A STUDY OF CATEGORICAL BEHAVIOR OF PRESCHOOL CHILDREN EXHIBITED DURING SPONTANEOUS PLAY: AN OBSERVATIONAL STUDY

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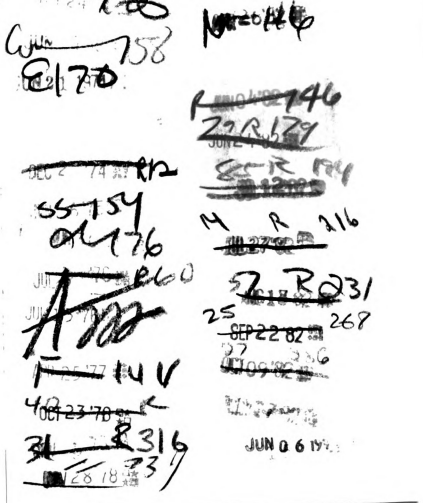
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ABSTRACT

A STUDY OF CATEGORICAL BEHAVIOR OF PRESCHOOL CHILDREN EXHIBITED DURING SPONTANEOUS PLAY: AN OBSERVATIONAL STUDY

By

Leah Kunkle Acus

The purpose of this observational study was to investigate the categorical behavior of preschool children, exhibited during their spontaneous play. During a pilot study engaged in by the writer prior to this formal study, it was found that preschool children do make categorical judgments concerning their environmental surroundings and that they do so in great enough frequency to allow for a study of such categorical behavior.

The writer chose specified types of categorizations made by preschool children for study. These included categorizations based on descriptive criteria of color, shape, size, mass, physical composition and number; and categorizations based on relational-contextual criteria.

Three-, four-, and five-year-old children participating in a cooperative nursery school program were observed by the writer during their free-play (spontaneous play)

period. On-the-spot recordings, both written and tape recorded were used to collect all verbal responses made by the children selected for observation during event sampling procedures, structured by time interval boundaries. The recorded dialogue was then examined and verbal responses indicating categorical behavior determined by the specified descriptive and relational-contextual criteria were extracted and used in the analysis.

It was hypothesized that there would be no difference between three-, four-, and five-year-old children in the kinds and frequencies of categorizations made while engaged in spontaneous play. It was also hypothesized that there would be no difference in preference for categorizations made using descriptive criteria over categorizations made using relational-contextual criteria by three-, four-, and five-year-old children. Lastly, it was hypothesized that there would be no difference between girls and boys in the frequencies of their categorizations depending on specified types of criterion.

The results of the study indicated that there was a difference in the kinds and frequencies of categorizations made by three-, four-, and five-year-old children while engaged in spontaneous play. An increase in age was associated with an increase in frequencies of categorizations based on both descriptive criteria and on relational-contextual criteria. Descriptive criteria of color, size,

shape, mass, physical composition and number, when analyzed separately, did not produce the consistant frequency increases with increases in age. The inconsistant increase in frequencies associated with an increase in age was thought, by the writer, to be due to the small cell frequencies associated with each individual criterion when analyzed separately.

The study indicated that there was a difference in the preference for certain types of criteria by three-year-old children, four-year-old children and five-year-old children. Three-year-old children preferred the use of descriptive criterion over relational-contextual criterion. The four-year-old children and five-year-old children preferred the use of relational-contextual criterion over the use of descriptive criterion.

The test of the final hypothesis indicated that there was a difference between girls and boys in the frequencies of some types of criteria. The frequency of descriptive criteria was found to be the same for boys and girls; while the frequency of relational-contextual criteria for boys was greater than that for girls. The frequency of the use of color criteria was greater for girls than for boys. The frequency of the use of criteria of shape was greater for boys than for girls. The frequency between boys and girls in the use of size criteria was not found to be different.

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CHAPTER I

INTRODUCTION

Need For The Study

In an editorial for the Phi Delta Kappan special issue on early childhood education, Harold Shane writes on the renaissance of early childhood education. Shane points out that for centuries great educators such as Comenius, Pestalozzi, Froebel, and Montessori intuitively sensed the importance of children's experiences before the age of six.[1] Also, during the past 40 years, nursery and pre-school specialists have made a strong case for the guidance of boys' and girls' early learning. James Hymes and Laura Zirbes are representative of the many contemporary figures who, beginning in the 1920's, made important contributions to pre-school practices. Sometimes this was accomplished through research, but more often through reasoned conjectures based upon empirical study and personal insight.

Despite enthusiastic supporters and available literature before 1960, no priority and frequently no heed was

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[1]Harold G. Shane, "The Renaissance of Early Childhood Education," Phi Delta Kappan, Vol. L, (March, 1969), p. 369.

given by the public shcools or the general community to the development of programs for children from age two through age five. However, the confluence of events and circumstances of recent years have led to the present revival of interest in the young child which holds promise for the long delayed provision for education of two-to-five-year olds.

> A major contemporary development in education, one which seems certain to influence public schools in the 1970's, is the widespread reawakening of interest in the very young child.[1]

James Hymes speaks of this new interest in young children in his address presented at the 1966 Conference of the National Association for the Education of Young Children. He says, "Today's interest in young children exemplifies the increasing focus on nursery education."[2]

Because of this new interest in young children, we are seeing more research being conducted and new innovations and programs being developed in reference to the young child. In order to provide useful information for persons participating in preschool programs, as to what elements facilitate the growth and development of young children, persons engaged in research must continue to explore and investigate

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[1] Ibid., p. 369.

[2] James L. Hymes, Jr., "Emerging Patterns in Early Childhood Education," Ideas That Work With Children, ed. by Katherine Read Baker (National Association for the Education of Young Children, 1972), p. 28.

an enormous array of factors which contribute to the growth and development of young children.

One aspect of childhood education is the phenomenon known as play. There is at this time, no definition of play which is so all-inclusive as to fit the needs and theories of all those who attempt to explain and explore this phenomenon known as play. For this reason, the researcher and writer must select a definition of play which has been proposed by others, or create one of his own which fits his individual needs and purposes. The writer of this research paper has borrowed a definition of play from Lowenfeld, who defines play as:

> . . . all activities of children that are spontaneous and self-generated; that are ends in themselves; and that are unrelated to 'lessons' or to the normal physiological needs of a child's own day.[1]

Although the writer of this paper has selected Lowenfeld's definition of play, a definition borrowed from several other writers on the subject of play, would have served equally well the needs of this study, as they are very similar in content. Frank, Isaacs, Almy, Biber, and Hartly are examples of the many writers whose definition of play is very similar to the definition proposed by Lowenfeld.

