances and needs are being developed. . . these results suggest that basic characteristics of the individual reflected in his mode of field approach are established relatively early in life and tend to persist through the changes that accompany development and altered relations with the environment (49, 20).

#### Implications from Research on Perception

The implications from the research on perceptual development suggest that consideration of the described individual differences in mode of field approach as reflected in psychological functioning is of utmost importance in educational decisions. Development of curriculum and criteria for evaluation would need to encompass and allow for differences in products children produce and other types of behavior based on their cognitive style and psychological differentiation. Recognition of the basic characteristics involved in the analytical and global way of experiencing would be one of the directives on which educational decisions would be based.

Implications from research on perception also seem to indicate that how children perceive and process information will be

evident in how and what they choose to express in their art work. Children who are more analytical in their approach will be able to overcome embedding contexts, include more details and perceive parts in relation to the whole in the stimuli presented for art work. Children who are more global in their approach will tend to see the stimuli as a whole, less able to detect an embedded context and tend to use less details in their work.

### III. Cognitive Development

It is the purpose of this section to review some of the developmental trends in cognition and concept formation; the evidence of consistencies in cognitive style; and, the implications of the research to this study.

The phrase 'cognitive development' refers to the growth and change in such phenomena as thinking, perceiving, imagining, problem-solving, and concept formation. Five major response classes are included: (1) perceptual differentiation of environmental stimuli; (2) development of a vocabulary that allows a child to label external events and internal feelings; (3) acquisition of rules about natural events and the ability to apply rules of reasoning to problem situations; (4) increased capacity for immediate memory resulting, in part, from more efficient use of abstract words to group or 'chunk' disparate bits of information; and (5) increased ability to communicate thoughts verbally or graphically (35).

Knowledge of the external world and the individual's relationship to it is obtained through his senses: tactual, visual, auditory, gusta-

tory, olfactory, interoceptive and proprioceptive. The developing central nervous system of the growing and experiencing child selects, organizes, integrates and differentiates these sensory impressions. Sensory experiences are interpreted in an increasingly complex manner as the child grows (43.4).

The interpretation, differentiation and integration of sensory impressions form the basis of concept formation. Concepts provide the basis for language abstractions of man and precede the actual use of overt language by children.

Research on the development of concepts in the child are based on visual, tactual and kinesthetic sensory impressions. Very little research has been conducted on developmental trends of concepts derived from gustatory and olfactory sensations (43.5).

Form discriminations appear to be among the first made by the young child. Infants at two months of age showed consistent preferences for visual patterns (10). Link's study indicated that by the sixth month of life some concept of form has been developed independent of absolute size (28). Children can correctly manipulate and discriminate spatial forms prior to recognition by name (30) (40). The research cited indicates that form concepts precede their verbal associations in psychological development.

Color concepts appear to follow form concepts in development.



Brian and Goodenough studied the behavioral choices of children from two to fourteen years of age and adult women when presented with form and color choices. Children up to the age of three tended to choose form as a basis for matching objects, from three to six years of age, color was the preference; after age six up to adult level, form became the predominating factor in choices made (4).

The development of spatial concepts is postulated by Meyer as proceeding in three stages:

. . . (1) up to about two and one-half years the child responds to what Piaget has called 'practical space,' in which objects are presented only to satisfy his need; (2) between three and four years of age the child responds to a 'subjective' or 'empirical' space, showing interest in the objects themselves but still centered upon his own activities, adjusting his activities, however, to spatial materials; (3) after four years of age, the child responds to 'objective' space, considering himself as one object among many and attempting to adjust his behavior to the relative positions of available objects (34).

There is some evidence indicating that the infant's first advances in spatial orientation come from perceptual differentiations related to his own body (29). Discriminations between various parts of the body help establish a concept of the physical self. Frank places this phase of psychological development within a cultural context by suggesting that "there may be broad cultural variations in man's awareness of himself and his relationship to the external world and that these

variations are probably related to differential early experiences (43. 6). The evidence cited on the development of spatial concepts is very similar to the findings of Witkin on bodily orientation in space and factors influencing field-dependency.

Motivation and need satisfactions seem to influence cognitive processes, including perception and concept formation (43. 8). Research studies by various investigators show that perceptions are socially influenced by the particular cultures and subcultures in which an individual lives (43. 9). A study by Bruner and J. Goodman illustrates the effects of needs on the social perceptions of children. They found that less advantaged boys perceived money as being larger than more advantaged boys (43. 8).

Research studies cited above indicate that cognitive development is multidimensional and shaped by many internal and external factors. For the most part, the findings discussed focused on particular aspects of concept formation such as form discriminations, color concepts, spatial concepts, and the influence of culture and needs on concept formation.

A more comprehensive view of cognitive growth has been developed by Witkin, Piaget and Bruner in their respective theoretical frameworks which they used as a basis for extensive research studies on cognition. Witkin's psychological differentiation theory of perceptual

and cognitive development has been discussed in previous sections, therefore, only Piaget's and Bruner's views on cognitive growth will be reviewed in this section. Piaget's main hypothesis is that children develop in non-overlapping stages in their conceptual development at particular age levels. The progression from one stage to another is described as taking the form of leaps and bounds rather than in a gradual manner (43.7). Central to Piaget's theory on cognitive development is his idea of an operation. He defines operation as an interiorised action:

To know an object is to act on it. To know is to modify, to transform the object, and to understand the process of transformation, and as a consequence to understand the way the object is constructed. An operation is thus the essence of knowledge; it is an interiorised action which modifies the object of knowledge (36).

Piaget's four main stages of cognitive development are as follows:

1st Stage: Sensory-motor, pre-verbal stage. This stage encompasses the first eighteen months of life. Practical knowledge developed in this stage constitutes the sub-structure of later representational knowledge. These structures are considered indispensable for the structure of later representational thought.

2nd Stage: Pre-operational representation. This stage of growth is the beginnings of language and thought. During this stage there must be a reconstruction of all that was developed on the sensory-motor level.

3rd Stage: Concrete operations. During this stage of development the first operations appear but only as

objects and not as yet on verbally expressed hypotheses.

4th Stage: Hypothetic - deductive operations. At this level the child can reason on hypotheses as well as on objects. New operations are constructed (36. 1).

The four main factors Piaget postulates as influencing the development from one set of structure to another (progression of stages) are: first, maturation; second, the role of experience; third, social transmission; and fourth, equilibration, or self-regulation (36. 1).

Whereas Piaget's theory of cognitive development is from a maturational point of view, Bruner's theory is from both a cultural and maturational approach.

Bruner's position is that cognitive growth in humans is dependent on the emergence of two forms of competence - representation and integration. That is, during the developmental process children must acquire ways of representing the recurrent regularities in their environment as means for dealing with information on the one hand, and they must organize acts of information processing into a higher order of cognitive structure to permit long-range problem solving efforts -- efforts that transcend the immediate and link past to present to future (38).

According to Bruner's theory on cognitive growth, the developing child experiences three successive modes of representation: enactive representation (action), or the use of motor responses and action to represent events; iconic representation (image), or the use of images or spatial schema to represent the world; and symbolic representation

(word), or the use of symbols in translating experience (38). These modes of representation are one of three major themes axiomatic to Bruner's theoretical point of view on cognitive growth and the conditions that shape it. The second major theme focuses on the influence of culture in the shaping and nurturing of growth. The third major theme relates man's growth to his evolutionary history -- his adaptation to the environment by social and technical means (5).

Bruner's main assumption is that "cognitive growth is a series of psychological events" (5.1). His view of growth used in extensive longitudinal, cross-sectional and cross-cultural studies is contained in the term "instrumental conceptualism" concerning the nature of knowing.

. . . our knowledge of the world is based on a constructed model of reality, a model that can only partially and intermittently be tested through input. . . the physical requirements of adoptive action 'force' us to conceive of the world in a particular way, a way that is constrained by the nature of our own neuromuscular system (5.3).

Representation of reality in terms of imagery and symbolism also have constraints. Imagery is constrained by the primitive properties of visual, auditory and haptic space. Symbolism is constrained by native endowment for mastering symbolic systems. Therefore, one tenet of instrumental conceptualism is the individual's model or representation of reality and the constraints involved. The second

tenet of instrumental conceptualism is the development of models of reality "as a function of the uses to which they have been put first by the culture and then by any of its members who must bend knowledge to their own uses" (5.4).

It would appear that the successive levels of cognitive growth as postulated by Bruner -- enactive, iconic and symbolic -- are similar to the pre-operational stage, stage of concrete operations, and stage of formal operations suggested by Piaget. However, their hypotheses are derived from different premises. Piaget focuses on: the role of maturation; the movement from discrete developmental stage to another by leaps and bounds; and longitudinal studies of small groups of Swiss, middle-class children. Bruner's approach involves maturational as well as cross-cultural factors; the successive emergence of stages of cognitive growth as gradual and overlapping; and extensive cross-sectional, longitudinal and cross-cultural studies.

Bruner's findings in the replication of some of Piaget's experiments differed due to the differences in theoretical frameworks. The implied universality of Piaget's discrete stages in cognitive development is challenged by these results. Bruner found that schooled children of various Western cultures were more similar in performance in conservation experiments than unschooled and schooled

children of the same culture. "The difference in both cases (schooled and unschooled children)\* is most compactly described as a difference between abstraction and concreteness. . . . Schooling appears to be the single most powerful factor we have found in the stimulation of abstraction" (5.2).

Cognitive development in children has received more systematic attention by investigators than cognitive style. The term "cognitive style" refers to stable individual preference in mode of perceptual organization and conceptual categorization of the external environment (22.2). Current theory in cognition describes the developmental sequence of perception and cognition as initially global and overgeneralized but, becoming differentiated and abstract as the child advances in age (22.1). This broadly defined general construct may be applied to the gross differences between pre-school children and school children, however, some investigators propose that it is not adequate to account for blatant individual differences in cognitive products among children of the same age (22.6) (49) (21) (14). Some children characteristically analyze and differentiate the stimulus field, applying labels to sub-elements of the whole while others tend to categorize a relatively undifferentiated stimulus. Both

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\*Parentheses are mine.

Kagan and Witkin found evidence of these characteristics operative in young school children. Their studies also show relative stability in preferred mode of conceptualizing and perceiving during years of rapid growth and development.

The Conceptual Style Test (CST) was devised by Kagan as a preliminary measure of conceptual preference in children. The original test consists of forty-four sets of stimuli, each set containing three black and white drawings. The task involves selection of two of the three figures that are alike or go together in some way. Two main responses are possible: the analytical response which is based on similarity in objective attributes that is a differentiated part of the total stimulus; and the global or relational response which is based on a functional relationship between the stimuli (26.2).

Elementary school children were used by Kagan in longitudinal and cross-sectional developmental studies on correlates of an analytical-global conceptual preference using the Conceptual Style Test as the preliminary measure. The data suggests that an individual's preferred conceptual strategy is implicated in a wide variety of behaviors (word associations, figure sorting, organization of words for commitment to memory, interpretation of ink blots or pictures and reaction speed). The tendency to be analytic shows some degree of consistency -- at least for boys -- across different stimulus situations.



The sex differences in the pattern of relationships among cognitive measures is a recognized but unsolved problem reported by Kagan, Witkin and Gardner (22. 9).

Further studies by Kagan suggest that two basic cognitive dispositions are fundamental to the analytic attitude: (1) the tendency to analyze visual arrays; and (2) the tendency to reflect over alternative responses when simultaneously available before making the actual response.

A tendency toward reflection versus impulsivity displayed a stability over time and a generality across tasks that is unusual for psychological attributes and tempts one to conclude that this disposition is a basic component of a child's behavioral organization (23. 4).

Factors contributing to the disposition to be reflective or impulsive are suggested by Kagan as: "constitutional predispositions, degree of involvement in tasks, and expectation of failure" (23. 4).

Kagan dispels the tendency of others to interpret his data as implying that the reflective child is better or more intelligent than the impulsive child.

It seems reasonable to assume that efficient learning and performance on varied intellectual tasks will sometimes be facilitated by a reflective or analytic approach; sometimes by a more impulsive or less analytic orientation (23. 5).

Some academic contents with deductive structures such as mathematics and physical science are facilitated by the reflective-analytical attitude. Others, such as the humanities, arts and social sciences would

be hampered by an excessively strong reflective attitude.

#### Implications from the Research on Conceptual Development

Implications from the research on cognition seem to indicate that general theories on cognitive development and constructs explaining individual cognitive styles are not necessarily diametrically opposed. Both approaches appear essential in the assessment of conceptual growth and the understanding of differences in products children produce. The negation of one construct for another would perhaps distort investigations in the area of cognition.

For the purpose of this study, consideration will be given to the general development of graphic expression in children. The point of view taken by the author is that development proceeds in overlapping phases rather than on the basis of discrete age levels. Children of the same age project various levels of development due to individual differences in experiencing and in the processing of information. Therefore, the author postulates that differences in the graphic expression of children of the same age will be related to preferred mode of perception and cognition.

#### IV. Graphic Expression

Theories on child art currently in practice are: (1) naive realism theory, (2) intellectualist theory, (3) perceptual development,

(4) haptic and visual theory, (5) age-based concepts of developmental levels, and (6) perception-delineation theory (32.2). Although each theory differs in regards to theoretical constructs and basic assumptions they make about behavior in art, they share a common concern about factors influencing human development in art. How these theories differ and what limitations they present is the subject of this section.

The theory of naive realism assumes a one-to-one relationship between the physical object and its image perceived by the mind. In this theory major differences between child art and adult art are attributed to the differences in motor control. The many variables affecting individual information processing such as: prior learning, culture, perceptual development, conceptual development, early experiencing, values and attitudes, and cognitive style, and the many factors of personality that influence a child's readiness to respond to visual stimuli in his environment are not recognized (32.3).

The intellectualist theory takes another extreme view by assuming that the child draws what he knows rather than what he objectively sees. His concept of the object develops from his intellectual experiences with the object. It is assumed that the child draws more detail as he learns more information. The importance of visual analysis and perceptual discrimination are excluded. Research

has shown that concept formation and visual analysis occur in information processing and that both are influenced by training and experience (32.4) (49) (23) (2).

The perceptual theory developed by Arnheim (2) has its basis in Gestalt psychology. This theory postulates that the child draws what he sees. It is assumed that the perceiving process starts with undifferentiated wholes and proceeds toward more detail. Although this trend is generally accepted in theories of concept formation as well as theories on perceptual development, there is evidence of a greater range of individual differences in preferences for simple or complex pictures at each age level among children than among adults (13). Research cited in preceding sections is further evidence of individual differences and preferences in mode of perceiving which are relatively stable during years of rapid physical, social and intellectual growth (49).

Lowenfeld's haptic and visual theory is based on the assumption that space-orientation is a biogenic factor and not influenced or modified by experience (31). The haptic child is described as dependent on his own feelings in orienting himself to his world; the visual child depends on his visual environment. However, recent studies by Witkin on space orientation indicate that the tendencies to orient oneself to space as field-independent (haptic) or field-dependent

(visual) are mainly learned (48). The important influencing variables he cites have their origins in early childhood experiences and child-rearing practices.

Theories of child art postulating developmental stages in art using age as a criterion are based on the assumption that biogenic growth patterns can be identified. Universal similarities in children's graphic expression are also assumed. Cross-cultural studies on the influence of culture, environment, values and intellectual development on the nature of symbols children invent and on perceptual differences refute the basic assumption made by age-based developmental theories on child art (7) (39).

The most comprehensive current theory on child art is McFee's perception-delineation (P-D) theory which is eclectic, assimilating research from the fields of psychology, cultural anthropology and art. In this theory individual variables that affect art production are identified. The P-D theory consists of six major points around which there are clusters of variables that affect individual performance in creative expression (33):

- |          |  |
|----------|--|
| Point I. | <u>Readiness</u>                           |
| 1.1      | Perceptual and Conceptual Development      |
| 1.2      | Cognitive Style                            |
| 1.3      | Cultural Effects on Perceptual Development |
| 1.4      | Prior Learnings                            |
| 1.5      | Art Values of Child's Subculture           |
| 1.6      | Readiness for Creative Behavior            |
| 1.7      | Present Physical Condition                 |

Point II.     Psycho-cultural Environment

- 2.1 Psychological Differences to Classroom Subculture
- 2.2 Subcultural Differences in Classroom

Point III.    The Visual Physical Environment

- 3.1 Affective Meaning
- 3.2 Structure and Design
- 3.3 Symbolic, Verbal and Iconic Meaning
- 3.4 Physical Conditions of Environment
- 3.5 Tools and Materials

Point IV.     Information Handling

- 4.1 Development of New Concepts, Percepts and Symbols to Handle New Ideas
- 4.2 Adjusting Learning to Cognitive Style
- 4.3 Encouraging Creative Information Processing

Point V.      Creative Delineation

- 5.1 Formalizing Understanding of Art
- 5.2 Translating Percepts, and Concepts into Communicable Symbols
- 5.3 Giving Form to Design
- 5.4 Appropriate Tools and Materials
- 5.5 Programming Use of Media

Point VI.     Evaluation of Feedback, Transfer and Teacher's Role

- 6.1 Increased Readiness
- 6.2 Response to Environment
- 6.3 Response to Motivating Forms
- 6.4 Improved Information Handling
- 6.5 Increased Facility in Symbolizing Designing and Using Tools and Materials
- 6.6 What Learnings Can They Transfer?

The many variables listed above are ordered in a theoretical construct so that the parts have a working relationship to the whole.

McFee describes the whole as

. . . the interaction pattern of developing child behavior that results from the transactional interplay of the unique

potential of the individual, his social and physical environment and his expression and response in art (33).

In comparison to the comprehensiveness of the P-D theory, other current art theories discussed briefly in this section, focus on specific limited aspects of creative expression resulting in the exclusion of important variables that affect human behavior.