Often included in writings on early childhood education, is information regarding the contribution play makes

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[1]Margaret Lowenfeld, Play in Childhood (New York: John Wiley & Sons, Inc., 1967), pp. 36-37.

to a number of factors felt important in the growth and development of children. John Dewey devotes a chapter to a discussion of the value of play in education, in his book entitled Schools of Tomorrow. He says of play:

> The educational value of play is obvious. It teaches the children about the world they live in. The more they play the more elaborate becomes their paraphernalia, the whole game being a fairly accurate picture of the daily life of their parents in its setting, clothed in the language and bearing of the children.[1]

Lawrence Frank lends support to the contention that play is important in education, when he writes that, "Play is the finest form of education because it is essentially personality development, whereby the individual organism becomes a human being willing to live in a social order and in a symbolic cultural world."[2] The value of play in education gains further support from Barbara Biber who says that, "The free dramatic play of children during these early years serves as an extraordinarily effective mechanism by which they find release from emotional pressures at the same time that they clarify experience in the world."[3] There are

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[1]John Dewey, Schools of Tomorrow (E. P. Dutton & Co., Inc., 1915), p. 79.

[2]Lawrence Frank, "Play In Personality Development," p. 589.

[3]Barbara Biber, "The Five to Eights and How They Grow," Childhood Education, Vol. XVIII (Oct., 1941), p. 67.

scores of books written on early childhood education that emphasize the importance of play in the young child's life.[1,2]

Bower writes that, "Play is important, indeed mandatory, for animal and human existence. Young monkeys deprived of play show more serious developmental and functional deficits than those deprived of mothering."[3] Harlow found that infant monkeys brought up in small cages, with only their mothers for the first seven months of life, showed no interest in other infants when given the opportunity, and were less likely to develop normal adult sexual behavior than infants brought up on surrogate mothers, but together with age-mates.[4]

Although there is strong support, in the form of reasoned conjectures, for the contention that play contributes to the growth and development of young children, there is much less empirical evidence to support the claim. Over 30 years ago, Margaret Lowenfeld expressed the need for

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[1]Verna Hilderbrand, Introduction to Early Childhood Education (New York, The Macmillan Co., 1971).

[2]Elizabeth B. Hurlock, Child Development, (New York: McGraw-Hill Book Co., 1956, 1964).

[3]Eli M. Bower, "Play's the Thing," Today's Education - NEA Journal (September, 1968).

[4]H. F. Harlow, Maternal Behavior in Mammals, ed. by H. L. Reingold (John Wiley, 1963), Chapter VIII.

intensive study of children's play in her observation that:

> There is hardly any feature of human life to which so little serious consideration has been given as that of children's play.[1]

Herron and Sutton-Smith in 1971 stated that, "Margaret Lowenfeld's observation is as true today as when she stated it over 30 years ago. Yet some progress has been made and scientific interest in the phenomenon of 'child's play' has picked up noticeably in the last decade."[2]

Although the research on play may be limited, a great deal of theoretical attention, in the form of theories of play, has been paid to play behavior. The first formulations of theories of play were undertaken during the mid- and late-nineteenth centruy. One of the oldest theoretical statements concerning the significance of play is attributed to Spencer. His theory is usually referred to as the 'surplus energy theory' of play. Briefly stated, this theory holds that play is the result of a surplus of energy, a surplus that exists because the young are freed from the business of self-preservation through the actions of their parents. The energy finds its release in the aimless exuberant activities that we term play.[3] Soon after Spencer

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[1]Lowenfeld, op. cit., p. 9.

[2]R. E. Herron and Brian Sutton-Smith, Child's Play (New York: John Wiley & Sons, Inc., 1971), preface vii.

[3]Herbert Spencer, Principles of Psychology II (New York: P. Appleton & Co., 1899).

presented his theory on play, Karl Groos proposed a theory of play known as the pre-exercise theory. He regarded play as the expression of instinct, and particularly of that form of instinct which impels the young to train themselves in infancy for the roles they are to play in maturity.[1] At about the time Karl Groos' pre-exercise theory was becoming known, G. Stanley Hall put forth his recapitulation theory, which saw play not as an activity that developed future instinctual skills, but rather one that served to rid the organism of primitive and unnecessary instinctual skills carried over by heredity. Hall was the first to conceive of stages of play. He postulated that each child passes through a series of play stages corresponding to, and recapitulating, the cultural stages in the development of races.[2]

The three theories of play mentioned briefly are classical theories of play. They are classical insofar as all of them view the specific content of play behaviors as being more or less incidental to the cause of play generally. The newer theories of play differ from the classical play theories primarily in that they invoke explanations of play behavior based on dynamic factors of individual

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[1]Karl Groos, Play of Man, (Trans. by E. L. Baldwin), (New York: Appleton, 1901).

[2]G. Stanley Hall, Aspects of Child Life and Education (Boston: Ginn and Company, 1907).

personality and they are geared to explaining individual shifts in play behavior. Included in these newer theories of play is Piaget's theory of play and the psychoanalytic theories of play.

Piaget's theory of play is closely bound up with his account of the growth of intelligence. Piaget postulates two processes which he believes to be fundamental to all organic development: assimilation and accommodation. Assimilation refers to any process whereby the organism changes the information it receives, in the process of making it part of the organism's know-how. Accommodation means any adjustment the organism has to make to the external world in order to assimilate information. Intellectual development is due to the continual, active interplay between assimilating and accommodating. Intelligent adaptation occurs when the two processes balance each other, or are 'in equilibrium.' When they are not, accommodation or adjustment to the object may predominate over assimilation. This results in imitation. Alternatively, assimilating--fitting the impression in with previous experience and adapting it to the individual's needs--may predominate. This is play. It is pure assimilation which changes incoming information to suit the individual's requirements. Play and imitation are an integral part of the development of intelligence, and, consequently, go through the same stages. Piaget's theory gives play a clear biological function as active

repetition and experiment which 'mentally digests' novel situations and experiences.[1] Further discussion of Piaget's theory, as it relates to the intellectual development in young children is dealt with in a later section of this paper.