The author accepts the basic assumptions the P-D theory postulates on human development and behavior in art expression and response. Of particular interest are the variables affecting cognitive styles and perceptual development in graphic expression which are identified in the P-D theory and used in this study. Whether an individual's preferred mode of cognitive style and perceptual organization are also evident in his graphic expression is a dimension of behavior central to the concerns of this study.

#### Implications from the Research on Graphic Expression

With the exception of the perception-delineation theory, other child art theories neglect many of the variables affecting individual patterning and coding of cognitive and visual information used by children when creating visual symbols. Differences in the art products of children of the same age can hardly be attributed solely to age-based developmental levels, or biogenic factors, or maturation of perceptual processes and cognitive processes. Many interacting,

multidimensional variables affect the way in which a given child produces visual symbols.

Most theories on child art provide for the assessment of art work of children by using averages of likenesses in children's art production at given ages found by surveys. The use of averages as a criterion does not adequately explain intraindividual differences in the art products of children of the same age.

On the basis of the implications drawn from the review of research on graphic expression, the following postulates are presented: (1) intraindividual differences in the graphic expression of children of the same age are related to their preferred mode of perceptual organization and conceptual categorization; (2) the child performs in a self-consistent manner when processing visual and/or cognitive information into graphic expression; and (3) intraindividual differences in art products of children of the same age are more adequately explained by modes of information processing than by averages.



## CHAPTER III

### THE RESEARCH DESIGN

#### Research Hypothesis

The research reviewed in the preceding chapter indicated that (1) the individual's basic reliance on external stimuli (field-dependence) or internal stimuli (field-independence) is an expression of a more general mode of perceiving; (2) central to the field-dependence dimension is the ability to overcome an embedded context; (3) field dependence is the perceptual component of a general cognitive style dichotomized as analytical field approach and global field approach; and (4) some children characteristically analyze and differentiate the stimulus field, applying labels of sub-elements of the whole while others tend to categorize a relatively undifferentiated stimulus, attending to functional or relational aspects. The Conceptual Style Test developed by Kagan and his colleagues and used in extensive studies as the preliminary measure of preferred mode of conceptualizing, appeared to be consistently reliable in dichotomizing analytical and global tendencies in children. The Conceptual Style Test is used in this study to determine preferred cognitive style.

Witkin, in his studies, concluded that the ability to overcome an embedding context is central to the field-dependence dimension. The Embedded Figures Test was found to be highly correlated to the Body Adjustment Test and the Rod and Frame Test. The Children's Embedded Figures Test is used in this study to determine preferred mode of perceiving.

This study attempts to determine whether the preference of children for conceptual analytical groupings or relational groupings (as measured by the Conceptual Style Test), and for analytical or global mode of perceiving (as measured by the Children's Embedded Figures Test) is significantly related to differences in graphic expression.

Hypotheses: One of the general hypotheses for the study is:

I. The subjects' cognitive style, as measured by the Conceptual Style Test, and his mode of perceiving as measured by the Children's Embedded Figures Test will correlate significantly with specific criteria of his graphic expression.

The General Hypothesis I will be analyzed on the basis of the following specific hypotheses:

IA. The subjects' cognitive style and mode of perceiving will be significantly correlated.

IB. The subjects' cognitive style will correlate significantly

with Drawings I, II and III.

IC. The subjects' cognitive style will correlate significantly with his Sophistication of Body Concept.

ID. The subjects' mode of perception will correlate significantly with Drawings I, II and III.

IE. The subjects' mode of perception will correlate significantly with the Sophistication of Body Concept.

IF. The subjects' articulation of his body concept will correlate significantly with Drawings I, II and III.

The second general hypothesis for the study is:

II. Analytical scores on the Conceptual Style Test, Children's Embedded Figures Test and graphic expressions (Drawings I, II and III and Sophistication of Body Concept) will increase as subjects advance in grade, revealing a developmental trend from initially global processing of information to a more differentiated or analytical mode.

The General Hypothesis II will be analyzed on the basis of the following specific hypotheses:

IIA. The means of the total scores on Drawings I, II and III will increase as subjects advance in grade.

IIB. The means of the total scores on the Sophistication of Body Concept Test will increase as subjects advance in grade.

IIC. The means of the total scores on the Conceptual Style Test will increase as subjects advance in grade.

IID. The means of the total scores on the Children's Embedded Figures Test will increase as subjects advance in grade.

#### Tests Used to Measure the Dependent Variables

Conceptual Style Test -- The Conceptual Style Test (CST) was developed by Kagan to study interindividual differences of children in the processing of information in relation to the analytic versus nonanalytical categorizations. Basic to the premise is the tendency of children and adults to have a hierarchial preference with respect to the stimulus characteristics they will initially attend to in a situation where the individual has freedom of choice.

The CST consists of a set of nineteen stimuli; each with three black-white line drawings of familiar objects. The subject is to "pick out two pictures that are alike or go together in some way." These stimuli have been constructed to elicit two major classes of responses -- analytic and relational concepts. Another type of response, the inferential-categorical, is possible to a lesser degree.

Originally, the CST consisted of forty-four triad stimuli. This number was reduced to thirty and later to nineteen in order to suppress inferential-categorical responses which are based on some

inferred quality or language convention, such as "furniture," "animals," "men." The intent was to use analytic and relational responses as opposite ends of a continuum.

Using the CST, Lee, Kagan and Robson (26.3) tested the reliability of an analytic tendency over a twelve-month period among twenty-four girls and twenty-two boys in grades three and four. The reliability was .70 ( $p < .001$ ) for girls and .34 ( $p < .05$ ) for boys. Relational responses showed parallel stability coefficients ( $r = .64$ ,  $p < .001$ ;  $r = .40$ ,  $p < .06$ ) for girls and boys respectively. Children who gave a large number of analytic responses in the CST also attached labels to differentiated parts of a geometric stimulus. The less analytic children attached labels to the entire stimulus.

Analysis of the responses to CST by children in grades one through five revealed that analytic responses increase with age while relational responses decrease with age. Analytic and relational responses were negatively correlated with each other and independent of inferential-categorical responses. The intratest (split-half) reliability of analytic and relational responses for samples of children in grades one through five was in the low nineties (26.3).

Children's Embedded Figures Test (CEFT) -- The ability to overcome an embedding context was found to be central to the field dependence dimension by Witkin, Dyk, Faterson, Goodenough and

Karp in their extensive research on psychological differentiation. Further studies revealed that field-dependence-independence was not an adequate label to encompass other related observed behaviors. The terms analytical (field-independence) and global (field-dependent) were adopted to describe the perceptual component of a general cognitive style.

Witkin's Embedded Figures Test (46) is useful for testing the analytic-global dimension of older children and adults. Because of the age limitation, Goodenough and Eagle developed a children's version, called CHEF (18). Certain mechanical problems, such as lack of portability and complexity of administering the CHEF, due to size and weight led to a revision of this test. Karp and Konstadt assisted by Goodenough and Witkin developed the CEFT used in the author's study.

The CEFT includes twenty-five test items, each involving the location of a simple figure (tent, house) that is embedded within a complex realistic picture (boat, train).

Standardization of the CEFT is based on results from the testing of 160 public school children ranging in ages from five to twelve years. Witkin's EFT was used as a criterion measure for obtaining validation data on the CEFT. Because of its difficulty, the twelve item form of the EFT was given to subjects nine years

of age or older. Younger subjects received only the CEFT. Reliability coefficients ranged from .83 to .90 and validity coefficients ranged from .70 to .86 for the older children. These results appear consistent with reliability estimates obtained for the EFT. Age effects were significant ( $F = 39.70$ ,  $p < .01$ ), performance improving with increased age. Neither sex nor interaction (age x sex) effects were significant ( $F = 0.81$  and  $0.49$ , respectively). These results are consistent with those obtained for the CHEF by Goodenough and Eagle (24).

Sophistication-of-Body-Concept -- Evidence from studies conducted by Witkin and his colleagues (49.15) suggest that there is a similarity in a child's manner of experiencing himself and the world around him.

The child who could not readily perceive his body as separate from the field had difficulty identifying a simple figure embedded in a complex design; the child who had a clear sense of the relations among important people around him also had a definite sense of his own role in the family and in various social groups (49.14).

From these observations, the following hypothesis was developed: children with an analytical field approach would tend to have a more articulated body concept than children with a global approach.

The Sophistication-of-Body-Concept Scale (SBC) was designed by Marlens to reflect the degree of primitivity or sophistication of

children's drawings of the human figure.\* This scale involves a single rating based on a number of specific criteria. The criteria are based on directly observable characteristics of the figures rather than on the usual projective interpretations of drawings.

Reliability and validity coefficients for the SBC were obtained by Marlens in a study using twenty-three ten year old boys. The subjects were asked to draw a person, and, when finished, to draw a person of the opposite sex. A single rating from a five-point rating scale was assigned to each child. Scores from the SBC rating scale correlated with perceptual index scores (consisting of the Rod and Frame Test, the Body-Adjustment Test and the EFT) .71 (P .01). A correlation of .84 (P .01) between ratings of two judges suggested satisfactory interjudge reliability. Correlations of .54 (P .01) and .61 (P .01) were obtained between SBC ratings and intellectual and cognitive index scores, respectively. These findings suggest that children with an analytic field approach tend to have an articulated body concept (49.16).

The SBC was used in this study as another measure of the analytic-global dimension in the graphic expression of children. Since no visual stimuli is presented in administering the SBC, the drawing

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\*See Appendix I for the complete SBC scale.



of a figure is the child's conceptual interpretation, an abstraction constructed from his experience as a result of interacting with his environment. This drawing response differs from the three drawing tests introduced by the author to elicit the child's perceptual interpretation of visually presented stimuli. The act of perceiving refers to the direct apprehending of objects and their relationship to situations and events that are physically present to the senses. The assumption was made that the conceptual and perceptual graphic expressions of individual subjects would show consistency in the preferred mode of information processing as related to the global-analytic dimension.

Drawing Tests -- Three drawing tests developed by the author were used in the study to compare the analytic-global graphic responses of children to their conceptual (CST and SBC) and perceptual (CEFT) responses of the same dimensions. The visual stimuli consisted of three black and white 35 mm. slides of subject matter familiar to most children. A slide of a close-up view of the entrance of Moffit Elementary School in Springfield, Oregon, familiar to the subjects, was used as the visual stimuli for Drawing Number I. For Drawing Number II, a slide of a grouping of toys (a horse on wheels, a basketball and a truck) was used as the visual stimuli. A child holding a toy truck and seated on outdoor stairs with a portion of a

house in the immediate background was the subject matter for the slide used in Drawing Number III.\* Slides rather than real objects were used in order to eliminate many points of view possible in a classroom situation where children necessarily see different views of objects by virtue of their seating arrangement.

The subject matter and composition of the slides were selected on the basis of a number of factors determined as relevant considerations for presentation to children ranging in grade from the second to the sixth. General familiarity of subject matter would tend to eliminate undue emphasis on and efforts to cope with the unknown by some subjects. Those familiar with the objects would perhaps be recording other kinds of information. In the process of drawing what one sees, recognition or nonrecognition of objects is a variable affecting and eliciting different kinds of responses. It would appear that the conceptual interpretation of an unknown object rather than an actual perceptual interpretation could occur. When confronted with an unfamiliar object, the tendency is to associate the object with those familiar to one's experience and to interpret the unfamiliar in those terms. This type of behavior appears evident in responses elicited from Rorschach inkblot tests.

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\*See Appendix II for photographs of slides used in Drawing Tests I, II and III.

Simplicity of background and detail was another factor considered in selecting the visual stimuli. Too much simplicity as well as too little, would affect the range and quality of responses due to age differences of the subjects used in this study. Extraneous background and details were eliminated in the content of each slide.

High contrast in dark and light values of the slides was considered desirable for better recognition of the subject matter as well as criteria in evaluating global and analytical responses. The decision to use black and white slides rather than color is related to the use of high contrast as a relevant factor. Dark and light values are more difficult to determine in color than in black and white. Colors exist in relation to other colors, affecting responses to a particular color. One of the most important considerations in eliminating color as a factor was the type of drawing materials used in the study. Pencils were the drawing tools used. The intent was for subjects to draw what they saw. The introduction of color in slides and art materials would necessitate consideration of many variables pertaining to individual response to color.

The selection of objects and subject matter of defined and somewhat varied size, space and figure-ground, relationships was an important consideration for the evaluation of global and analytical responses in graphic expression. The rationale for criteria developed

by the author and used to evaluate drawings on a global-analytical continuum was based on the extensive research conducted by Witkin and Kagan. Space, size and figure-ground relationships are variables noted by both investigators that appear to elicit different kinds of responses from the global and analytical person. Kagan's findings indicated:

. . . that children who were highly analytical in the thirty-item CST, in comparison to nonanalytical children, were more likely to (a) produce interpretations of ink blots that were highly differentiated and contained references to descriptive aspects of the stimulus. . . and produce fewer indistinct percepts. . . , (b) attach new verbal response to the component parts of a geometric design rather than only to the most salient aspect of the stimuli (23.2).

Fifty-seven fourth grade boys were given the CST and a measure of visual analysis,

There was a positive correlation between analytic concepts and the tendency to analyze the geometric stimuli into distinct figural and background components, indicating that visual analysis was a determinant of analytic groupings (23.6).

Some communality was thus demonstrated between how the person experiences his body and how he experiences neutral objects outside himself. If, in experience, he readily 'loses' his body in the field, he is also apt to 'lose' any neutral external object. This relatively global, unarticulated way of experiencing manifests itself not only in performance in special laboratory situations, but also in the quality of the person's awareness of the social world around him (49.4).

Criteria for judging the three drawing tests on an analytical-global continuum were derived from implications implicit in the discussions found in Chapters I and II as well as examples cited above. Five categories, each of which contained five criteria describing drawing responses on a global-analytic continuum were used for this evaluation process. The categories selected were size relationships, value relationships, detail relationships, space relationships, and figure-ground relationships.\* The subject received a score for each category based on the numerical value assigned to each criterion within the category. A total score for individual drawings was obtained by adding the scores from all of the categories.

#### Procedure

The Environment -- This study took place at Moffitt Elementary School in Springfield, Oregon. Springfield, with a population of approximately 26,000 is adjacent to Eugene, a university city of approximately 76,000.

In contrast to Eugene, a cultural and educational center, Springfield is primarily an industrial blue-collar city whose economy is based on the lumber industry. However, Springfield is greatly

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\*See Appendix III for the complete rating scale on Drawings I, II and III.

influenced by the university through experimental programs operating in the public schools and by the availability of university classes for the teachers and general population. The close proximity of the university encourages attendance.

Moffitt Elementary School, at the time of this study, had a student enrollment of 508 in grades one through six. The mean number of students in a class (nineteen classrooms) was 26.7. Children are grouped heterogeneously -- the only determinants in placing incoming students are age, grade and availability of space. Approximately twenty per cent of the children come from families that are on welfare or qualify for poverty programs. A minimum percentage of children have parents in professional fields, in business, or executive positions.

The school program includes a series of enrichment programs and a number of specialists. The enrichment programs include: a volunteer tutorial program of junior and senior high students as well as parents; an Outdoor Education program; and a Cooperative Teacher Program for the intermediate grades where students are grouped by achievement levels for part of the day and teachers exchange students for the purpose of giving special instruction. Specialists regularly assigned to Moffitt Elementary School include: a guidance counselor, a speech therapist, a reading specialist

and a music specialist.

Description and Choice of Sample -- Two classes of boys from each grade level two through six, for a total of ten individual groups, were used in this study. The rationale for selecting boys as subjects and grade levels two through six were as follows:

- (1) Most of the studies conducted by Witkin and Kagan used boys for their samples. A sex difference was evident in the results of studies in cognitive style when both boys and girls were used as samples (22.7) (49.17). The reason for this difference is speculative and generally unresolved.
- (2) Reliability and validity coefficients of the CST, CEFT and the SBC were obtained from studies using boys as subjects.
- (3) By including grade levels two through six in this research developmental trends could be studied.

The selection of two classes from a choice of three from each grade level two through six was somewhat arbitrary, originally based on interest of the classroom teacher and presence at an orientation meeting. Most of the teachers expressed an interest in participating in the study, so eliminations were necessary. The guidance counselor and principal made the final selections,

Size of Groups -- Only boys who were present for all of the tests were considered as usable subjects for the study. Table 1 shows the initial number of subjects tested and the usable number of subjects based on completion of all tests.

TABLE 1  
INITIAL NUMBER OF SUBJECTS;  
USABLE NUMBER OF SUBJECTS

	grade 2	grade 3	grade 4	grade 5	grade 6	total
Initial No. of Subjects	26	22	20	25	26	119
Usable No. of Subjects	24	22	19	25	24	114

Age and I. Q. -- Information pertaining to age and I. Q. of each subject was obtained from school records. All students had taken the short form of the California Test of Mental Maturity. Range, means and standard deviations of age and I. Q. for each grade are shown in Table 2.

In order to check similarity of groups, the means of the I. Q. for each age group were compared. The analysis of variance was used to determine if there was a significant difference between the means of groups.



TABLE 2  
MEAN, RANGE AND STANDARD DEVIATION OF  
AGE AND I. Q. BY GRADE LEVELS

	N	AGE			I. Q.		
		Range in Months	Mean Age Standard in Months	Standard Deviation	Range	Mean	Standard Deviation
Grade 2	24	87-108	95.62	5.37	78-127	106.58	12.74
Grade 3	22	102-120	106.85	4.65	82-127	102.04	13.67
Grade 4	19	113-128	119.00	4.72	82-115	100.89	11.23
Grade 5	25	122-139	130.44	4.54	70-116	95.16	13.42
Grade 6	24	136-155	144.66	3.83	83-135	106.57	11.66

Table 3 presents the F-ratio significant at the .05 level. Appendix VIII contains the significant and non-significant F-ratios for all grades.

TABLE 3  
F-RATIOS YIELDING .05 LEVEL OF SIGNIFICANCE\*  
I. Q.