Gilmore traces the beginnings of psychoanalytic theories of play to the cathartic theory of play. The cathartic theory views play as reflecting the child's attempt to master situations that at first are too much for him. The psychoanalytic theory of play is a special case of the more general cathartic theory. The psychoanalytic play theory was first introduced by Freud in the early 1900's. Freud thought of play as being closely related to phantasy behavior; in fact he defined play as phantasy woven around real objects (toys), as contrasted with pure phantasy, which is daydreaming. Play, for Freud, shares many of the unconscious determinants that shape dream life. He speaks of children's play as arising from a source of painful encounters that have passively suffered. Play arising from this source does so in accordance with an inherited tendency to repeat, over and over, any experience that has been too much for the child.[2] The most direct influence of Freud's view

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[1]Jean Piaget, Play, Dreams and Imitation in Childhood (New York: W. W. Norton & Co., Inc., 1962).

[2]J. Barnard Gilmore, "Play: A Special Behavior," Current Research in Motivation, ed. by Ralph Haber (Holt-Rinehart, 1966), p. 343-354.

on play was on the various forms of therapy used with disturbed children, which were derived from psychoanalysis. Most of these used spontaneous play as an aid to communicating with the children or simply in order to observe them.

Erikson is well known for his contributions to a psychoanalytic theory of play. While agreeing with Freud regarding the major sources of play, Erikson has emphasized the coping effects of play, saying, "I propose the theory that the child's play is the infantile form of the human ability to deal with experience by creating model situations and to master reality by experiment and planning."[1]

Although there are many theories of play, there is much less scientific research on the subject of play. One exception to this observation is the abundance of studies conducted in the area of play therapy. The beginnings of play therapy may be traced back to Freud, who proposed his psychoanalytic theory of play in the early 1900's. Freud was the first to use play in the treatment of young children. Klein was another pioneer in the use of psychoanalysis of children. She used spontaneous play in her therapy, assuming that what the child does in free play symbolizes the wishes, fears, pleasures, conflicts, and preoccupation of which he is not aware.[2]

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[1]Erik H. Erikson, Childhood and Society (New York: Norton, 1950), p. 195.

[2]Millar, op. cit., p. 30.

These early approaches to the treatment of disturbed children marked the beginning of the techniques known as 'play therapy.' A great number of different kinds of therapy have grown up, some with only tenuous links to the original concepts or techniques. After the early 1930's, the interest in play was largely channeled by psychoanalytic interpretations and implemented through doll-play techniques.

There are a number of play techniques used for therapeutic purposes. Doll-play has been used and studied extensively as to its therapeutic value. A summary review of the literature on doll-play is given by Levin and Wardwell.[1] Axline[2] is actively involved in the study of nondirective play therapy in the treatment of problem children.

Millar points out the fact that up until the last decade, the majority of publications on children's play have been almost entirely concerned with the use of play as a technique for personality research and in the diagnosis and treatment of disturbed children.[3] Isaacs tells of the contribution that psychoanalytic studies of young children

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[1]H. Levin and E. Wardwell, "The Research Uses of Doll Play," Psychological Bulletin, Vol. 59, 1961, 27-56.

[2]Virginia M. Axline, Play Therapy (New York: Ballantine Books, Inc., Rev. ed. 1969).

[3]Millar, op. cit., p. 30.

have made to the understanding of children's play in her statement that:

> It has remained for psycho-analysts, and in particular those working with young children, to show in the greatest detail how play is indeed the breath of life to the child, since it is through play activities that he finds mental ease, and can work upon his wishes, fears and phantasies, so as to integrate them into a living personality.[1]

Isaacs makes a plea for educators saying, "The function of the educator with regard to play lies in the study of the normal interests and activities of the child at different ages, so that he may know how to supply those materials and opportunities and stimuli to play as shall give him the greatest fulfillment along all directions of his growth. It is here that the study of norms of development in the early years, with regard to skill or understanding, is of greatest possible aid to the educator of little children."[2]

As indicated earlier in this paper, there are few empirical studies of play as it relates to the social, emotional, physical, and intellectual development of young children. Despite this lack of research on play, practicing educators have recognized the value of play as it relates to certain aspects of child growth and development.

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[1]Susan Isaacs, Social Development in Young Children (London: Routledge & Kagan Paul Ltd., 1933, Rev. Ed. 1967), p. 425.

[2]Ibid., p. 425.

However, educators often place exclusive emphasis on the contributions of play to the child's emotional development and social learning, failing to recognize the contribution play makes to the intellectual development of young children. Robison and Spodek support this observation, saying:

> . . . in years past, educators of young children understood 'child development' as an approach to their physical, social and emotional growth. While intellectual growth was always added to the list, teachers' concerns for social and emotional growth were regarded as primary, with intellectual growth as an expected result but requiring little of the teachers' time in planning and programmings. However, a new imbalance was created in which childrens' need for intellectual content was largely ignored.[1]

Kenneth Wann, in his book, Fostering Intellectual Development in Young Children, says that, "Sound physical, social, and emotional development must receive adequate attention today as always. This is not enough, however. There is mounting evidence that intellectual development of children at these ages must come in for its share of attention at this time."[2]

It is important to recognize that in the literature on play, two different forms of play are often mentioned.

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[1]Helen F. Robison and Bernard Spodek, New Directions in the Kindergarten (New York: Teachers College Press, Columbia University, 1965), p. 3.

[2]Kenneth D. Wann, Miriam Selchen Dorn, and Elizabeth Ann Liddle, Fostering Intellectual Development in Young Children (New York: Bureau of Publications, Teachers College, Columbia University, 1962), p. 2.

Millie Almy identifies these two forms of play. She says the first form of play is adult-prescribed activity, initiated and directed by the teacher and the nature of the equipment. The second form of play is activity that is self-initiated by the child. It is lacking in structure other than that given it by the child's interests and imagination.[1] Almy's second form of play--play which is self-initiated by the child, is the one to which this research study is concerned. This form of play is also commonly known as spontaneous play.