Grade 2	Grade 5	Grade 5	Grade 6
9.318			9.280

\*F of 4.08 is significant at .05 with 40/1 d. f.

The two grade comparisons yielding significant differences between means on the I. Q. were grades two and five, and grades five and six. The means on the I. Q. for grades two and six differed significantly from

the mean for grade five.

Testing Procedure -- The testing procedure involved both group and individual administering of tests over a two-month period of time. The SBC, Drawings I, II and III were given to intact classes in a group situation. The CEFT and the CST were administered to subjects on an individual basis. No subject, or group of subjects were involved with more than one testing session per day.

To avoid practice effects on drawing of the human figure, the SBC preceded the visually presented stimuli for Drawings I, II and III.

Sophistication of Body Concept -- The SBC was the first drawing test administered to each class, followed by Drawing tests I, II and III, respectively. Instructions for the SBC to each group were minimal. Subjects were asked, by the author, to draw a person, and, after this was accomplished, he was asked to draw a person of the opposite sex.

Using Marlens' five-point SBC rating scale, a single rating based on both drawings was assigned to each child by a rater and checker working independently. The rater scored the SBC drawings of all subjects; the checker scored thirty of the 114 drawings -- ten drawings from the first, middle and last sections of the assigned numbers. An interjudge agreement of eighty per cent on thirty

drawings was considered satisfactory.

Drawings I, II, III -- The procedure used for Drawing tests I, II and III was identical; only the content of the slides differed. The tests were administered to each of the ten groups within their respective classrooms. Every classroom was equipped with a projection screen and opaque drapes. Desks were rearranged so as to eliminate a distorted view of the visual stimuli. Subjects received a twelve by eighteen sheet of manila paper, a number two pencil and an eraser and instructions to "draw what you see, using as much of your paper as you can and fill in areas, if you wish."

The visual stimulus was projected on the screen, and maintained until all subjects completed their drawings. Time of completion ranged from twenty to forty-five minutes within each group. Six identical copies of each slide set for automatic change intervals of thirty seconds on the projector preserved the quality of the visual stimuli and prevented warping and distortion caused by intense heat for long periods of time. The three drawing tests were presented in consecutive order to each group. To avoid fatigue, drawing sessions were limited to one per day for each class. For the two sixth grade classes, one fifth grade class and one third grade class it was possible to administer the drawing tests on consecutive days. Due to scheduling problems all other classes were given the drawing tests

\*Drawing I: School; Drawing II: Toys; Drawing III: Child.

within a week's time, but not on consecutive days. A total of thirty drawing sessions were necessary to complete this phase of testing. All sessions were conducted by the author.

#### Raters and Rating Scale

The two judges selected for evaluating the drawings were teaching assistants and doctoral students in art education. Both judges had previous experience teaching art at the elementary school level. Each judge was supplied with the Rating Scale, score sheets, and five by seven inch black and white photographs made from slides used in the tests and mounted on a single sheet of white cardboard. After reading the instructions and discussing the rating scale with the experimenter, the judges had a practice session rating fifteen drawings, five from each stimuli. Each judge made independent ratings. A comparison of the ratings was made and differences discussed. The judges then rated fifteen more drawings independently and compared their ratings. The five criteria within each of the five categories were discussed by the judges until mutual agreement as to the interpretation of each criterion was reached. Generally, they discovered that the use of the terms "twenty-five per cent," "about half" and "fifty per cent" were difficult to determine in judging the drawings. These terms did not seem to be of value in judging the

distinction between criteria two and three in most categories. For specific discussion on and agreements reached by the judges on criteria within each category, see Appendix IV.

The judges alternated in the roles of rater and checker for each set of drawings. The rater evaluated all 114 drawings within a set; the checker evaluated thirty drawings from the same set. Due to the large number of drawings and evaluations, it was decided that each of the drawing tests should be judged at separate sessions. The drawings were judged in the same order as given to students.

A total of 1,710 ratings were necessary (114 subjects, three drawings per subject, five categories per drawing:  $114 \times 3 \times 5 = 1,710$ ). The rater made 1,710 evaluations, the checker made 450 evaluations. Using the same rater-checker system as applied to the SBC, thirty drawings of each stimulus were selected; ten from the beginning, middle and end of each group of 114 drawings, for a total of ninety drawings. With five evaluations for each drawing, the total number of judgments by the checker equalled 450.

Inter-rater Agreement -- After the training period and as a result of close interjudge agreement in scoring, the decision was made to count as disagreements only scores that were more than one-point apart. Scores with a one-point difference were counted within the range of agreement.

The five-point criteria used for each of the five categories contained various levels of discernment, some of which were difficult to detect with exactitude within each drawing. Differentiating between criteria two and three (about twenty-five per cent, or about fifty per cent, respectively, of objects drawn showing relationships) seemed to present the greatest difficulty for the raters. In only ten out of 450 ratings were the raters more than one point apart. None of the ratings were more than two points apart.

Tables 4, 5 and 6 present the percentage of agreement between the ratings by the two judges of each drawing test, indicating the high reliability for agreement between the raters. The right-hand column of each of the following tables indicates the percentage of agreement including one-point differences accepted by the author for the inter-rater reliability figure.

TABLE 4  
INTERJUDGE PERCENTAGE OF AGREEMENT  
ON DRAWING I\* BY CATEGORIES

Category	% Complete Agree**	% Agreement within 1 point **
A	63.3	96.6
B	83.3	100.
C	60.	100.
D	66.6	96.6
E	70.	96.6

\* Number of judgments = 150

N = 30

\*\* On five-point scale

TABLE 5  
INTERJUDGE PERCENTAGE OF AGREEMENT  
ON DRAWING II\* BY CATEGORIES

Category	% Complete Agree**	% Agreement within 1 point**
A: Size	60.	100
B: Value	90.	100
C: Detail	66.6	100
D: Space	66.6	100
E: Figure - Ground	70.	100

\* Number of judgments = 150

N = 30

\*\* On five-point scale

TABLE 6  
INTERJUDGE PERCENTAGE OF AGREEMENT  
ON DRAWING III\* BY CATEGORIES

Category	% Complete Agree**	% Agreement within 1 point**
A: Size	53.3	90.
B: Value	83.3	100.
C: Detail	66.6	96.6
D: Space	76.6	100.
E: Figure - Ground	63.3	90

\* Number of judgments = 150

N = 30

\*\* On five-point scale

Table 7 presents the percentage of agreement between the ratings of the two judges when all of the drawings are totaled. In Table 8, the percentages shown are based on the total number of judgments (450).

Both tables indicate high reliability for agreement between the raters.

TABLE 7  
INTERJUDGE PERCENTAGE OF AGREEMENT  
ON DRAWINGS I, II, III\* BY CATEGORIES

Category	% Complete Agree**	% Agreement within 1 point**
A : Size	58.8	95.5
B : Value	85.5	100
C : Detail	64.4	98.8
D : Space	70.	98.8
E : Figure - Ground	67.7	95.5

\* Number of judgments = 450

N = 90

\*\* On five-point scale for each drawing (five x three drawings = 15)

TABLE 8  
INTERJUDGE PERCENTAGE OF AGREEMENT  
ON TOTAL NUMBER OF RATINGS\*

% Complete Agreement	% Agreement within 1 Point
69.3	97.7

\* Total Number of Judgments = 450

CST and CEFT Procedures -- Individual testing procedures were used in administering the CST and CEFT. For the CST, the subject was seated next to the tester. Instructions for taking the test were read out loud and, after the initial response for stimulus one, other



possible responses were discussed to show the subject that many alternatives were possible. After stimulus one, the initial response to other stimuli was recorded by the tester without additional comments on possible alternatives. Testing time ranged from ten to twenty minutes. Responses were scored on the global-analytical continuum using Kagan's definitions of these terms to determine the category of the response: analytical, global or inferential-categorical. A single score was assigned to each subject. Subjects with high scores were rated as analytical; those with low scores were rated as global. Some examples of the range of responses possible for each stimulus and the rationale used for rating responses as analytic, global or inferential-categorical can be found in Appendix V.

For administering the CEFT, the subject was placed opposite the tester. Instructions and procedures as indicated in the CEFT Manual were followed. Since time limitations were not indicated, subjects were allowed as much time as they desired in trying to detect the hidden figure. Testing time ranged from ten to forty-five minutes. The author was assisted by a graduate student in art education in the administering of the CST and CEFT.

## CHAPTER IV

## STATISTICAL RESULTS OF THE STUDY

The testing program was completed for all groups on April 11, 1969. Scores from the six tests included in the study were recorded on score sheets for each student and are presented in Appendix VI. The drawing tests were rated according to procedures described in Chapter III and were recorded.

As indicated in Chapter III, inter-rater agreement of the two judges on Drawings I, II and III was consistently high yielding percentages between ninety and one hundred. For the SBC, the inter-rater agreement was satisfactory at eighty per cent.

Since the purpose of the study was to determine whether there is a relationship between various modes of processing information in the global-analytical dimensions, the .10 level of significance was accepted as denoting relationships though it will be seen that most of the significant levels of relations were .05 or lower. Anything above the .10 level was considered nonsignificant.

Correlations, shown in Table 9, between the five categories used to rate Drawings I, II and III were found to be significant at

levels .10 to .001 except for the B category (Value Relationships) in Drawing I, and, to some degree, the B category in Drawing III. This discrepancy affected one total score out of forty-five, yielding a correlation of .153 at the .20 level of significance. The remaining forty-four correlations showed levels of significance ranging from .05 to .001. Since all but one correlation was highly significant, the decision was made to use the total scores of Drawings I, II and III in discussing and reporting results except when discussion of individual categories seemed relevant.

Correlations of each category to the total scores of Drawings I, II and III are presented in Table 10.

TABLE 10  
COEFFICIENTS OF CORRELATIONS OF EACH CATEGORY  
TO TOTAL SCORE BY DRAWINGS\*

Drawings	A: Size	B: Value	C: Detail	D: Space	Figure- E: Ground
I	.879	.435	.877	.861	.880
II	.893	.647	.924	.903	.887
III	.817	.515	.873	.877	.863

\* All correlations are significant at .001.

The B category correlation figures were lower than any other category, however, they were considered high enough to include the total score.

TABLE 9

COEFFICIENTS OF CORRELATIONS BETWEEN CATEGORIES  
A, B, C, D, E OF DRAWINGS I, II AND III AND THE  
TOTALS FOR EACH DRAWING

N=114	I B	I C	I D	I E	II A	II B	II C	II D	II E	III A	III B	III C	III D	III E	ITot	IITot	IIITot
I A	.245	.741	.723	.703	.412	.195	.484	.447	.389	.442	.178	.559	.544	.464	.879	.461	.563
I B		.222	.204	.305	.158	.189	.181	.147	.002	.142	.299	.086	.225	.126	.435	.153	.209
I C			.695	.722	.526	.279	.605	.512	.506	.509	.185	.689	.599	.532	.877	.578	.650
I D				.714	.418	.198	.480	.439	.468	.433	.307	.593	.583	.514	.861	.471	.620
I E					.434	.288	.510	.443	.451	.453	.301	.530	.566	.577	.880	.499	.617
II A						.431	.821	.776	.744	.605	.265	.601	.595	.606	.502	.893	.681
II B							.479	.490	.465	.225	.288	.338	.332	.261	.288	.647	.363
II C								.794	.793	.649	.208	.680	.682	.644	.582	.924	.734
II D									.790	.587	.054	.524	.558	.548	.513	.903	.585
II E										.569	.115	.552	.586	.600	.480	.887	.623
III A											.203	.635	.702	.685	.511	.630	.817
III B												.335	.322	.313	.308	.210	.515
III C													.721	.678	.643	.649	.873
III D														.709	.646	.654	.877
III E															.573	.633	.863
I Total																.558	.684
II Total																	.711

Levels of Significance: x = NS; \* = .10; \*\* = .05; \*\*\* = .02 to .01; \*\*\*\* = .001.

These results, as well as those shown in Table 9 verified the decision to use total scores of Drawings I, II and III as well as individual scores from each of the five categories.

### Testing General Hypothesis I

The General Hypothesis I for the study stated that the subjects' cognitive style, as measured by the Conceptual Style Test (CST), and his mode of perceiving, as measured by the Children's Embedded Figures Test (CEFT) would correlate significantly with specific criteria of his graphic expression -- Drawings I, II, III and Sophistication of Body Concept (SBC).

The General Hypotheses I was analyzed on the basis of results obtained from specific Hypotheses IA, IB, IC, ID, IE and IF.

#### Testing Hypothesis IA

To test Hypothesis IA, that the subjects' cognitive style and mode of perceiving will be significantly correlated, scores from the CST and the CEFT for the total group and by grade levels were analyzed. Coefficients of correlation and levels of significance for the total group and for grade levels are presented in Table 11.

TABLE 11  
 COEFFICIENTS OF CORRELATION BETWEEN THE CST AND  
 CEFT BY TOTAL GROUP AND BY GRADE LEVELS

Total Group: N = 114	Grade 2: N = 24	Grade 3: N = 22	Grade 4: N = 19	Grade 5: N = 25	Grade 6: N = 24
.099*	.135*	.257*	.563**	-.036*	-.023*

Levels of significance: \* = NS; \*\* = .02.

Results of Correlations for the Total Group and for Grade  
 Levels Between the CST and CEFT

The result of the correlation between the CST and CEFT for the total group (.099) was not significant. Similar nonsignificant correlations resulted for grades two, three, five and six, as shown in Table 11. The CST and CEFT were found to correlate significantly (.563) at the .02 level at grade four.

Conclusions

On the basis of the results presented in Table 11, Hypothesis IA was rejected for the total group. The subjects' cognitive style (CST) and his mode of perceiving (CEFT) were not significantly correlated. For grades two, three, five and six, correlation figures were not significant, thus Hypothesis IA was rejected for these particular grades. The hypothesis was accepted for grade four. The .02 level of significance indicated that, for grade four

the CST and CEFT were significantly correlated.

Testing Hypothesis IB

Scores from the CST and the totals of Drawings I, II and III were used to test the hypothesis that a significant correlation existed between the subjects' cognitive style and his graphic expressions. Coefficients of correlation were obtained for the total group and for grade levels.

Results of Correlations for the Total Group and for Grade Levels Between the CST and Drawings I, II, III

The results of the coefficients of correlation between the CST and Drawings I, II and III for the total group and for grade levels are shown in Table 12.

TABLE 12

COEFFICIENTS OF CORRELATION BETWEEN  
THE CST AND DRAWINGS I, II AND III FOR  
THE TOTAL GROUP AND GRADE LEVELS

	Total Group	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
DR. I	.099*	.363**	.276*	.243*	-.039*	.214*
DR. II	.115*	.379**	.030*	.365*	.036*	.245*
DR. III	.132*	.330*	.407**	.573***	.201*	.074*

Levels of Significance: \* = NS; \*\* = .10; \*\*\* = .02.

Low correlation figures for the total group on Drawings I, II and III indicated that the CST and these particular drawing tests did not correlate

For grades five and six, correlations between the CST and Drawings I, II and III were nonsignificant. Correlations for grade two on Drawings I and II yielded a .10 level of significance, indicating a trend. For grade three, Drawing III also resulted in a trend towards significance when correlated with the CST. The highest level of significance (.02) was obtained by grade four on Drawing III.

### Conclusions

Hypothesis IB was rejected for the total group and for grades five and six. Correlations for these groups were found to be low and nonsignificant between the CST and Drawings I, II and III. Correlations yielding a .10 level of significance, indicating a trend, were obtained for grade two on Drawings I and II, and for grade three on Drawing III. For grade four, the .02 level of significance was yielded from the correlation between Drawing III and the CST. Since the resulting data were ambiguous, Hypothesis IB was neither confirmed nor rejected for grades two, three and four, but remains open for further study.

### Testing Hypothesis IC

To test the hypothesis that the subjects' cognitive style would



correlate significantly with the SBC, scores from the CST and SBC were correlated for the total group and for each grade level. Coefficients of correlations and their respective levels of significance were obtained and recorded.

Results of Correlations for the Total Group and Grade Levels Between the CST and the SBC

Table 13 presents the results of the correlations between the CST and the SBC for the total group and for each grade level.

TABLE 13

COEFFICIENTS OF CORRELATION BETWEEN THE CST AND SBC FOR TOTAL GROUP AND FOR GRADE LEVELS

Total Group	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
.039*	.214*	.091*	.461**	.066*	.039*

Levels of Significance: \* = NS; \*\* = .05.

Except for grade four, all other grade levels, including the total group yielded low and nonsignificant correlations. The correlation between the CST and the SBC for grade four was significant at the .05 level.

Conclusions

Since correlations were nonsignificant, Hypothesis IC was

rejected for the total group and for grades two, three, five and six. The hypothesis was accepted for grade four at the .05 level of significance. For grade four, a significant correlation was found between the CST and the SBC.

#### Testing Hypothesis ID

Hypothesis ID stated that the subjects' mode of perception would correlate significantly with Drawings I, II and III. To test this hypothesis, scores from the CEFT and total scores from Drawings I, II and III were used. Coefficients of correlations were obtained for the total group and for each grade level.

#### Results of Correlations for the total Group and for Grade Levels Between the CEFT and Drawings I, II, III

The results of the coefficients of correlation between the CEFT and Drawings I, II and III are shown in Table 14.

TABLE 14

COEFFICIENTS OF CORRELATION BETWEEN THE CEFT AND DRAWINGS I, II, III FOR TOTAL GROUP AND GRADE LEVELS

Drawings	Total Group	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
I	.491****	.630****	.297 <sup>x</sup>	.494**	.327 <sup>x</sup>	.496***
II	.397****	.644****	-.011 <sup>x</sup>	.529***	.191 <sup>x</sup>	.324 <sup>x</sup>
III	.471****	.627***	.239 <sup>x</sup>	.451*	.164 <sup>x</sup>	.542***

Levels of Significance: x = NS; \* = .10; \*\* = .05; \*\*\* = .02 to .01; \*\*\*\* = .001.