There is support for the idea that there are cognitive aspects involved in the spontaneous play of young children. In the modern era, Piaget's work has been the primary exponent of play as a cognitive activity. It is through his work that one may gain information concerning play and its relation to cognitive development in young children. Piaget sees learning as a series of adaptive processes which consists of accommodation, in which the child's behavior, or more specifically his thinking, conforms to the outer reality; and of assimilation, in which the child internalizes the information, thus gained, into this already existing systems of meaning. Assimilation--the fitting of impressions in with previous experiences

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[1]Millie Almy, "Spontaneous Play: An Avenue for Intellectual Development," The Bulletin of the Institute of Child Study (Toronto, Ontario: University of Toronto, May, 1969), p. 266.

and adapting them to the individual's needs, often predominates. This is play. It is pure assimilation which changes incoming information to suit the individual's requirements.[1] Hunt says that, "Piaget's observations and experiments indicate that the behavioral and thought structures comprising intelligence are continually changing as a consequence of the accommodation and assimilation involved in a person's encounters with his environment.[2] Gilmore hypothesizes that on the basis of Piaget's theory, if play behavior were to be prevented somehow--a difficult thing since the sources of play are presumed to be internal--then many fewer abilities and concepts would remain available to the child.[3] Piaget seems to suggest that structured play may not be sufficient, particularly for the younger children in their learning process. The reason for this lies in the child's own egocentric and affect-laden way of thinking. The construction of logical thought depends not only on the child's activity with material things but also on his social collaboration with other children . . . Clearly, Piaget's theoretical formulations regarding the function of play in

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[1]Jean Piaget, Play, Dreams and Imitation in Childhood (New York: W. W. Norton & Co., Inc., 1962).

[2]J. McVicker Hunt, Intelligence and Experience (New York: The Ronald Press Co., 1961), p. 246.

[3]J. B. Gilmore, "Play: A Special Behavior," Current Research in Motivation (New York: Holt, Rinehart, & Winston, 1966), pp. 343-355.

the intellectual life of the child can be used to support the contention that spontaneous play has a legitimate place in the nursery school.[1]

Susan Isaacs had been interested in the intellectual development of young children engaged in spontaneous play. She gathered observational data of children's cognitive behavior directly from children engaged in spontaneous play. After having brought together the notes on cognitive behavior of the group of children, she ordered and classified the mass of play incidents indicating cognitive behavior. Within this continuous activity, certain broad types of behavior were made out. Isaacs divided these broad types of cognitive activities into groups: applications of knowledge, increase of knowledge, and social interchange of knowledge, so as to make her overwhelming number of observations of cognitive activity of children more manageable and thus more understandable.[2]

Kenneth Wann is another who has been actively investigating the intellectual development of young children engaged in spontaneous play. Wann and colleagues studied young children's intellectual development, stated several hypotheses, one of which was that young children collect

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[1]Piaget, op. cit., pp. 166-167.

[2]Susan Isaacs, Intellectual Growth in Young Children (New York: Schocken Books, 1930.

information which they test and use in conversation and dramatic play. They proceeded to test these hypotheses by observation and experimentation. Testing of the hypotheses consisted of finding evidence that children three, four, and five years of age were capable of the behaviors described in the hypotheses. The analysis consisted of classifying the recorded behaviors in order to find support for each of the stated hypotheses. Wann says:

> Young children learn best when they are actively involved in first-hand experiences; when they can play out or work out an experience; and when new or old activities are commensurate with their developmental needs and abilities. Play is a young child's way of learning. Through play the child meets new situations, sets out to understand them, and in the process gains new understandings and skill in problem solving.[1]

Although there is substantial support for the idea that there is cognitive value to be found in the spontaneous play of young children, this idea has been generally overlooked by researchers as an area worthy of study. The need for studies of play as it relates to the intellectual development of young children is expressed by Hunt, who says, "The problem for the management of child development is to find out how to govern the encounters that children have with their environments to foster both an optimally rapid rate of intellectual development and a satisfying life . . . It might be feasible to discover ways to govern

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[1]Wann, op. cit., p. 137.

encounters that children have with their environments, especially during the early years of their development. Inasmuch as the optimum rate of intellectual development would mean also self-directing interest and curiosity and genuine pleasure in intellectual activity, promoting intellectual development properly need imply nothing like the grim urgency which has been associated with 'pushing' children."[1] Almy, also urges educators to nurture the cognitive elements in spontaneous play, saying:

> Is spontaneous, free-flowing, self-initiated play to be replaced by structured play where the cognitive culmination can be clearly foreseen (by the adult at least) from the outset? Perhaps--if nursery educators and their colleagues fail to appraise adequately the cognitive elements in spontaneous play, and if nursery teachers continue, as some have in recent years to abdicate their responsibility for nurturing these elements.[2]

Sutton-Smith recognizes the need for research studies on play stating that, "If we want to rescue the field of play from cognitive child labor, we have a lot of hard research work to do. What I am arguing for really is the recognition that the phenomenon of play be recognized as having a qualitative character in its own right and be studied as such."[3]

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[1]J. McVicker Hunt, Intelligence and Experience (New York: The Ronald Press Co., 1961), p. 362.

[2]Almy, op. cit., p. 267.

[3]Brian Sutton-Smith, "The Playful Modes of Knowing," Play: The Child Strives Toward Self-realization (National Association for the Education of Young Children, 1971), p. 24.

The Problem

In the nursery school programs which view spontaneous play as an avenue for intellectual growth in young children, the development of skills and competencies is promoted largely through play, supported by a variety of materials and a wide range of experiences; under the guidance of teachers who understand and value play as an avenue for learning.

> The whole panorama of life is lived over again in the play of children. If there is any way of gaining knowledge particularly suitable to this stage of development, it is in the play which they spontaneously devise but which needs an attentive teacher for its support and nourishment.[1]

In this statement, Biber points out the role of the teacher in facilitating learning through play initiated by the children. By providing materials, experiences, and by offering questions, suggestions, and encouragement, she helps the child become more aware of possiblities for play and better able to perceive clearly the problems to be solved in play.

Teachers can only take on the role described above if they have adequate information concerning cognitive growth in young children. One aspect of cognitive growth in young children is concept formation. The process of

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[1]Barbara Biber, "Young Deprived Children and Their Educational Needs" (Washington, D.C.: Association for Childhood Education, International Bulletin, J., 1967), p. 6.

concept formation has been a subject of study for many years. There is, however, a lack of agreement as to the nature of concepts and about the process by which they develop. Many agree, however, that concepts are built by a process of seeing relationships, categorizing, discriminating, and generalizing about those things which the child sees, hears, and feels in his environment.[1] Piaget prefers to call the discriminations children make, categorical or classificatory behavior.[2]

In order to make differentiations or categorical judgments to members of a collection, the child chooses some criterion for this differentiation. This criterion may be of the simpler, perceptual type such as color, size, and shape; or it may require a higher level of abstract thinking, such as roles different people play in society, the abilities different objects possess, or the functions different animals perform.

Young children engaged in spontaneous play exhibit such categorical behavior daily in their play as is evidenced by the recorded dialogue of young children (Piaget, Isaacs, Wann). However, children differ in the kinds of categorizations they make during spontaneous play. If the teacher is

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[1]Wann, op. cit., pp. 11-12.

[2]Jean Piaget and Barbel Inhelder, The Early Growth of Logic in the Child (New York: W. W. Norton and Company, Inc., 1964).

to provide learning environments conducive to cognitive development, which is dependent upon an array of elements, including discrimination learning; she must have information concerning the categorical behavior of children engaged in spontaneous play.

The purpose of this study is to determine the nature of the criterion chosen by children ages three to five years old in the categorizations they make during spontaneous play. The study is based on the hunch that children, depending upon their age and sex, vary in their selection of criteria for the categorizations they make during spontaneous play.

Definition of Terms

The terminology employed in the hypotheses developed for this study, and used throughout the narrative is, in some instances, unique. Thus the following definitions are provided:

1. Spontaneous Play: An activity engaged in by two to four children, which is initiated and carried through by the children themselves.
2. Three-year-olds: Those children who were born after January 1, 1967, and before January 31, 1968.
3. Four-year-olds: Those children who were born after January 1, 1966, and before January 1, 1967.
4. Five-year-olds: Those children who were born after January 1, 1965, and before February 1, 1966.

5. Criterion for categorization: Distinguishing characteristics of objects, animals, and persons noticed by the child, which sets them apart from other objects, animals, and persons. In this study, these characteristics may be either perceptual characteristics or conceptual characteristics.
6. Perceptual categorization: A categorization made on the basis of perceptual discriminations, i.e., color, form, size, mass, weight, and shape.
7. Conceptual categorization: A categorization made on the basis of conceptual discrimination, i.e., role, function, abilities and personal attributes of objects, animals, and persons.
8. Descriptive classification: Classification based on physical criteria, such as form, color, or structure.
9. Relational-contextual classification: Classification made on the basis of the interdependence of items in an array. Items are related by virtue of use--you use a match to light a cigarette.

Objectives of the Study

This investigation is an observational study undertaken for the purpose of identifying the nature of the categorizations made by children while engaged in spontaneous play. The objectives of this study are:

1. To identify the kinds of categorizations made by young children while engaged in spontaneous play, who are:
    a. three-years-old.
    b. four-years-old.
    c. five-years-old.
2. To determine the frequencies of the different kinds of categorizations made by young children while engaged in spontaneous play, who are:
    a. three-years-old.
    b. four-years-old.
    c. five-years-old.
3. To determine the extent of preference for different kinds of categorizations as exhibited in the spontaneous play of:
    a. three-year-olds.
    b. four-year-olds.
    c. five-year-olds.
4. To determine the extent of preference for different kinds of categorizations as exhibited in the spontaneous play of:
    a. girls.
    b. boys.
5. To confirm or disconfirm the available research evidence (obtained through testing techniques) on the categorical behavior of young children.

Hypotheses

I. There will be no difference between three-year-old children, four-year-old children, and five-year-old children in the kinds of categorizations made while engaged in spontaneous play.

II. There will be no difference between three-year-old children, four-year-old children, and five-year-old children in the frequencies of their categorizations of the following types:

a. total categorizations (descriptive and relational-contextual).

b. total descriptive categorizations (color, size, shape, mass, physical composition, and number).

c. total relational-contextual categorizations.

d. color

e. size

f. shape

g. mass

h. physical composition

i. number

j. total of descriptive criterion of the following type: color, size, and shape in comparison to total descriptive criterion of the following type: mass, physical composition, and number.

III. There will be no difference in preference for categorizations made using descriptive criteria over

categorizations made using relational-contextual criteria by three-year-olds, four-year-olds, and five-year-olds.

IV. There will be no difference between girls and boys in the frequencies of their categorizations using criteria of the following types:

a. descriptive

b. relational-contextual

V. There will be no difference between girls and boys in the frequencies of their categorizations using descriptive criteria of the following types:

a. color

b. size

c. shape

Limitations

The present study suffers from certain limitations. These limitations stem from the disadvantages associated with studies of intact groups. The number of participating children in each age group was small. It is difficult to locate large groups of preschool children for study, due to the fact that it is generally considered desirable, for a number of reasons, to maintain groups of small size. The possibility of selecting several preschool programs for study was dismissed on grounds that this procedure might produce findings of questionable reliability. The reason for this is that the use of many groups of small size would

most certainly introduce interfering environmental variables such as teacher variability, curriculum variability, socio-economic variability, and play equipment variability, which are suspected of affecting the categorical behavior of young children.

Another aspect of the study which may be identified as a limitation of the study, depending on the degree to which it is actually present, concerns the socio-economic backgrounds of the children engaged in the study. A precise evaluation of the children's socio-economic background was not undertaken during the study. However, the writer and the teachers, through observational evaluation, thought that there were no children involved in the study who would be considered as having come from severely deprived backgrounds. Intelligence levels of the children were not obtained. It was the view of the writer, derived from observational evaluations, that none of the children in the study departed greatly from a normal range of intelligence. Intelligence, as determined by intelligence tests, was not considered to be an interfering variable so long as the mental abilities did not depart greatly from a normal range of intelligence. The reason for this assumption lies in the findings that age is a more powerful variable than intelligence in determining the categorical behavior of preschool children. Therefore, it was assumed that the minimal variation associated with the children's intelligence would have little influence upon the results of the study.