The results indicated that for the total group, the CEFT and Drawings I, II and III were correlated at the .001 level of significance. For grade two correlations were significant for Drawings I and II, at .001 and at .01 for Drawing III. The results for grade four yielded .05 and .02 levels of significance for Drawings I and II, respectively, with the .10 level for Drawing III indicating a trend. Drawings I and III for grade six correlated with the CEFT at the .02 and .01 levels of significance. Correlations for grades three and five were non-significant.

### Conclusions

Significant correlations were obtained between the CEFT and Drawings I, II and III for the total group and for grade two. Significant correlations were yielded for Drawings I and II for grade four; the .10 level of significance for Drawing III indicated a trend. The hypothesis was accepted for these groups. For grade six, the hypothesis was accepted for Drawings I and III and rejected for Drawing II. Since correlations were nonsignificant on Drawings I, II and III for grades three and five, Hypothesis ID was rejected for these grade levels.

### Testing Hypothesis IE

To test the hypothesis that the subjects' mode of perception

would correlate significantly with the SBC, scores from coefficients of correlation were obtained between the CEFT and the SBC for the total group and for each grade level.

Results of Correlations for the Total Group and for Grade Levels Between the CEFT and SBC

Table 15 presents the coefficients of correlation between the CEFT and the SBC for the total group and for each grade level.

TABLE 15

COEFFICIENTS OF CORRELATION BETWEEN THE CEFT AND SBC FOR TOTAL GROUP AND GRADE LEVELS

Total Group	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
.351***	.491**	.203 <sup>x</sup>	.395*	.124 <sup>x</sup>	.247 <sup>x</sup>

Levels of Significance: x = NS; \* = .10; \*\* = .02; \*\*\* = .001

The results indicated that for the total group and for grade two correlations between the CEFT and the SBC were significant at the .001 and .02 levels of significance, respectively. For grade four, the .10 level suggests a trend toward significance. Coefficients of correlation were nonsignificant for grades three, five and six.

Conclusions

The Hypothesis IE that stated that the subjects' mode of perception (CEFT) would correlate significantly with the SBC, was

accepted for the total group and for grades two and four. Correlations were significant at the .001 (total group), and .02 (grade two) levels. At grade four, the .10 level of significance suggests a trend. The hypothesis was rejected for grades three, five and six because of nonsignificant correlations.

### Testing Hypothesis IF

To test the hypothesis that the subjects' articulation of his body concept would correlate significantly with Drawings I, II and III, scores from the SBC and Drawings I, II and III were used. Coefficients of correlation were obtained for the total group and for each grade level.

### Results of Correlations for the Total Group and for Grade Levels between the SBC and Drawings I, II, III

Table 16 presents the coefficients of correlation between the SBC and Drawings I, II and III for the total group and for each grade level.

TABLE 16

#### COEFFICIENTS OF CORRELATION BETWEEN THE SBC AND DRAWINGS I, II, III FOR TOTAL GROUP AND GRADE LEVELS

Drawings	Total Group	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
I	.511****	.479***	.461**	.555***	-.035 <sup>x</sup>	.509***
II	.540****	.661****	.575***	.451*	.184 <sup>x</sup>	.419**
III	.626****	.605***	.744****	.639***	.277 <sup>x</sup>	.520***

Levels of Significance: x=NS; \*=.10; \*\*=.05; \*\*\*=.02 to .01; \*\*\*\*=.001

Significant correlations were indicated for the total group and grades two, three and six between the SBC and Drawings I, II and III. For grade four, Drawings I and III were significantly correlated with the SBC at the .02-.01 level; Drawing II yielded a .10 level of significance. So significant correlations were obtained for grade five.

### Conclusions

The Hypothesis IF that stated that subjects' articulation of body concept (SBC) would correlate significantly with Drawings I, II and III was confirmed for the total group and grades two, three, and six. Significant correlations also occurred on the fourth grade level for Drawings I and III yielding a .01 level of significance; Drawing II obtained a .10 level of significance. The hypothesis was accepted for grade four. Nonsignificant correlations were indicated for grade five, this, the hypothesis was rejected for this grade.

### Summary of General Hypothesis I

The General Hypothesis I stated that the subjects' cognitive style, as measured by the CST, and his mode of perceiving, as measured by the CEFT would correlate significantly with specific

criteria of his graphic expressions (Drawings I, II, III and the SBC). For the purpose of analysis, the General Hypothesis I was subdivided into five specific hypotheses. The results are summarized as follows:

Hypothesis IA: Correlations between the CST and CEFT were found to be nonsignificant for the total group and for grades two, three, five and six. The hypothesis was rejected for these groups. The correlation was significant for grade four, thus, the hypothesis was supported for this grade level.

Hypothesis IB: Correlations between the CST and Drawings I, II and III yielded nonsignificant correlations for the total group and grades five and six. The hypothesis was rejected for these groups. Significant correlations were found for grade two on Drawings I and II; for grades three and four on Drawing III. Since the resulting data were ambiguous, Hypothesis IB was neither rejected nor confirmed for grades two, three and four, but remains open for further study.

Hypothesis IC: Correlations between the CST and SBC were nonsignificant for the total group and grades two, three, five and six. The hypothesis was rejected for these groups. Since a significant correlation was found at grade four, the hypothesis was accepted in this instance.

Hypothesis ID: Correlations between the CEFT and Drawings I, II and III were significant for the total group and grades two and

four. Drawing III at grade four yielded the .10 level of significance indicating a trend. Significant correlations were found for grade six on Drawings I and III. The hypothesis was accepted for these groups and drawings. The hypothesis was rejected for grades three and five on the basis of nonsignificant correlations.

Hypothesis 1E: Correlations between the CEFT and the SBC were significant for the total group and for grade two; the .10 level for grade four suggesting a trend toward significance. The hypothesis was accepted for these groups. For grades three, five and six, the hypothesis was rejected on the basis of nonsignificant correlations.

Hypothesis 1F: Correlations between the SBC and Drawings I, II and III were significant for the total group and for grades two, three and six; and for grade four on Drawings I and III. A trend toward significance was indicated for grade four on Drawing II with a .10 level of significance. Hypothesis 1F was accepted for the total group and grades two, three, four and six. The hypothesis was rejected for grade five on the basis of nonsignificant correlations.

Table 17 presents a summary of levels of significance yielded by correlations from the specific hypotheses used to analyze the General Hypothesis I.

The results of the summary of General Hypothesis I as presented in Table 17 indicates various degrees of acceptance or rejection when



the total group and each grade level is considered separately. Seven out of twelve correlations were significant for grade four at levels .05 or lower; three correlations at the .10 level suggested a trend toward significance. Seven correlations were significant for grade two, with two other correlations at the .10 level, followed by seven significant correlations for the total group. Grade six yielded five significant correlations while grade three had three at the .05 level or lower and one correlation at the .10 level denoting a trend. For grade five, none of the correlations were significant.

TABLE 17

LEVELS OF SIGNIFICANCE OBTAINED OF CORRELATIONS FROM  
SPECIFIC HYPOTHESES OF GENERAL HYPOTHESIS I

Hypothesis	Total Group	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
IA: CST-CEFT	NS	NS	NS	.02	NS	NS
IB: CST :Dr. I	NS	.10	NS	NS	NS	NS
Dr. II	NS	.10	NS	NS	NS	NS
Dr. III	NS	NS	.10	.02	NS	NS
IC: CST-SBC	NS	NS	NS	.02	NS	NS
ID: CEFT :Dr. I	.001	.001	NS	.05	NS	.02
Dr. II	.001	.001	NS	.02	NS	NS
Dr. III	.001	.001	NS	.10	NS	.01
IE: CEFT-SBC	.001	.02	NS	.10	NS	NS
IF: SBC : Dr. I	.001	.02	.05	.02	NS	.02
Dr. II	.001	.001	.01	.10	NS	.05
Dr. III	.001	.01	.001	.01	NS	.01

## Testing General Hypothesis II

The General Hypothesis II for the study was that analytical scores on the CST, CEFT and graphic expressions (Drawings I, II III and the SBC) would increase as subjects advanced in grade, revealing a developmental trend from initially global processing of information to a more differentiated or analytical mode.

The General Hypothesis II was analyzed on the basis of results obtained from specific Hypothesis IIA, IIB, IIC and IID.

### Testing Hypothesis IIA

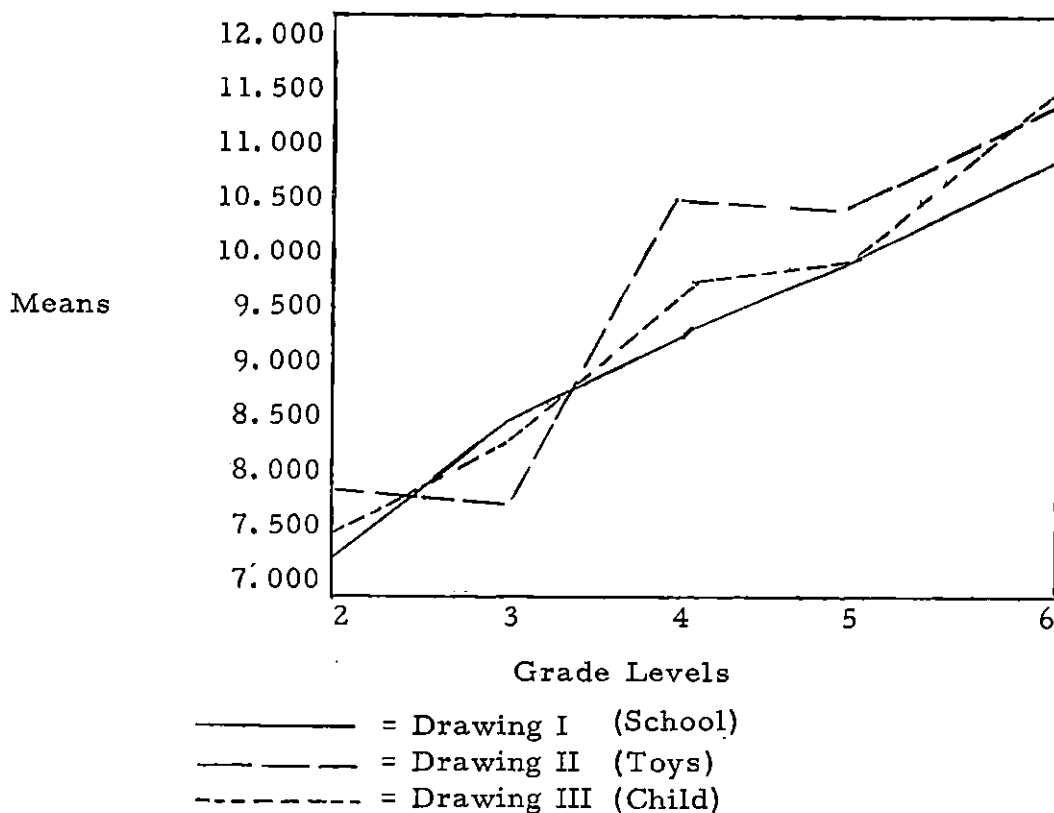
To test the hypothesis that the means of the total scores on Drawings I, II and III would increase as subjects advanced in grade, total scores for the three drawings were divided according to grade level and the means for each group were compared for developmental trends. The analysis of variance was used to determine whether or not there were significant differences between means.

### Results of Differences between Means of Total Scores on Drawings I, II, III

Graph I presents the means on Drawings I, II and III for each grade level. Appendix IX shows graphs indicating the means on each category of Drawings I, II and III for all grade levels.

GRAPH I

## MEANS ON DRAWINGS I, II, III FOR GRADE LEVELS



Except for a slight decline in means from grades two to three and four to five on Drawing II, the general increase of means on the three drawings indicated a developmental trend. Though not necessarily discrete between grade levels, a clear difference between second and sixth grade is evident.

Table 18 presents the F-ratios significant at the .05 level resulting from the differences between means among grades used in the study. Only significant F-ratios are shown. Appendix X.

contains the significant and nonsignificant F-ratios for all grades.

TABLE 18  
F-RATIOS YIELDING .05 LEVEL OF SIGNIFICANCE\*  
DRAWINGS I, II, III

Grades	2	4	2	5	2	6	3	4	3	5	3	6
DR I		6.208		9.151		10.882						7.590
DR II		8.187		9.150		10.483		10.011		10.848		11.370
DR III		7.847		10.386		22.563				4.129		13.387

F of 4.08 is significant at .05 with 40/1 d. f.

Significant differences between means on Drawings I, II and III were indicated for grades two and four, two and five, two and six, three and six in the direction of the intermediate grades. Significant F-ratios for Drawings II and III were obtained between grades three and five, again in the direction of the upper level. A significant difference between means on Drawing II for grades three and four also indicated a developmental trend.

### Conclusions

Hypothesis IIA stated that means of the total scores on Drawings I, II and III would increase as subjects advanced in grade. The results as presented in Graph I confirms the hypothesis. Significant differences between means on all three drawings occurred between four grade level comparisons: grades two and four, two and five, two and

\*One-way analysis of variance.

six, three and six. Significant F-ratios were also obtained between grades three and five on Drawings II and III, and between grades three and four on Drawing II. All significant differences were in the direction of the intermediate grade level.

#### Testing Hypothesis IIB

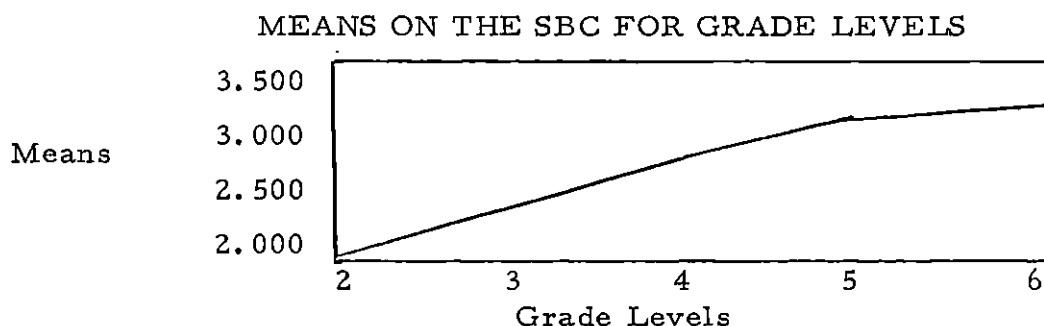
To test the hypothesis that the means on the SBC would increase as subjects advanced in grade, the means of the total scores from the SBC were divided according to grade levels and comparisons were made for developmental trends. The analysis of variance was used to determine whether differences between means were significant. An F-ratio of 4.08 yielding the .05 level of significance was applied.

#### Results of Differences Between Means of Total Scores

##### On the SBC

Graph II presents the means on the SBC for each grade level. Specific numerical means are shown in Appendix VIII.

GRAPH II



As shown in Graph II the increased means for each successive grade level indicated a developmental trend.

Grade levels that attained a significant difference between means on the SBC are presented in Table 19. The F-ratios for all grade comparisons indicating both significance and nonsignificance are shown in Appendix X.

TABLE 19  
F-RATIOS YIELDING .05 LEVEL OF SIGNIFICANCE\*  
ON THE SBC

Grades	2	4	2	5	2	6	3	5	3	6
		11.702		30.537		21.233		10.354		7.816

F of 4.08 is significant at .05 with 40/1 d. f.

The significant F-ratios as presented in Table 19 were well beyond the required 4.08 figure necessary for the .05 level of significance. The highest F-ratio (30.537) occurred between grades two and five. All of the significant differences between means were in the direction of the intermediate grades, indicating a developmental trend. The results presented in Table 19 are similar to those shown in Table 18. Significant differences between the means of both the SBC and Drawing II were found in the following grade comparisons: two and four, two and five, two and six, three and five, three

\*One-way analysis of variance.

and six. Significant F-ratios for the SBC and Drawings I, II and III were found in the following grade comparisons: two and four, two and five, two and six, three and six.

### Conclusions

The results, as presented by Graph II, of comparing means on the SBC for each grade level indicated a developmental trend. The means on the SBC increased as subjects advanced in grade. Hypothesis IIB was accepted.

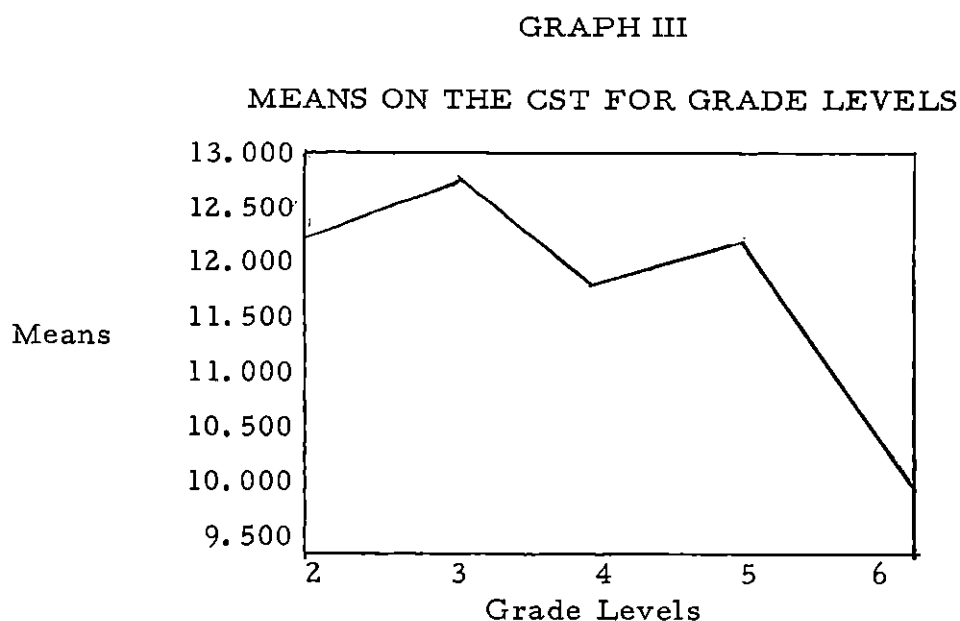
Significant F-ratios were obtained in five out of ten grade comparisons. The significant differences between means on the SBC were in the direction of the intermediate grades.