Summary

The preceding pages have discussed the recent renaissance of interest in early childhood education and its resulting effects on research emphasis and the nature of nursery schools found today. The need for studies of play, as it relates to intellectual development, was identified. The categorical behavior of children was presented as one facet of intellectual development. Definition of terms, objectives of the study, and stated hypotheses were presented.

CHAPTER II

REVIEW OF RELATED LITERATURE

Play Behavior in General

As was pointed out earlier, the phenomenon known as child's play, does not elicit universal agreement in the form of a common definition, accepted by all persons who study children's play. Despite this fact, there are many individuals who have managed to describe the play of children, making available normative accounts of children's play, identifying play periods, and offering evidence to support the idea that play is not only a behavioral phenomenon but also a developmental one, with its own distinctive sequences.

Normative accounts of children's play may be found in the writings of Buhler,[1] Isaacs,[2] and Lowenfeld.[3]

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[1]C. Buhler, From Birth to Maturity: An Outline of the Psychological Development of the Child (1935).

[2]Susan Isaacs, Social Development in Young Children (New York: Harcourt, Brace, 1933).

[3]Margaret Lowenfeld, Play in Childhood (New York: John Wiley & Sons, Inc., 1967).

Baldwin,[1] Kirkpatrick,[2] and Lehman and Witty[3] are among the many who have classified the age periods in play behavior. Hurlock says, however, that there is no agreement as to how many play periods there are in the child's development, what names shall be applied to these periods, nor how long each one of them last.[4] Lowenfeld notes that normally developing children from the age of two years on, continue the process of differentiation and maturation in their play activities, and advance as their emotional, social, and intellectual development proceeds.[5]

In an article entitled "Consideration of Current Basic Issues on Play," Curry describes the material that was elicited during a play conference held in 1971. In regards to play as a developmental phenomenon, she writes:

> The panelists agreed that there were, indeed, strong developmental trends in play, but that all children did not experience these sequences in the same order or with the same intensity. It was pointed out that throughout the history of the play movement, it has been assumed that play stages were universal. Piaget, too, had made

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[1]B. T. Baldwin, "Child Development," Canadian Nurse, 25, 1929, 607-611.

[2]E. A. Kirkpatrick, Fundamentals of Child Study (New York: The Macmillan Co., 1922), pp. 179-185.

[3]H. C. Lehman and P. A. Witty, "Periodicity and Growth," Journal of Applied Psych., Vol. 11, 1927, 106-116.

[4]Elizabeth B. Hurlock, "Experimental Investigations of Childhood Play," Psychological Bulletin, 1934, 31, p. 47.

[5]Lowenfeld, op. cit.

> this same assumption. However, cross-cultural studies in play and Smilansky's work have shown that play sequences are not necessarily invariant . . . it was agreed that there are developmental sequences of play which are probably biologically determined but which must be nurtured, patterned and elicited by the child's family and cultural milieu in order to function. This cultural patterning or modeling would account for the presence or absence of a certain developmental sequence of play.[1]

Dividing play into periods based on age may be helpful in many respects, but there is the danger of accepting these age limits for play periods as exact. Many investigators have stressed the fact that the transition from one form of play to another is gradual and often barely perceptible. Lehman and Witty point out that the different play periods are not separated by distinct dividing lines.[2] Keeping this caution in mind, the writer will, in this chapter, review some of the investigations of the forms of play which are characteristic of each age, ranging from age two to age five.

Studies of children's plan indicate that the play behavior of young children is affected by a number of variables. The variables affecting play which have received the most attention in terms of research studies are: age

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[1]Nancy E. Curry, "Consideration of Current Basic Issues on Play," Play: The Child Strives Toward Self-realization (Washington, D.C., National Association for the Education of Young Children, 1971), p. 53.

[2]H. C. Lehman and P. A. Witty, "Periodicity and Growth," Journal of Applied Psychology, 1927, 11, 106-116.

of child, intelligence of child, sex of child, environmental conditions surrounding the child, and the nature of the play equipment available to the child. Each of these variables and their affect upon children's play will now be discussed.

Variables Affecting Children's Play

Age as a Variable

A variable found to affect children's play is age. Blatz and Bott have found that the two-year-old is solitary in his play while the three-year-old plays with older children and shows the rudiments of social play.[1] Parten agrees with this finding, saying that at two and one-half years, there was more solitary play than at any other age level, while the most common form of social participation was parallel play.[2] Hagman found that there was no definite preference for playmates of the same or of the oppostive sex at three years of age.[3] Gesell says there is an increasing interest in playing with other children rather than playing along at the age of three. The groups are usually of two

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[1]W. E. Blatz and H. Bott, Parents and the Preschool Child (New York: William Morrow and Co., 1929), pp. 128-136.

[2]M. B. Parten, "Social Participation Among Preschool Children" Journal of Abnormal and Social Psych., 1932, 27, No. 3, 243-269.

[3]Elizabeth B. Hurlock, "Experimental Investigations of Childhood Play," Psychological Bulletin, 1934, 31, 47-66.

or three children, but these groups are constantly shifting in make-up and activity.[1]

Gesell has presented norms of play behavior for young children. He says that at 36 months, dramatization and imagination begin to enter into children's play.[2] Piaget concurs with Gesell's observation, saying that real pretending becomes clearly apparent in the play of the child at the end of his second year when the child also attempts to attract another child to participate in his game. Real symbolic social play develops only after the child can articulate verbally; it is characteristic of the play behavior of children between two and four years old. This form of play behavior of children gradually becomes more and more complex.[3]

Brown describes the three-year-olds' play as being fluid and shifting, not clearly defined during this age. Collecting or gathering is a characteristic of three-year-olds, which with time becomes refined or discriminative in the context of dramatic play. Brown says of the three-year-olds' play, "Because of its lack of a preconceptualized theme, the dramatic play of three-year-olds can be compared

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[1]Arnold Gesell, The First Five Years of Life (New York: Harper & Row, Publishers, 1940).

[2]Ibid.

[3]Sara Smilansky, The Effects of Sociodramatic Play on Disadvantaged Preschool Children (New York, John Wiley & Sons, Inc., 1968), p. 11.

to the process-oriented behavior of the sensorimotor activities, in which the activity is a pleasurable end in itself and the product is not yet needed."[1]

In regards to the use of play materials, Hetzer found that after the age of two, the construction was first in the form of "specific manipulation," and then later in the form of "meaningful manipulation."[2] When playing with clay, the three-year-old enjoys making forms: flat round "cakes," balls, etc. In the sand, he makes cakes, pies, etc. During block play the three-year-old is interested in order and balance in building and combining the cars, trains, etc.[3]

At the age of four, children prefer to play in a group of two or three children, often choosing favorite companions of his own sex. There is some cooperation in building in small groups of children age four.[4] Bailey notes that during the three-to-four-year-old period, the child reaches the height of concentration on other children. It is her opinion that this sociability largely results from and

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[1]Nancy Brown, Play: The Child Strives Toward Self-Realization (Washington, D.C.: National Association for the Education of Young Children, 1971), pp. 8-9.

[2]Hurlock, op. cit., pp. 47-66.

[3]Gesell, op. cit., p. 256.

[4]Nancy Curry, Play: The Child Strives Toward Self-Realization (Washington, D.C.: National Association for the Education of Young Children, 1971), pp. 10-11.

depends on the child's experience in school situations and the impact of that environment.[1]

At the age of four, there is a considerable increase in the dramatization found in play. The child at this age has very complicated ideas but is unable to carry them out in detail, and has no carry-over from day to day.[2] Curry and Tittnich describe the four-year-olds' play:

> Masculine and feminine traits are exaggerated. For this kind of play all the trappings of masculinity or femininity are now needed: cowboy suits, girls dressed up as mothers, etc. With the increased awareness of masculine and feminine roles and a more stable sense of self, the four-year-old has a clearer idea of who other people are. Play is no longer just centered around the home, but can be expanded to include the beautyshop, store, firehouse--with appropriate roles played out in these settings. Discriminations of all sorts are made with children being excluded or included in play on the basis of differences or likenesses in sex, color, kind of clothes worn, etc. More attributes of a character can be assumed without threat of loss of self. He can play out experiences that interest, baffle or frighten him.[3]

Bühler contends that after the age of four, the child uses his play materials specifically to make something out of them, in contrast to mere manipulation which is characteristic

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[1]N. Bailey, "Mental Growth During the First Three Years. A Developmental Study of Sixty-One Children by Repeated Tests," Genetic Psychology Monograph, 14, 1933.

[2]Gesell, op. cit.

[3]Nancy E. Curry and Ethel Tittnich, Play: The Child Strives Toward Self-Realization (Washington, D.C.: National Association for the Education of Young Children, 1971), p. 9.

of earlier years.[1] In the use of clay, there is an increase in representation and imagination of the four-year-old. The block play of the four-year-old involves extensive complicated structures, combining many shapes of blocks in symmetrical manner.[2]

The child of five enjoys playing in groups of two to five. Friendships are becoming stronger. They carry out the group enterprise in detail. There is a wide panorama of play at age five with many earlier developmental themes still being worked upon, either as unsolved issues or as regressive phenomena. Some children are moving into the games-with-rules play of the school-age child. With the intent dramatization of every aspect of his widening world, the five-year-old responds to those external stimuli which mesh with his burgeoning developmental interest. Pretend roles include both an enactment of real life roles (nurse, teacher, bride, etc.) and of cultural folk heroes (spacemen, kings, etc.). The sociodramatic play often has quite realistic elements as the children attempt to imitate perceived adult actions and reactions. As the five-year-old becomes more capable of dealing with the concrete world, he demonstrates a dawning capacity to deal with abstraction.[3]

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[1]C. Bühler, "The Child and Its Activity with Practical Material," Brit. J. Educ. Psych., 1933, 27-41.

[2]Gesell, op. cit., p. 257.

[3]Nancy Curry, op. cit., pp. 10-11.

At age five, the objects produced during play with clay are more recognizable and generally are made with a purpose in mind--i.e., made as gifts, or to use in dramatic play in the dollhouse, store, etc. One often finds five-year-olds involved in block play, planning the block structure before building.[1]

Intelligence as a Variable

Intelligence has been identified as a variable affecting the play behavior of young children. The best-known study of gifted children is Terman's[2] long-term investigation in the 1920's. A number of differences were found between gifted children's play and that of their contemporaries. The gifted children's play interests included far more intellectual as opposed to physical activities. Their play was more like that of older children and they preferred playmates slightly older than themselves. They showed a less marked preference than their less gifted contemporaries for one or the other sex in choosing a playmate, and less preference for competitive games. Imaginary playmates and living in imaginary countries are common among these gifted children between the ages of two and five.

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[1]Gesell, op. cit., p. 257.

[2]L. M. Terman, "Mental and Physical Traits of a Thousand Gifted Children," Genetic Studies of Genius, Vol. I. (Stanford University Press, 1926).

Similar results, reported in Lehman and Witty,[1] were found in other studies of the play of bright children. A study conducted by Boynton and Ford[2] found that intelligent children played about fifty minutes a day more than retarded children. Lehman and Witty[3] indicate, that in general, the play of intelligent children has been characterized as more varied, versatile, resourceful, and mature. By contrast, retarded children show less originality in their play activities, prefer games without complicated rules, and games more usually played by younger children.

Sex as a Variable

Another variable affecting the play behavior of children is sex. Millar[4] writes that in most societies, differences in play between boys and girls are not merely expected but are actively encouraged. In our own culture, only very young boys may be allowed to play with dolls occasionally. Millar gathered evidence to indicate that North American three-year-olds already show sex differences

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[1]H. C. Lehman and P. A. Witty, The Psychology of Play Activities (New Jersey: Barnes, 1927).

[2]P. L. Boynton and F. A. Ford, "The Relationship Between Play and Intelligence," Journal of Applied Psychology, 17, 1933, 194-301.

[3]Lehman and Witty, ibid.

[4]Susan Millar, The Psychology of Play (Baltimore, Maryland: Penguin Books, 1968), pp. 194-197.

in the aggressiveness with which they play with miniature dolls. Four-year-old boys engaged more in romping and activities involving the large muscles; girls tended to play house or paint. Rosenberg and Sutton-Smith[1] say that differences in the play of boys and girls have changed to some extent within the last forty years. Early studies showed more variety in the play of boys compared with girls. A study in the 1960's found a much greater variety of activities engaged in by the girls.