### Testing Hypothesis IIC

To test the hypothesis that the means of the total scores on the CST would increase as subjects advanced in grade, the means on the CST were divided according to grade levels and comparisons were made between grades. The analysis of variance was used to indicate significant differences between means. An F-ratio of 4.08 yielding an .05 level of significance was applied to the results.

### Results of the Differences Between Means of Total Scores on the CST

Graph III presents the means on the CST for each grade level. For the specific numerical means for each grade see Appendix VIII.



A decrease of analytical responses is indicated in Graph III. The mean on the CST for grade two was 12.292 as compared to a mean of 9.958 for grade six. The highest mean score on the CST was that of grade three (12.857).

Significant F-ratios at the .05 level between grades are presented in Table 20. Significant and non-significant F-ratios for all grade comparisons are shown in Appendix X.

The two grade comparisons yielding significant differences between means on the CST were grades three and six, and grades five and six. In both instances, the significant differences were



in the direction of the lower grade.

TABLE 20  
F-RATIOS YIELDING .05 LEVEL OF SIGNIFICANCE\*  
ON THE CST

Grade 3	Grade 6	Grade 5	Grade 6
5.246		4.371	

\*F of 4.08 is significant at .05 with 40/1 d. f.

### Conclusions

The results, as presented in Graph III, indicated a decrease of analytical responses. Except for grade three, the means on the CST decreased as subjects advanced in grade. Hypothesis IIC was rejected.

Significant F-ratios, as shown in Table 20, were in the direction of the lower grades, confirming the results presented in Graph III.

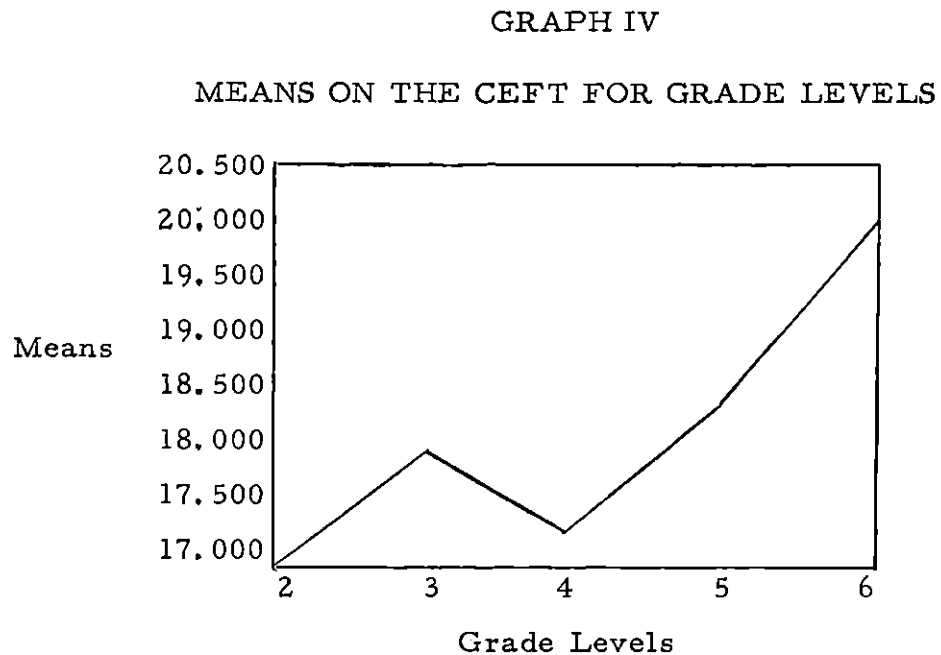
### Testing Hypothesis IID

The means of the total scores on the CEFT for each grade level were used to determine developmental trends as subjects advanced in grade. Comparisons between means were made to test Hypothesis IID. The analysis of variance was used to indicate significant differences between means.

\*One-way analysis of variance.

Results of the Differences Between Means of Total  
Scores on the CEFT

Graph IV presents the means on the CEFT for each grade level. Specific numerical means appear in Appendix VIII.



As indicated in Graph IV, with the exception of grade four, the means on the CEFT increased as subjects advanced in grade. A developmental trend was apparent from grades two through six.

Table 21 presents the significant F-ratios between grades. A complete list of significant and nonsignificant F-ratios between all grade levels for the CEFT are shown in Appendix X.

Significant differences between means on the CEFT were obtained

for grade level comparisons of grades two and six, grades four and six, in the direction of the higher grade level.

TABLE 21  
F-RATIOS YIELDING .05 LEVEL OF SIGNIFICANCE\*  
ON THE CEFT

Grade 2	Grade 6	Grade 4	Grade 6
	6.716		4.373

\*F of 4.08 is significant at .05 with 40/1 d. f.

### Conclusions

Hypothesis IID stated that the means of the total scores on the CEFT would increase as subjects advanced in grade. Graph IV presents the means for all grade levels. With the exception of grade four, the means for all other grade levels increased as subjects advanced in grade. Hypothesis IID was accepted.

In addition to the results presented in Graph IV, Table 21 indicates significant differences between means of grade comparisons two and six, four and six, in the direction of the higher grade level. A developmental trend is suggested.

### Summary of General Hypothesis II

The General Hypothesis II stated that the analytical scores on

\*One-way analysis of variance.

the CST, CEFT and graphic expressions (Drawings I, II, III and the SBC) would increase as subjects advanced in grade, revealing a developmental trend from initially global processing of information to a more differentiated or analytical mode. For the purpose of analysis, the General Hypothesis was subdivided into four specific hypothesis. The results are summarized as follows:

Hypothesis IIA: The means of the total scores on Drawings I, II and III increased as subjects advanced in grade. The Hypothesis IIA was accepted.

Hypothesis IIB: The Hypothesis IIB was accepted. Results of the data indicated that the means of the total scores on the SBC increased as subjects advanced in grade.

Hypothesis IIC: The means of the total scores on the CST decreased for all grades except grade three. The Hypothesis IIC was rejected.

Hypothesis IID: Except for grade four, the means of the total scores on the CEFT increased as subjects advanced in grade. The Hypothesis IID was accepted.

With the exception of the CST, the means of the total scores on the SBC, the CEFT, and Drawings I, II and III increased as subjects advanced in grade, indicating a developmental trend.

The means, standard deviations and range of scores on the CST,

TABLE 22

MEANS, STANDARD DEVIATIONS AND RANGES OF SCORES  
FOR EACH GRADE LEVEL ON THE CST, CEFT,  
SBC, DRAWINGS I, II, III

	Grade 2			Grade 3			Grade 4			Grade 5			Grade 6		
	M	SD	R	M	SD	R	M	SD	R	M	SD	R	M	SD	R
CST	12.292	4.175	4-19	12.857	3.705	3-19	11.842	3.271	7-18	12.240	2.803	7-17	9.958	4.648	1-17
CEFT	17.000	4.314	7-25	18.046	3.000	10-24	17.263	4.942	6-25	18.400	3.123	12-23	20.125	4.036	9-25
SBC	2.000	.780	1- 4	2.409	.908	1- 4	2.790	.713	2- 4	3.160	.688	2- 5	3.208	1.021	2- 5
DR I	7.292	2.095	5-12	8.500	2.220	5-14	9.368	2.733	5-16	9.920	2.886	6-16	10.792	3.270	6-20
DR II	7.792	3.036	5-17	7.727	2.414	5-14	10.579	3.339	6-19	10.520	3.268	5-18	11.458	4.644	5-22
DR III	7.458	2.395	5-15	8.364	2.237	5-13	9.790	3.066	5-17	9.920	2.914	5-16	11.541	3.464	5-20

M = Means; SD = Standard Deviation; R = Range

the CEFT, the SBC and Drawings I, II and III for each grade level are presented in Table 22.

Table 22 summarizes the four specific hypotheses of General Hypothesis II. Developmental trends are indicated by generally increased means from one grade level to another. Significant differences between means occurred with some grade comparisons. Most of the significant differences were indicated when comparing a primary level with an intermediate level.

Another dimension presented in Table 22 is the range of individual differences within each grade level. As indicated by the range of scores on each test for each grade level, much greater differences occurred within groups than between groups. Even though ranges of scores between grades differ only slightly, means between grades in most instances increased, as a function of a greater number of higher scores within the range of scores. Implied in Table 22 is the diversity teachers might find within a given grade level.

This study was limited to the investigation of the stated hypotheses, however, the author recognizes that many other diverse and complex variables, not within the scope of this study, may have influenced the responses subjects made to the tasks presented. Chapter V presents discussions and conclusions on the subject of individual differences, grade level differences and response attitudes as related to the study.

## CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS  
FOR FURTHER STUDY

## Summary

Purpose

This study was undertaken to investigate the relationship of consistencies in mode of perceiving and mode of cognition to the graphic expression of boys at five grade levels. This study attempted to determine whether (1) an individual's preference for an analytical mode of perceiving and conceptualizing would also be demonstrated in his graphic expression, whether (2) an individual's preference for a global mode of perceiving and conceptualizing would also be demonstrated in his graphic expression, and whether (3) a developmental trend occurs from the global to a more analytical processing of information as students advance in grade.

Importance

Recent studies in cognition and perception seem to indicate stable intraindividual consistencies of patterning in coping with and relating verbal and visual information. The possibility of an individual performing in a self-consistent manner when processing visual

and/or cognitive information into graphic expression has not been studied.

Any observable relationships of intraindividual consistencies in information processing in the domains of perception, cognition and graphic expression which are found as a result of this study would indicate a possible need for re-examination of the underlying assumptions of most of the current child art theories. If consistency is found to be a characteristic of human behavior in the domains considered, then this dimension would be relevant for curriculum development in art and for the assessment of individual art production.

#### Theoretical Background of the Study

The theoretical bases for this study come primarily from the research in cognitive styles concerning conceptualizing and perceiving. Following are the major assumptions on which this study is based:

(1) An individual's preference for an analytical mode of perceiving is also evident in his preference for an analytical mode of conceptualizing.

(2) An individual's preference for a global mode of perceiving is also evident in his preference for a global mode of conceptualizing.

The inference drawn from these assumptions was: 1) an



individual's preferred mode of information processing would be consistent across the domains of perception, cognition and graphic expression.

### The Limitations of the Study

This study was limited to testing the following hypotheses:

General Hypothesis I: The subjects' cognitive style, as measured by the Conceptual Style Test, and his mode of perceiving, as measured by the Children's Embedded Figures Test will correlate significantly with specific criteria of his graphic expressions (Drawings I, II, and III and Sophistication of Body Concept).

The General Hypothesis I was analyzed on the basis of the following specific hypotheses:

Hypothesis IA: The subjects' cognitive style and mode of perceiving will be significantly correlated.

Hypothesis IB: The subjects' cognitive style will correlate significantly with Drawings I, II and III.

Hypothesis IC: The subjects' cognitive style will correlate significantly with the Sophistication of Body Concept.

Hypothesis ID: The subjects' mode of perception will correlate significantly with Drawings I, II and III.

Hypothesis IE: The subjects' mode of perception will

correlate significantly with the Sophistication of Body Concept.

Hypothesis IF: The subjects' articulation of his body concept will correlate significantly with Drawings I, II and III.

General Hypothesis II: Analytical scores on the Conceptual Style Test, Children's Embedded Figures Test and graphic expressions (Drawings I, II, III and Sophistication of Body Concept) will increase as subjects advance in grade, revealing a developmental trend from initially global processing of information to a more differentiated or analytical mode.

The General Hypothesis II was analyzed on the basis of the following specific hypotheses:

Hypothesis IIA: The means of the total scores on Drawings I, II and III will increase as subjects advance in grade.

Hypothesis IIB: The means of the total scores on the Sophistication of Body Concept Test will increase as subjects advance in grade.

Hypothesis IIC: The means of the total scores on the Conceptual Style Test will increase as subjects advance in grade.

Hypothesis IID: The means of the total scores on the Children's Embedded Figures Test will increase as subjects advance in grade.

### Research Design

The following procedures were used in testing the hypotheses:

- (1) Boys from ten classes, two of each grade level from grades two through six participated in the study. The students attended Moffit Elementary School in Springfield, Oregon. Since students were assigned to classrooms on the basis of age, grade level and available space rather than homogeneous groupings, the students selected for the study were considered randomly distributed in the classes.
- (2) Age and I. Q. scores were obtained from school records. All subjects participating in the study had been given the short form of the California Test of Mental Maturity.
- (3) The testing procedure involved both group and individual administering of tests over a two-month period of time. The SBC, Drawings I, II and III were given to intact classes in a group situation. The CEFT and CST were administered to subjects on an individual basis by the author and a graduate student in art education. The SBC and Drawings I, II and III were administered by the author.
- (4) Drawings I, II and III were coded and then rated by two independent judges on the basis of a rating scale designed by the writer. The percentages on inter-rater agreement were consistently high.

(5) The SBC was rated by two independent judges on a rating scale designated for the test. The percentage on inter-rater agreement was satisfactory.

#### Testing the General Hypothesis I

The General Hypothesis I was analyzed on the basis of five specific hypotheses derived from the General Hypothesis.

#### Testing Hypothesis IA

Scores from the CST and CEFT for the total group and by grade levels were correlated to test Hypothesis IA.

#### Results

Coefficients of correlation for the CST and CEFT for the total group and for grades two, three, five and six were low or nonsignificant. The correlation was significant at the .02 level for grade four. Hypothesis IA was rejected for the total group and for grades two, three, five and six. The hypothesis was accepted for grade four.

#### Testing Hypothesis IB

Scores from the CST and the total scores from Drawings I, II and III were used to test Hypothesis IB. Coefficients of correlation were obtained for the total group and by grade levels.

### Results

Hypothesis IB was rejected for the total group and for grades five and six. Correlations for these groups were low or nonsignificant. Significant correlations were obtained for grade two on Drawings I and II, for grade three on Drawing III, for grade four on Drawing III. Since the resulting data were ambiguous, Hypothesis IB was neither confirmed nor rejected for grades two, three and four. The hypothesis remains open for further investigation.

### Testing Hypothesis IC

Scores from the CST and SBC were correlated for the total group and for each grade level to test Hypothesis IC.

### Results

Correlations between the CST and the SBC were low or nonsignificant for the total group and for grades two, three, five and six. The hypothesis was rejected for these groups. A significant correlation was obtained at grade four, therefore, the hypothesis was accepted at this level.

### Testing Hypothesis ID

To test Hypothesis ID, scores from the CEFT and total scores from Drawings I, II and III were used. Coefficients of correlation

were obtained for the total group and for each grade level.

### Results

Correlations between the CEFT and Drawings I, II and III were significant for the total group and for grades two and four. Significant correlations were yielded for grade six on Drawings I and III. The hypothesis was accepted for these groups. The hypothesis was rejected for grades three and five on the basis of low or nonsignificant correlations.

### Testing Hypothesis IE

Scores from the CEFT and the SBC were used to test Hypothesis IE. Coefficients of correlation were obtained for the total group and for each grade level.

### Results

Significant correlations were yielded for the total group and for grades two and four. The hypothesis was accepted for these groups. For grades three, five and six, the hypothesis was rejected on the basis of low or nonsignificant correlations.

### Testing Hypothesis IF

To test Hypothesis IF, scores from the SBC and Drawings I, II and III were used. Coefficients of correlation were obtained for

the total group and for each grade level.

### Results

Correlations between the SBC and Drawings I, II and III were significant for the total group and for grades two, three and six; and for grade four on Drawings I and III. A trend toward significance was indicated for grade four on Drawing II with a .10 level of significance. Hypothesis IF was accepted for the total group and grades two, three, four and six. The hypothesis was rejected for grade five.

### Testing the General Hypothesis II

The General Hypothesis II was analyzed on the basis of four specific hypotheses derived from the General Hypothesis.

### Testing Hypothesis IIA

Total scores on Drawings I, II and III were divided according to grade level and the means for each group were compared to test Hypothesis IIA. The analysis of variance was also used to indicate significant differences between means.

### Results

Except for a slight decline in means from grades two to three

and four to five on Drawing II, the general increase of means on the three drawings indicated a developmental trend. The hypothesis was accepted. Significant differences between means on all three drawings occurred between four grade level comparisons: grades two and four, two and five, two and six, three and six. Significant F-ratios were also yielded between grades three and five on Drawings II and III, and between grades three and four on Drawing II. All significant differences were in the direction of the intermediate grade level.

#### Testing Hypothesis IIB

To test Hypothesis IIB, the means of the total scores from the SBC were divided according to grade levels and comparisons were made between grades for indications of a developmental trend. The analysis of variance was used to indicate significant differences between means.

#### Results

The increased means on the SBC at each successive grade level indicated a developmental trend. The Hypothesis IIB was accepted.

Significant F-ratios were obtained in five out of ten grade comparisons. The significant differences between means on the



SBC were in the direction of the intermediate grades.

#### Testing Hypothesis IIC

The means of the total scores on the CST were divided according to grade levels and compared to test Hypothesis IIC. The analysis of variance was used to indicate significant differences between means.

#### Results

The results indicated a decrease of analytical responses. Except for grade three, the means on the CST decreased as subjects' advanced in grade. Hypothesis IIC was rejected.

#### Testing Hypothesis IID

The means of the total scores on the CEFT for each grade level were used to determine developmental trends as subjects advanced in grade. Comparisons between means were made to test Hypothesis IID. The analysis of variance was used to indicate significant differences between means.

#### Results

With the exception of grade four, the means for all other grade levels increased as subjects advanced in grade. Hypothesis IID was accepted.

Significant differences between means were indicated for

grade comparisons two and six, four and six in the direction of the higher grade level.

### Conclusions and Discussion

#### Relationship of Conceptual Style to Perceptual Mode and Graphic Expression

The results of the study led to the following conclusions:

1. The Conceptual Style test used as a measure of cognitive style, yielded less significant correlations than any other measure used in the study (see Chapter IV, Table 17).
2. Nonsignificant correlations between the CST and the CEFT, the SBC and Drawings I, II and III for the total group and for grades five and six indicated that, for these groups, little relationships were found between the measures.
3. Significant correlations occurred between the CST and CEFT, the CST and SBC for grade four; the CST and Drawings I and II for grade two; the CST and Drawing III for grades three and four.

#### Discussion on Conceptual Style

A relationship, indicating consistency, appears to exist between conceptual style, perceptual mode and graphic expression

in the analytic-global dimension for particular grade levels within some measures. For grade levels with significant correlations, the task involving conceptualizing (CST) appeared to be related in the analytic-global dimension to the tasks involving perception -- overcoming an embedded context (CEFT), and drawings based on perceiving (Drawings I, II, III) and conceptualizing (SBC).

The lack of consistency, as indicated by nonsignificant correlations for the total group and grades five and six between the CST and the CEFT, the SBC and Drawings I, II and III may be related to the low reliability figure of .34 ( $p < .05$ ) for boys in grades three and four obtained by Lee, Kagan and Robson on the CST in testing the reliability of an analytic tendency over a twelve-month period. (26.3)

#### Relationship of Perceptual Mode to Graphic Expression

The results of the study led to the following conclusions:

1. The results of correlations between the CEFT and the SBC and Drawings I, II and III indicated a significant relationship for the total group and grades two and four across each measure.
2. Correlations were significant between the CEFT and Drawings I and III at the sixth grade level.
3. Nonsignificant correlations were indicated for grades three and five.

### Discussion on Perceptual Mode

Significant correlations between the CEFT and measures of graphic expression for the total group and at grade levels discussed above, indicated that the scores appeared to be consistent across tests in the global or analytic dimension. For groups yielding significant correlations, the task of overcoming an embedded context (CEFT) seemed to be related in the analytic-global dimension to the tasks involving drawings based on perceiving visual stimuli (Drawings I, II, III) and conceptualizing (SBC). The magnitude of the correlation between the CEFT and the SBC for the total group suggests considerable correspondence between mode of field approach and extent of articulation of body concept.

### Relationship of Drawings Based on Conceptualizing to Drawings Based on Visual Stimuli

The results of the study led to the following conclusions:

1. The results of correlations between the SBC and Drawings I, II and III indicated a significant relationship for the total group and for grades two, three and six.
2. Correlations were significant for grade four on Drawings I and III, with Drawing II yielding a .10 level, suggesting a trend toward significance.

3. None of the correlations were significant at the fifth grade level.

#### Discussion on Conceptual Drawings

Significant correlations between the SBC and Drawings I, II and III suggest that the scores were consistent across tests in the analytic-global dimension. For groups yielding significant correlations, the task of conceptualizing one's body concept in graphic form (SBC) appeared to be related to the task involving drawings based on perceiving visual stimuli (Drawings I, II and III).

#### Conclusions on Developmental Trends for Each Measure

1. A developmental trend from an initial global processing of information to a more differentiated or analytical mode as subjects advanced in grade occurred for the following measures: Drawings I, II and III, the SBC and the CEFT. Scores from these measures increased as subjects advanced in grade.

2. In three instances the means decreased: at grades three and five on Drawing III, and at grade four on the CEFT. Since the means for all other grade levels on these measures increased the discrepancies may be a function of the individual differences of subjects within the grade levels and of unknown variables affecting human behavior.

3. The results from the CST indicated a decrease of analytical responses. Except for grade three, scores on the CST decreased as subjects advanced in grade.

#### Discussion on Developmental Trends

The results from the CST indicating a reversed developmental trend were contradictory to the data obtained by Kagan, Moss and Sigel (22.8). Their analysis of the responses to the CST by children in grades one through five revealed that, with age, analytic responses increased while relational responses decreased. Kagan, Moss and Sigel used the thirty triad form of the CST for their study. The present form of the CST includes nineteen triad stimuli. The differences in resulting data may be due to the present shortened form of the CST used in this study.

The CST, in general, yielded less significant correlations between tests than any other measure (Table 17). Consideration of reasons why this occurred remains mainly speculative. An examination of the differences in testing procedures for each measure could suggest directions for further study of the phenomena.

#### Discussion on Testing Procedures; Affect of Impulsive-Reflective Attitudes

Initial responses to each triad stimuli of the CST were recorded for scoring. Although many responses were possible and subjects, at times, gave several responses to a set of triad stimuli, only the first response was considered valid according to testing procedures. Testing time for subjects ranged from ten to twenty minutes. The responses appeared to be impulsive. In comparison, the testing procedures for the CEFT included a practice session and no time limitation for identifying the embedded figure. The testing attitude appeared to be more reflective than impulsive. For the SBC and Drawings I, II and III, subjects were allowed as much time as needed to complete their drawings. Since erasers were distributed, first responses could be altered and further changes were possible. Again, the testing attitude appeared to be more reflective than impulsive. The main question raised by the author is whether testing procedures involving impulsive and reflective behaviors affect responses. Kagan, Rossman, Day, Albert and Phillips (23), in a series of studies, investigated the significance of analytic and reflective attitudes of children in information processing. Their results indicated that the production of analytic concepts were related to several dispositions that were relatively independent of each other:

- (1) the tendency to reflect over alternative solutions or classifications in situations in which several

response alternatives are available simultaneously, and (2) the tendency to analyze visual arrays into their component parts (23. 1).

Reaction time and the nature of the response for second and third grade children were studied by Kagan and his colleagues. One group of the sample was instructed to respond slowly and to reflect upon their answers, the other group was instructed to respond quickly. The thirty-item form of the CST, the Design Recall Test (DRT) and the Hidden Figures Test (HFT) were used as the dependent variables. The results indicated that the group instructed to respond slowly (reflective) were more likely to (a) produce more analytic responses on the CST ( $p < .001$ ), (b) select initially the correct figure on the DRT ( $p < .01$ ), and (c) select initially the correct hidden figure on the HFT ( $p < .001$ ) (23. 3). Experimental conditions appeared to affect the kinds of responses made. Without manipulating reaction times, the question remains of why some children are more reflective than others. Kagan and his colleagues suggest three possibilities deserving exploration: constitutional dispositions, degree of involvement in tasks and expectation of failure (23. 4).

The dimension of reflection and visual analysis appears to influence the manner in which information is classified and the content of the final response. Whether the generally impulsive



attitude that appeared to prevail during the administering of the CST, as compared to the generally reflective attitude assumed for the CEFT, the SBC and Drawings I, II, III, affected the nature of the responses remains to be investigated.

#### Relationship of Individual Differences to the Study

The results of the study led to the following conclusions:

1. The range of individual differences in scores for all measures appeared to be greater within, rather than between, grade levels.
2. Scores on all the measures for a given individual were somewhat consistent in the tendency to be global or analytical but also showed some variation from task to task. These individual differences may be due to the nature of the task and to the influence of unknown variables, such as the affect of the classroom teacher, prior training in the task, involvement in the task and constitutional disposition.
3. Age ranges extend from one grade to the next. The results indicate that development proceeds in overlapping phases rather than on the basis of discrete age levels.

#### Discussion on Individual Differences

Differences in the graphic expressions of children of the same

age appeared to reflect differences in their modes of information processing. Implied in the resulting data is that, for the total group and for most grade levels studied, an individual's preference for an analytical mode or global mode of experiencing seems to be evident in his drawings.

Implications from research on perceptual development suggest that consideration of individual differences in mode of field approach as reflected in psychological functioning is of utmost importance in educational decisions. Development of curriculum and criteria for evaluation would need to encompass and allow for differences in products children produce and other types of behavior based on their cognitive style and psychological differentiation. How children perceive and process information would be evident in how and what they choose to express in their art work. Children who are more analytical in their approach would be able to overcome embedding contexts, include more details and perceive parts in relation to the whole in the stimuli presented for art work. Children who are more global would tend to see the stimulus as a whole, be less able to detect an embedded context and would tend to use less details in their work.

#### Differences Between Grade Levels Four and Five

1. The greatest differences between grade levels were noted

between grades four and five. Table 17 in Chapter IV presents the levels of significant correlations between all measures for the total group and for each grade level. For grade four, significant correlations were yielded on ten out of twelve relationships. This number of significant correlations exceeded those for any other grade level.

2. For grade five, none of the twelve correlations were significant.

#### Discussion on Grade Levels Four and Five

The explanation of the differences found between grades four and five is speculative. For grade four, the change in methodology and curriculum from the primary to the intermediate level may have had some effect on the nature and quality of their responses to tasks used in the study. The effect of the classroom teacher is another variable requiring further investigation.

The guidance counselor at Moffitt Elementary School suggested several existing conditions that may have affected the performance of grade level five. For the school year 1968-69, more boys from grade five were referred to the counselor than any other age or sex group in the school. There were also more referrals for remedial reading from grade five than any other grade. Achievement scores were generally lower for grade five than for any other grade.

Significant differences between the means on I. Q. scores were yielded between grades two and five and grades five and six. The mean I. Q. score for grade five was lower than any other grade level. The affect of these variables on the performance of fifth grade boys used in the study remains to be investigated to see if this is developmental or a factor of this particular sample.

#### Recommendations for Further Study

Although extensive research has been conducted on cognitive styles pertaining to the perceptual and conceptual modes of processing information in the global and analytical dimension, the author knows of no other study relating cognitive styles to graphic expression based on perceiving visual stimuli. On the basis of her experience in this study, the writer makes the following recommendations for further research:

1. Further investigation of the nineteen triad form of the CST for reliability and validity and its use on a developmental basis and for possible intercorrelations with perceptual and drawing tasks.
2. Investigate the affects of reaction time of the various tasks used in the study. It seems plausible that performance on tasks are related to a reflective or impulsive attitude.
3. Identify the intervening variables within each grade level that may influence the quality of performance as a result of unusual

circumstances. To check the similarity of groups used in the study, means on the I.Q. were compared. A significant difference occurred for grade five. Further investigation revealed other differences that may have affected the results on tasks obtained for grade five.

4. Compare the assumptions made by current child art theories and the implications made for the assessment of individual art production. The wide ranges of scores within each grade level on the tasks used in this study indicated that children of the same grade level project various levels of development due to individual differences in experiencing and in the processing of information. Differences in the graphic expression of children of the same age appeared to be related to preferred mode of perception and, to some extent, cognition. A reevaluation of the bases used for assessing children's art work is a relevant area for further research.

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## APPENDIX I

MARLENS' SOPHISTICATION-OF-BODY-SCALE: A single rating based upon both drawings is to be assigned to each child. (49. 15)

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1. Most primitive and infantile drawings: These manifest a very low level of form (ovals, rectangles, sticks stuck on to each other); no evidence of role or sex identity (same treatment of male and female with, at most, difference in hair treatment, no facial expression, little shaping or clothing).
2. Moderately primitive drawings: Drawings which essentially still lack features of differentiation through form, identity, or detailing; however, these drawings show slightly more complexity in some respect (e. g. , presence of one body part that is unusual in most primitive drawings, such as the neck).
3. Drawings intermediate in level of sophistication : Drawings in which identification of sex is evident, attempts at shaping and a fair level of integration of parts are manifest and a minimum of detailing is present.
4. Moderately sophisticated drawings: Drawings which show a definite attempt at role assignment (with regard to age, activity, occupation, etc.) through adequate detailing, shaping, clothing; with continuity of outline (i. e. , integration of parts) attempted.
5. Most sophisticated drawings: These manifest high form level (e. g. , waistline, hips, shoulders, chest, or breast, shaped or clothed limbs, etc. ); appendages and details represented in proper relation to body outline, with some sophistication in mode of presentation; appropriate, even imaginative, detailing (e. g. , successful profiling, as young girl in evening clothes, well-dressed man with cigarette, etc. )

CHARACTERISTICS OF DRAWINGS REFLECTING LEVEL OF  
SOPHISTICATION: Marlens' Detail Analysis of the Sophistication-  
of-Body-Concept Scale. (49. 15)

---

A. Form Level

1. Primitive features

- a. Circles or ovals for body and limbs
- b. Triangular or rectangular body with limbs stuck on
- c. Other forms lacking attempt at human shape (e. g. ,  
absence of waist, shoulders, etc.)
- d. Limbs in form of sticks or ovals, shapeless, ending  
in pronglike or clawlike fingers; no shaping of hands;  
pronglike or clawlike toes
- e. Contact point of limbs to trunk involving overlapping  
or transparent joining; limbs stuck on or detached  
(as opposed to integrated body parts)
- f. Grossly unequally sized arms, legs, ears, fingers,  
etc. , combined with primitive form, uncontrolled  
lines
- g. Indiscriminately attached or misplaced body parts  
(e. g. , arms attached at center of trunk)

2. Sophisticated features

- a. Definite, shaped body outline; head, neck, shoulders  
well integrated into body outline and lead into  
trunk and appendages
- b. Attempt at humanlike shape, proportioning
- c. Adequate profiling (e. g. , trunk and legs facing in  
same direction, etc.)

B. Identity and sex differentiation

1. Primitive features

- a. Objectively interchangeable male and female figures
- b. Difference between figures only in hair and/or hat  
treatment
- c. Minimal inadequate trunk differentiation (i. e. ,  
triangle trunk for female, oval for male, but other-  
wise identical; or belt for male and buttons for  
female as only difference.)

2. Sophisticated features - marked and adequate role assign-  
ment, expressed in clothing and/or shape (also expressed  
in hair, features, appropriate accessories, uniforms, etc.)

C. Level of detailing

1. Primitive features

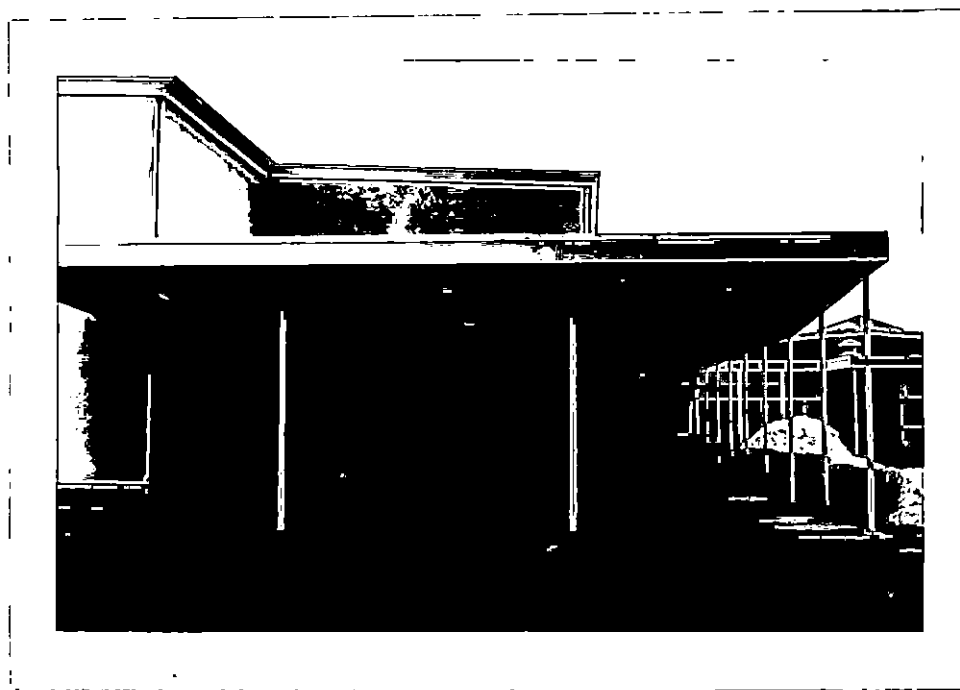
- a. Body parts omitted (e. g. , absence of neck, nose, ears, or eyebrows; fingers attached directly to arms with hands omitted)
- b. No clothing indicated
- c. Facial features expressed by dots or ovals
- d. Inadequate or consistent clothing (e. g. , buttons but no neckline, cuffs or hemline; hat, but no other clothing; toes shown in otherwise clothed figure; tie, but no neckline, etc. )

2. Sophisticated features

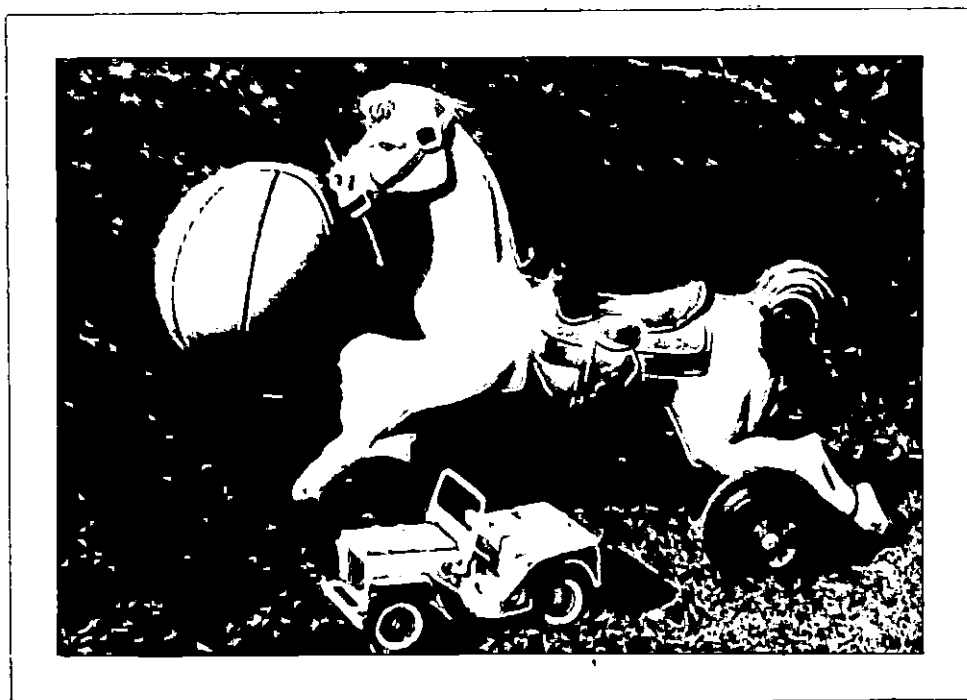
- a. Consistent, well-rationalized detailing; clothing; facial expression; shoes
- b. Figure cast in role with good attempt at presentation of action
- c. Figure cast in role with presentation of accessories consistent with this role (e. g. , cowboy with smoking gun, etc. )

## APPENDIX II

Photographs of slides used as visual stimuli  
for Drawings I, II and III



SLIDE I (Drawing I): Moffitt Elementary School



SLIDE II (Drawing II): Toys





SLIDE III (Drawing III): Child

## APPENDIX III

CRITERIA USED BY JUDGES FOR RATING DRAWINGS I, II  
AND III ON AN ANALYTIC-GLOBAL CONTINUUMGroupingsA. Size Relationships:

- |                   |  |
|-------------------|--|
| <u>Global</u>     | 1. No evidence of size relationships.  |
|                   | 2. Observable attempt to differentiated size relationships. A few objects (about twenty-five per cent) showing size relationships.       |
|                   | 3. Some observable differentiation in size relationships. About one half of the objects drawn in relation to the sizes of other objects. |
|                   | 4. Observable differentiated size relationships. Most objects drawn in relation to the sizes of other objects.                           |
| <u>Analytical</u> | 5. Definite observable differentiated size relationships. All or nearly all objects drawn in relation to the sizes of other objects.     |

B. Value Relationships:

- |               |  |
|---------------|--|
| <u>Global</u> | 1. Undifferentiated dark and light values.   |
|               | 2. Observable use of dark and light values to differentiate values.  |
|               | 3. Some observable use of dark and light values to differentiated objects. About one-half of the objects drawn correspond in value to the stimuli presented. |
|               | 4. Observable use of dark and light values to differentiate  |

objects. . Most objects drawn correspond in value to the stimuli presented.

- Analytical 5. Definite observable use of dark and light values to differentiated all or nearly all objects. Values used correspond closely to the stimuli presented.

C. Detail Relationships:

- Global
1. Minimal use of details; emphasis on the whole configuration rather than the parts of the object and their details.
  2. Observable use of detail and the relating of the parts to the whole drawing, however, they are barely discernible.
  3. Some use of detail and the relating of the parts to the whole drawing. About one-half of the objects drawn show differentiation by use of details within the object; parts of the objects related to the whole object; and, objects related to the total stimulus presented.
  4. Most of the drawing shows the use of details and the relating of the parts to the whole drawing. Most objects differentiated by the use of details within the object, most parts of the object related to the whole object; and, most objects are related to the total stimulus presented.
- Analytical 5. Observable use of detail and the relating of the parts to the whole drawing. Differentiation of each object by the use of details for clarification; parts of the object related to the whole object; and each object related to the total stimuli presented.

D. Space Relationships:

- Global
1. No evidence of spatial relationships.
  2. Observable attempt to differentiate spatial relationships. A few objects (about twenty-five per cent) showing spatial relationships.

- |                   |  |
|-------------------|--|
| <u>Analytical</u> | <ol style="list-style-type: none"> <li>3. Some observable differentiation in the placement of objects in their contained space. About half of the objects drawn in relation to other objects in their respective spatial positions.</li> <li>4. Observable differentiated space relationships. Most objects drawn in relation to other objects in their respective spatial position.</li> <li>5. Observable differentiation in the placement of objects in their contained space. All or nearly all of the objects drawn in relationship to other objects in their respective spatial position.</li> </ol> |
|-------------------|--|

E. Figure-Ground Relationships:

- |                   |  |
|-------------------|--|
| <u>Global</u>     | <ol style="list-style-type: none"> <li>1. No observable differentiation between figure and ground.</li> <li>2. Observable differentiation between figure and ground. A few objects (about twenty-five per cent) are differentiated from the space surrounding the object.</li> <li>3. Some observable differentiation between figure and ground. About one-half of the objects drawn are differentiated from the space surrounding the object.</li> <li>4. Observable differentiation between figure and ground. Most objects drawn are differentiated from the space surrounding the object.</li> </ol> |
| <u>Analytical</u> | <ol style="list-style-type: none"> <li>5. Definite observable differentiation between the figure and the ground. All or nearly all objects drawn are differentiated from the space surrounding the object.</li> </ol>  |

System of Rating and Scoring

1. Each student received a score for each category. Each drawing was rated on every criterion.
2. Correlations of the three drawings of an individual child on each category (A, B, C, D, E) were computed.

3. Correlations for each drawing between grades as well as within grades were computed.

Scoring Code Interpretation

A 1	Global	A - Size Relationship
A 2		
A 3	to	
A 4		
A 5	Analytical	

The higher the score, the greater the tendency of the child to interpret this type of visual information in an analytical mode.

The lower the score, the greater the tendency of the child to interpret this type of visual information in a global mode.

## APPENDIX IV

DISCUSSION OF JUDGES DURING THE TRAINING SESSION  
ON RATING DRAWINGS I, II AND III

In general the judges agreed that the use of the terms "twenty-five per cent," "about half," and "fifty per cent" were difficult to apply, especially between criteria two and three in each category.

The following discussion refers to categories and criteria within each category. Specific visual stimuli are mentioned when relevant.

## A. Size Relationship:

1. The judges never discussed size as a criteria assuming mutual agreement. However, they later discovered there were differences in agreement of the criteria. The term "about twenty-five per cent" seemed to be rather nebulous.

## B. Value Relationship:

1. There appeared to be close agreement in ratings by the judges on this category.
2. The judges agreed to rate as 1 drawings that were all light or all dark.
3. Individually drawn hair or solidly colored hair was not considered as shading, but as unintentional affect.
4. In reversals of value, the rating of 2 was given.

C. Detail Relationship:

1. Wording on criterion 2 was changed from "they are barely discernible," to "about twenty-five per cent use of detail."

D. Space Relationship:

1. The judges agreed on two ways of thinking about space in addition to the stated criteria:
  - a. The placement of objects left and right, up and down in relationship to each other.
  - b. The appearance of objects in depth or foreground and/or background.
2. The wording of criterion 1 was changed from "no evidence" to "barely discernible."

E. Figure-Ground Relationship:

1. On toys: overlapping was considered as evidence of figure-ground relationship.
2. Overlapping, but transparent objects were rated lower.
3. On school: evidence of figure-ground relationship if a baseline was evident; also if there was evidence of closure of form-lines connecting so as to relate to parts.

## APPENDIX V

SCORING FOR THE CONCEPTUAL STYLE TEST:  
CLASSIFICATION OF RESPONSES

Definition of Analytical concept: pairings based on similarity in an objective attribute that is a differentiated part of the total stimulus.

<u>Set No.</u>	<u>Pictures</u>	<u>Analytical Responses</u>
1	A, C	The watch and ruler both have numbers.
2	A, C B, C	The zebra and shirt have stripes. Each shirt has four buttons.
3	A, C	The house and the pipe have smoke coming out of them.
4	A, C	The man and woman are wearing hats. (or) He's wearing a hat and so is she.
5	A, B	The Indian and the hat have feathers.
6	A, C A, B	The shirt and the jacket have (six) buttons. The shirts have the same type of pocket or collar.
7	A, C A, B	The cat and the dog both have tongues sticking out. Both cats have their tails going around them.
8	A, C A, B	The leaf and the magazine are both torn. Both leaves have stems and veins.
9	A, C	The dog and the boy have no mouths.
10	A, C A, B	The woman and Indian have knives. Both wear shoes.





- 5        A, C        The man wears the hat.
- 6        A, C        You wear a shirt and then put a jacket over it.
- 7        B, C        The dog chases the cat.  
         A, C
- 8        A, B        You pick up fallen leaves from the ground.
- 9        A, B        The dog goes in the doghouse. (or)  
         The dog lives in the doghouse.
- 10       B, C        The Indian killed the deer with an arrow.  
         The Indian killed the deer.
- 11       A, C        The donkey chases the rabbit.  
         B, C        The rabbits play together.
- 12       B, C        The woman shot the man.  
         A, C        The man shot the man.
- 13       A, C        You sit on chairs.  
         A, B        This chair goes with this kind of table.
- 14       A, C        The boys are wearing the same type (style)  
         of clothing.  
         The boys are dressed alike.
- 15       B, C        The boy wears the glasses to help him see.
- 16       A, B        These two are brother and sister.
- 17       B, C        These two (giraffe and bear) live in a zoo.
- 18       A, B        The apple grows on the tree.  
         B, C        The ax chops down the tree.
- 19       A, B        The rake is used to rake the garden.

Definition of Inferential-Categorical Response: pairings that are based on some inferred quality or language convention. Use of conceptual label (class or categories of objects).

<u>Set No.</u>	<u>Pictures</u>	<u>Inferential-Categorical Responses</u>
1	A, C	Watch and ruler both measure something.
2	B, C	Two shirts.
3	B, C A, C	Both used for smoking. Both burning something.
4	A, B	Two men.
5	B, C	They're both alive; they're people. Both men.
6	A, B	They look alike. -- the same thing. They're both shirts.
7	A, B	Two cats -- they look alike.
8	A, B	Two leaves.
9	A, C	They are both living things.
10	A, C	Two people.
11	B, C	The same because they're both rabbits.
12	A, B	Two people have guns. Two people are alive -- or standing.
13	A, B B, C	Furniture. Chairs.
14	A, C	Two boys.
15	A, C	Both are living things.

- 16        A, C        They are alike; they're both boys.
- 17        A, C        They go together because they are dogs.  
          A, B        They go together because they are dogs.  
          A, C        Animals.  
          B, C        Animals.
- 18        B, C        Ax and tree are made of wood.
- 19        B, C        Shaped the same; use them for digging.

## APPENDIX VI

SUBJECT'S NUMBER, AGE IN MONTHS, GRADE, SCORES FOR  
 CONCEPTUAL STYLE TEST (CST), CHILDREN'S EMBEDDED  
 FIGURES TEST (CEFT), SOPHISTICATION  
 OF BODY CONCEPT TEST (SBC)

Subject's Number	Age in Months	I. Q.	Grade	CST	CEFT	SBC
100	99	127	2	7	18	2
101	98	103	2	12	21	2
102	99	121	2	13	22	3
103	96	107	2	15	16	1
105	97	110	2	15	18	3
106	100	113	2	11	22	3
107	101	122	2	19	25	4
108	108	113	2	15	14	1
109	102	105	2	18	19	2
110	94	78	2	12	11	2
111	98	78	2	13	19	2
111a	103	95	2	17	17	2
112	91	95	2	7	13	2
113	95	122	2	7	18	2
114	89	102	2	7	13	2
115	91	104	2	18	17	1
116	89	100	2	8	12	2
118	87	96	2	4	14	1
119	90	108	2	14	16	2
120	95	110	2	10	18	1
121	100	113	2	15	19	2
122	89	126	2	11	24	3
123	91	106	2	10	19	1
123a	93	104	2	17	13	2
124	103	105	3	8	18	3
125	107	97	3	17	24	2
126	107	126	3	18	20	3

Subject's Number	Age in Months	I. Q.	Grade	CST	CEFT	SBC
127	112	79	3	12	20	1
128	106	83	3	12	16	3
129	103	96	3	11	16	1
130	102	100	3	19	19	4
131	108	103	3	11	15	2
132	105	94	3	15	17	1
133	103	94	3	13	17	2
134	120	111	3	14	21	2
135	113	85	3	12	15	4
136	107	106	3	13	20	2
137	104	90	3	14	20	3
138	108	98	3	15	15	3
139	102	115	3	0	20	3
140	108	100	3	10	19	3
141	103	112	3	17	18	2
142	103	111	3	14	10	1
143	102	127	3	14	22	3
144	109	119	3	8	19	3
145	113	82	3	33	16	2
146	114	95	4	18	21	4
147	123	85	4	16	19	3
148	113	115	4	12	16	3
149	114	115	4	7	12	2
150	115	82	4	9	6	2
151	117	104	4	12	25	3
152	115	113	4	15	20	2
153	125	96	4	14	17	4
155	128	109	4	18	17	3
156	122	93	4	10	18	4
157	120	112	4	15	21	3
158	114	96	4	8	11	2
159	116	92	4	13	18	3
160	121	90	4	14	20	2
161	125	113	4	8	12	2
162	116	107	4	9	19	2
163	125	90	4	9	20	3
164	122	94	4	13	11	3
165	116	116	4	15	25	3
166	134	101	5	8	18	3

Subject's Number	Age in Months	I. Q.	Grade	CST	CEFT	SBC
167	134	99	5	15	20	4
168	138	73	5	13	16	3
169	138	98	5	15	18	3
170	129	70	5	13	16	3
171	139	72	5	12	12	3
172	122	95	5	11	19	3
173	132	91	5	13	18	5
174	134	97	5	11	22	3
175	132	107	5	14	23	4
176	134	106	5	7	21	2
177	130	84	5	13	12	3
178	126	100	5	7	13	3
179	128	95	5	14	22	3
180	132	101	5	13	18	3
181	125	111	5	12	18	2
182	132	89	5	12	16	3
183	124	111	5	14	19	3
184	134	90	5	10	16	3
185	131	75	5	16	19	2
186	127	83	5	16	19	4
187	125	116	5	9	23	3
188	132	110	5	13	21	3
189	129	91	5	17	19	3
190	123	114	5	8	22	4
191	153	119	6	10	20	2
192	146	96	6	11	16	4
193	146	122	6	1	23	4
194	146	101	6	9	9	3
195	155	119	6	4	23	4
197	142	90	6	11	24	3
198	149	119	6	10	22	4
199	149	95	6	13	24	4
200	146	115	6	13	25	4
201	147	93	6	15	16	3
202	144	127	6	6	23	5
204	136	135	6	9	20	5
205	142	103	6	10	18	2
206	141	118	6	5	23	3

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Subject's Number	Age in Months	I. Q.	Grade	CST	CEFT	SBC
207	146	105	6	17	20	4
208	144	112	6	16	24	4
209	148	112	6	11	15	4
210	141	106	6	4	15	2
211	142	112	6	16	22	3
212	139	110	6	16	24	2
213	144	83	6	4	21	2
214	147	95	6	15	16	2
215	136	104	6	4	23	2
216	139	111	6	9	17	2



APPENDIX VII

SUBJECT'S NUMBER, SCORES FOR EACH CATEGORY OF DRAWINGS I, II, III  
TOTAL SCORES FOR DRAWINGS I, II, III

Sub. No.	Drawing I					Drawing II					Drawing III					Total		
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	I	II	III
100	1	1	1	1	1	2	1	1	1	1	2	2	1	1	1	5	6	7
101	2	2	2	2	2	3	1	2	1	2	2	2	2	2	2	10	9	10
102	2	2	2	2	2	3	2	3	2	2	2	2	2	2	3	10	12	12
103	2	2	2	1	2	1	1	1	1	1	2	1	1	2	2	9	5	8
105	2	2	1	2	1	1	2	1	1	1	2	2	2	1	1	8	6	8
106	2	1	1	2	1	3	2	2	2	2	1	2	1	1	1	7	11	6
107	2	2	2	2	2	4	2	4	3	4	3	1	4	3	4	10	17	15
108	1	1	1	1	1	2	1	1	2	1	1	1	1	1	1	5	7	5
109	1	2	2	2	1	2	2	2	2	2	1	1	1	1	1	8	10	5
110	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	5	5	6
111	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	5	5	6
111a	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	5	5	6
112	1	1	1	1	1	2	2	2	2	2	1	1	1	1	1	5	10	5
113	2	2	2	2	1	2	1	2	2	1	2	1	2	1	1	9	8	7
114	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	6	5	5
115	2	2	2	1	1	2	2	2	1	1	1	2	2	1	1	8	8	7
116	1	1	1	2	1	1	1	1	1	1	2	1	1	1	1	6	5	6
118	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	5	5	7
119	2	2	1	2	2	2	1	1	1	1	1	2	2	2	2	9	6	9
120	2	1	1	1	1	1	1	1	1	1	2	1	1	1	1	6	5	6
121	2	1	1	2	1	2	2	2	2	2	1	2	1	2	2	7	10	8
122	3	2	3	2	2	2	2	2	2	2	3	1	2	2	2	12	10	10
123	1	1	1	2	1	2	2	1	1	1	1	2	2	1	1	6	7	7
123a	2	2	2	2	1	2	2	2	2	2	2	2	2	1	1	9	10	8
124	1	1	1	2	1	2	2	2	2	2	3	2	2	2	2	6	10	11

Sub. No.	Drawing I					Drawing II					Drawing III					Total		
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	I	II	III
125	2	1	3	2	3	1	1	2	1	2	2	1	2	2	2	11	7	9
126	3	2	2	2	2	2	2	2	2	2	2	2	2	3	3	11	10	12
127	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	8	5	5
128	2	1	1	2	1	2	1	2	2	2	2	1	2	2	1	7	9	8
129	1	2	1	1	1	2	1	1	1	1	2	1	1	1	1	6	6	6
130	2	1	2	3	2	1	1	3	2	3	3	1	3	3	3	10	10	13
131	1	2	1	2	2	1	2	1	1	1	1	2	1	1	1	8	6	6
132	1	1	1	1	1	1	1	1	1	2	1	1	2	1	2	5	6	7
133	2	2	2	2	2	1	2	1	2	1	1	1	2	2	2	10	7	8
134	2	2	2	2	2	3	2	2	2	2	2	1	2	2	2	10	11	9
135	2	1	2	2	2	2	2	2	1	2	2	2	2	2	2	9	9	10
136	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5	5
137	2	2	2	1	1	2	1	2	2	2	2	1	1	2	1	8	9	7
138	3	1	3	4	3	3	2	3	3	3	2	1	2	2	3	14	14	10
139	2	1	2	2	2	1	1	1	1	2	2	2	2	1	2	9	6	9
140	2	1	2	2	2	1	2	2	1	2	1	2	2	1	3	9	8	9
141	2	2	2	2	1	1	1	1	1	1	2	1	2	2	1	9	5	8
142	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	5	5	7
143	2	1	2	2	2	1	1	1	1	1	2	2	2	2	2	9	5	10
144	2	1	2	3	1	2	1	2	2	2	2	1	2	3	2	9	9	10
145	2	2	1	2	2	1	2	1	2	2	1	1	1	1	1	9	8	5
146	2	2	3	3	2	4	1	3	3	3	4	2	4	3	4	12	14	17
147	2	2	1	2	1	3	2	3	2	2	3	3	3	3	3	8	12	15
148	2	2	2	2	1	2	2	2	2	2	2	3	3	2	2	9	10	12
149	2	1	2	2	2	3	2	2	2	2	2	2	2	2	2	9	11	10
150	1	1	1	1	1	1	2	1	1	1	1	1	2	1	2	5	6	7
151	3	2	3	3	2	3	1	3	2	3	2	2	3	2	2	13	12	11
152	2	1	2	3	2	2	1	3	3	3	2	1	2	2	2	10	12	9
153	4	2	4	3	3	2	2	2	2	2	2	2	2	2	2	16	10	10

Sub. No.	Drawing I					Drawing II					Drawing III					Total		
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	I	II	III
155	3	2	2	2	2	4	1	4	4	3	2	1	2	2	2	11	16	9
156	2	1	2	1	2	3	2	3	2	2	3	1	3	2	2	8	12	11
157	2	2	2	2	3	4	4	3	4	4	3	2	2	3	3	11	19	13
158	1	2	1	1	1	1	2	1	2	1	1	1	1	1	1	6	7	5
159	2	1	1	2	1	1	2	1	1	2	2	1	2	2	1	7	7	8
160	1	1	1	1	1	2	1	2	1	2	1	2	1	1	2	5	8	7
161	2	2	1	2	2	1	2	1	1	1	1	1	1	1	1	9	6	5
162	2	2	2	2	2	2	1	2	2	2	2	2	1	2	2	10	9	9
163	2	2	2	3	2	2	1	3	2	2	2	2	3	2	2	11	10	11
164	2	1	1	2	2	2	1	3	1	2	2	1	2	2	2	8	9	9
165	2	2	2	2	2	2	2	3	2	2	2	1	2	2	1	10	11	8
166	2	1	2	2	2	2	1	1	2	2	1	1	1	1	1	9	8	5
167	2	1	1	1	1	2	1	2	2	2	2	1	2	2	2	6	9	9
168	2	1	2	1	2	3	1	3	3	2	3	2	3	2	2	8	12	12
169	2	1	2	2	1	2	1	2	2	1	2	1	2	2	2	8	8	9
170	2	1	2	2	1	3	2	2	3	2	2	1	3	2	2	8	12	10
171	1	1	2	1	1	2	2	2	2	2	2	1	2	1	1	6	10	7
172	1	1	2	1	1	2	1	1	1	1	2	1	2	2	2	6	6	9
173	2	1	2	2	2	3	2	3	2	2	2	2	3	2	3	9	12	12
174	3	1	2	2	1	2	1	2	2	2	2	1	2	2	2	9	9	9
175	3	2	2	2	2	3	1	3	3	2	2	1	2	2	1	11	12	8
176	2	2	2	2	2	3	2	3	3	3	2	1	1	2	2	10	14	8
177	1	2	2	2	2	2	2	2	2	2	2	2	2	1	2	9	10	9
178	2	2	2	2	2	1	1	1	2	1	1	1	2	1	2	10	6	7
179	3	1	2	2	2	2	2	2	2	2	1	2	2	1	2	10	10	8
180	3	1	3	2	2	3	3	4	3	3	3	1	5	3	3	11	18	15
181	3	1	2	2	2	2	1	1	1	2	1	2	2	1	1	10	7	7
182	3	2	3	3	2	2	1	2	2	2	2	2	3	3	2	13	9	12
183	2	2	3	2	2	4	2	3	2	3	3	2	3	3	3	11	14	14

Sub. No.	Drawing I					Drawing II					Drawing III					Total		
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	I	II	III
184	2	2	2	2	2	3	2	3	2	2	2	2	2	2	2	10	12	10
185	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	10	5	5
186	4	2	4	3	3	4	2	4	3	3	3	2	4	3	4	16	16	16
187	4	2	4	4	4	4	1	4	3	3	3	1	4	3	3	18	15	14
188	3	1	4	3	3	3	2	3	2	2	2	2	4	2	2	14	12	12
189	2	2	1	2	1	2	2	2	1	1	2	2	2	2	2	8	8	10
190	2	1	2	2	1	2	1	2	2	2	2	1	3	2	3	8	9	11
191	2	1	1	2	1	3	1	1	2	2	2	2	2	2	2	7	9	10
192	2	2	3	2	2	3	2	4	3	2	3	2	3	3	4	11	14	15
193	2	1	2	2	2	4	2	4	4	4	3	1	4	3	3	9	18	14
194	1	2	2	2	2	3	2	2	2	2	1	2	2	2	2	9	11	9
195	2	2	2	2	2	4	2	3	2	2	3	2	3	2	3	10	13	13
197	3	2	3	3	3	2	1	2	2	2	3	3	4	3	3	14	9	16
198	3	3	2	3	3	1	2	1	1	1	2	3	3	3	2	14	6	13
199	3	1	3	3	3	3	2	2	2	2	2	2	4	3	3	13	11	14
200	5	2	4	5	4	3	2	3	3	2	3	2	4	2	3	20	13	14
201	1	1	1	2	1	2	1	1	1	2	1	2	1	1	2	6	7	7
202	2	1	3	3	2	3	1	2	2	2	2	2	3	2	2	11	10	11
204	3	2	3	4	4	4	3	4	4	4	4	4	4	4	4	16	19	20
205	2	1	2	2	1	1	2	1	1	1	1	1	2	2	1	8	6	7
206	2	1	2	2	2	2	2	2	2	3	2	1	2	2	2	9	11	9
207	2	1	3	3	2	3	1	3	2	3	2	1	3	3	2	11	12	11
208	3	1	4	3	2	4	4	4	4	4	3	1	4	3	2	13	20	13
209	2	2	2	2	2	3	3	3	2	2	1	2	2	2	1	10	13	8
210	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	6	5	5
211	2	2	2	2	3	3	2	3	3	2	3	2	2	3	3	11	13	13
212	2	2	3	2	2	4	5	5	4	4	2	3	4	3	2	11	22	14
213	3	2	3	3	3	2	2	3	1	1	2	3	3	4	2	14	9	14
214	2	1	2	2	2	2	2	2	2	3	2	1	2	2	2	9	11	9
215	1	2	2	2	1	2	1	2	1	2	1	3	3	2	1	8	8	10
216	2	1	2	2	2	1	1	1	1	1	1	1	3	2	1	9	5	8

APPENDIX VIII

MEANS AND STANDARD DEVIATION FOR THE TOTAL GROUP AND  
EACH GRADE ON ALL MEASURES USED IN THE STUDY

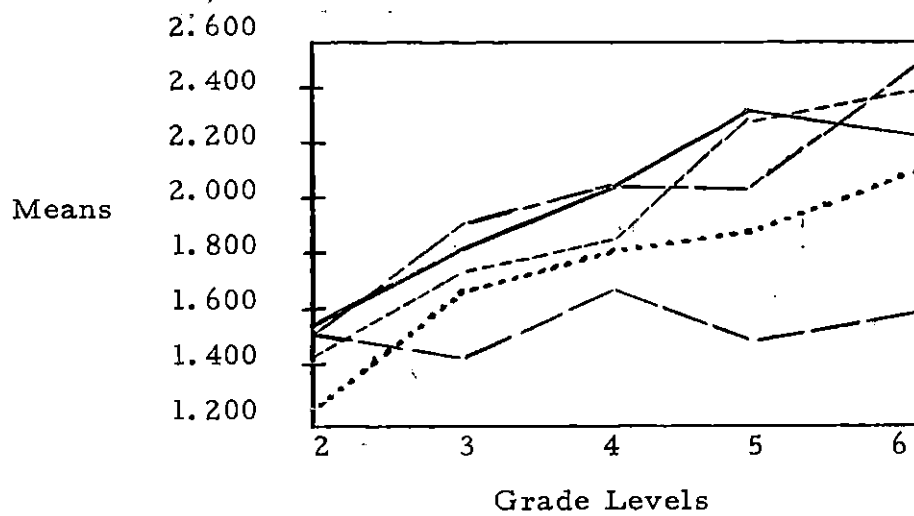
	N = 114 All Grades		N = 24 2nd Grade		N = 22 3rd Grade	
	MEANS	Standard Dev.	MEANS	Standard Dev.	MEANS	Standard Dev.
AGE	119.5877	18.2838	95.6250	5.3715	106.8571	4.6507
I. Q.	102.1364	13.1773	106.5833	12.7413	102.0476	13.6729
CST	11.8142	3.8604	12.2917	4.1753	12.8571	3.7052
CEFT	18.2105	3.9988	17.0000	4.3138	18.0455	2.9996
SBC	2.7193	.9455	2.0000	.7802	2.4091	.9081
I A	2.0000	.7642	1.5833	.5836	1.8182	.5885
I B	1.5088	.5195	1.5000	.5108	1.4091	.5032
I C	1.9386	.8124	1.4167	.5836	1.7273	.6311
I D	2.0000	.7526	1.5417	.5090	1.9091	.7502
I E	1.7368	.7414	1.2500	.4423	1.6364	.6580
II A	2.1579	.9555	1.8333	.8165	1.5000	.6726
II B	1.6053	.7117	1.4583	.5090	1.4091	.5032
II C	2.0614	.9802	1.5833	.7755	1.5909	.6661
II D	1.8596	.8295	1.4583	.5882	1.5000	.5976
II E	1.9123	.8044	1.4583	.7211	1.7273	.6311
III A	1.8947	.7331	1.6250	.6469	1.7273	.6311
III B	1.5789	.6503	1.5000	.5108	1.3636	.4924
III C	2.1754	.9524	1.5833	.7755	1.7727	.5284
III D	1.8772	.7659	1.3333	.5647	1.7273	.7025
III E	1.8947	.8241	1.4167	.7755	1.7727	.7516
I Total	9.1842	2.9104	7.2917	2.0951	8.5000	2.2200
II Total	9.6140	3.7215	7.7917	3.0357	7.7273	2.4139
III Total	9.4211	3.1480	7.4583	2.3953	8.3636	2.2370

	N = 19 4th Grade		N = 25 5th Grade		N = 24 6th Grade	
	MEANS	Standard Dev.	MEANS	Standard Dev.	MEANS	Standard Dev.
AGE	119.0000	4.7258	130.4400	4.5468	144.6667	3.8384
I. Q.	100.8947	11.2393	95.1600	13.4247	106.5714	11.6644
CST	11.8421	3.2705	12.2400	2.8030	9.9583	4.6483
CEFT	17.2632	4.9424	18.4000	3.1225	20.1250	4.0358
SBC	2.7895	.7133	3.1600	.6880	3.2083	1.0206
I A	2.0526	.7050	2.3200	.8021	2.2083	.8836
I B	1.6316	.4956	1.4400	.5066	1.5833	.5836
I C	1.8421	.8342	2.2800	.7916	2.3750	.8242
I D	2.0526	.7050	2.0400	.6758	2.4583	.8330
I E	1.7895	.6306	1.8400	.7461	2.1667	.8681
II A	2.3158	1.0029	2.4800	.8226	2.6250	1.0135
II B	1.6842	.7493	1.5200	.5859	1.9583	.9991
II C	2.3684	.8951	2.3200	.9452	2.4583	1.1788
II D	2.0526	.9113	2.1200	.6658	2.1667	1.0495
II E	2.1579	.7647	2.0000	.6455	2.2500	.9891
III A	2.0526	.7799	2.0000	.6455	2.0833	.8805
III B	1.6316	.6840	1.4400	.5066	1.9583	.8587
III C	2.1579	.8342	2.4800	1.0050	2.8333	.9631
III D	1.9474	.6213	1.9200	.7024	2.4583	.7790
III E	2.0000	.7454	2.0800	.7594	2.2083	.8836
I Total	9.3684	2.7327	9.9200	2.8856	10.7917	3.2701
II Total	10.5789	3.3386	10.5200	3.2675	11.4583	4.6436
III Total	9.7895	3.0656	9.9200	2.9143	11.5417	3.4638

## APPENDIX IX

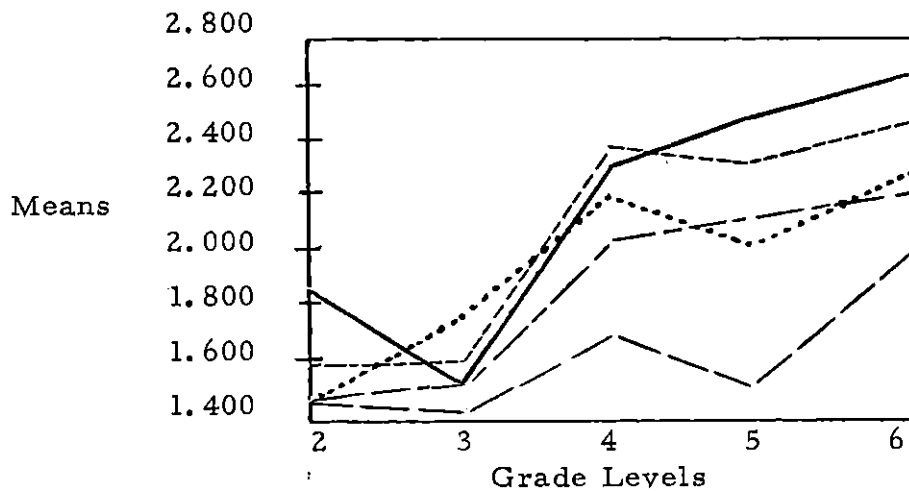
GRAPH V

MEANS ON FIVE CATEGORIES OF DRAWING I  
FOR GRADE LEVELS



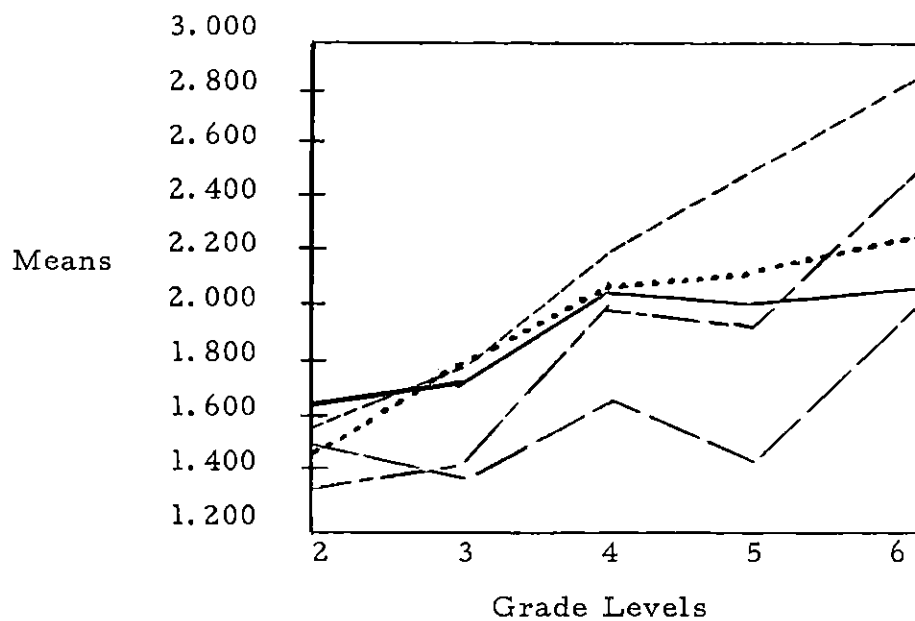
GRAPH VI

MEANS ON FIVE CATEGORIES OF DRAWING II  
FOR GRADE LEVELS



GRAPH VII

MEANS ON FIVE CATEGORIES OF DRAWING III  
FOR GRADE LEVELS



## Legend

- A. ————— : Size Relationships  
 B. - - - - - : Value Relationships  
 C. - . - . - . : Detail Relationships  
 D. - - - - - : Space Relationships  
 E. . . . . : Figure - Ground Relationships



APPENDIX X

F-RATIOS ON THE CST, CEFT, SBC AND DRAWINGS I, II, III  
BETWEEN GRADES\*

GRADE	CST	CEFT	SBC	DRAWING I	DRAWING II	DRAWING III
2					.006	
3	.228	.894	2.699	3.607		1.746
2	.148					
4		.035	11.702*	7.967*	8.187*	7.847*
2	.003					
5		1.704	30.537*	13.217*	9.150*	10.386*
2	3.347					
6		6.716*	21.233*	19.492*	10.483*	22.563*
3	.836	.387				
4			2.173	1.260	10.011*	2.947
3	.413					
5		.156	10.354*	3.500	10.848	4.129
3	5.246*					
6		3.875	7.816*	7.590*	11.370*	13.387*
4					.004	
5	.188	.870	3.034	.413		.021
4	2.238					
6		4.373*	2.303	2.316	.483	2.999
5	4.371*					
6		2.814	.038	.981	.674	3.155

\*F-Ratio of 4.08 is significant at .05 with 40/1 d. f.

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