Environmental Conditions as a Variable

The environment in which the child is reared has been found to be a variable, influencing the play behavior of young children. Millar[2] reviews studies which indicate that infants in institutions were reported to play much less than ordinary children. When play did occur, it was immature, stereotyped and lacking in inventiveness. There was a comparative absence of spontaneous play. The institution children showed little preference for one toy over another, explored less, and played less.

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[1]B. G. Rosenberg and B. Sutton-Smith, "A Revised Conception of Masculine-Feminine Differences in Play Activities," Journal of Genetic Psychology, 96, 1960, 165-170.

[2]Millar, op. cit., pp. 197-199.

Sears[1] found that the presence or absence of the parent, upon whom the child 'models' himself, affects his play. Boys whose fathers were absent from the home played less aggressively than boys whose fathers were present. Their play was more like the play of girls. Observations by Bishop,[2] of mothers playing with their three- to six-year-olds, showed that direct interference, control and criticism of the child's play was related to noncooperation or inhibition of play on the part of the child and tended to generalize to his attitude in subsequent play with a 'neutral' adult.

Social, economic, and cultural variables also influence children's play behavior. An extensive study, of six societies belonging to totally different social and cultural groups and the differences in the play of children from these societies, was undertaken by Whiting.[3] His study indicates major differences in the play of children of these six societies. Gesell and Lord[4] found that children from

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[1]P. S. Sears, "Doll-Play Aggression in Normal Young Children: Influence of Sex, Age, Sibling Status, Father's Absence," Psychol. Monog., 65, N: 6, 1951.

[2]M. B. Bishop, "Mother-Child Interaction and the Social Behavior of Children," Psychol. Monog., 65, N: 328, 1951.

[3]B. B. Whiting, Six Cultures: Studies of Child Rearing (John Wiley, 1963).

[4]A. Gesell and E. E. Lord, "A Psychological Comparison of Nursery School Children from Homes of Low and High Economic Status," J. Genet. Psych., 34, 1927, 339-356.

'good' neighborhoods stood far above those from 'poor' neighborhoods in initiative and spontaneity in play.

The frequency of social play at different ages varies with habits and social background. Piaget mainly drew the subjects of his investigations from the Maison des Petits which employs the Montessori methods. The Montessori methods used tend to encourage solitary occupations more than is customary for American children. This would account for the fact that the Swiss children were reported to play in parallel or in association rather than cooperatively at later ages than the American children.[1]

Smilansky[2] reports that "culturally deprived" children, aged from three to seven years, in spite of their development in the language learning process, do not develop the ability to engage in symbolic play. She claims that the differences between the two populations in regards to symbolic play is not due to different rates of development, but is rather of a qualitative nature, based on different cultural background and socialization processes. In support of Smilansky's report, psychologists working in Head Start programs have been pointing out that deprived children tend not to play imaginatively. Their play is dominated by sensory-motor and kinetic activities.[3]

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[1]Millar, op. cit. pp. 181-182.

[2]Smilansky, op. cit.

[3]R. E. Herron and Brian Sutton-Smith, Child's Play (New York: John Wiley & Sons, Inc., 1971), pp. 218-219.

Nature of Play Equipment as a Variable

Another variable affecting the play of children which has received attention in terms of research studies, is the nature of the play equipment available to the child. The number and kinds of toys which are around at any given moment make a difference both to the manner and the kind of children's play. A study, conducted by Johnson[1] of school children's behavior with different amounts of equipment in the playground, showed that with fewer toys around, children made a greater number of social contacts with each other. Large amounts of play equipment discouraged social contacts, but had a stimulating effect on individual exploration, construction, and the like.

Different kinds of toys also differ in the extent to which they encourage or discourage social contact between children. VanAlstyne[2] found that preschool children talk more in doll-play than in painting, cutting, etc.

The characteristics of objects likely to attract children will vary with growing skills and greater familiarity. What is noticed must depend on the maturity of the whole perceptual apparatus (including attentional and memory

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[1]M. W. Johnson, "The Effect on Behavior of Variation in the Amount of Play Equipment," Child Development, 6, 1935, 56-68.

[2]D. VanAlstyne, Play Behavior and the Choice of Play Materials of Preschool Children (University of Chicago Press, 1932).

factors), previous discriminations, and the mental pigeonholes available to the child.[1]

Hutt[2] engaged in a study of exploratory behavior in three to six-year-old nursery school children. The aim of the study was the investigation of exploratory activity elicited by a novel object. The results threw some light on the determinants and genesis of "play" activities. It was found that there is a progressive decrement of exploratory activity with repeated exposure. It was found that as investigation of the novel object decreased, other activities involving it increased. First, the children responded to the novel object by visual inspection, feeling, touching, and other manipulations. Then the children used the object as a "game," patting the lever repeatedly, making the bell ring continuously, etc. Finally, the children used the novel object explicitly in fulfilling another function, e.g., something to climb, a bridge, or a seat.

Categorical Behavior of Young Children

Description of Categorical Behavior

Our physical and social world is made up of a host of diverse stimuli. Sounds, lights, textures, and shapes

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[1]Jean Piaget and B. Inhelder, The Child's Conception of Space (New York: W. W. Norton & Co., Inc., 1948).

[2]C. Hutt, "Exploration and Play in Children," Symp. Zool. Soc. London, 18, 1966, pp. 61-81.

are among the innumerable sources of stimulation consistently impinging on our senses. Harvey, Hunt, and Schroder[1] say that one major reason we function so efficiently is that we have developed a system of concepts that ". . . serves as an experiential filter through which impinging events are screened, gauged, and evaluated, a process that determines in large part what responses can and will occur."[2] Concepts function as an adaptive mechanism through which we cope with reality.

Although there is not complete agreement as to how concepts are learned, there are many who believe that concepts are learned and are attained through a variety of complex processes. The child has to learn to recognize and identify objects. Further, he must learn to define the object's characteristics. He learns that various objects have multiple characteristics and attributes. In addition to such discriminations, he learns to perceive commonalties among diverse stimuli. Diverse items are organized into classes or categories that are labeled in conventional terms. This complex set of learnings is based on such processes as perception, discrimination, transposition, and generalization. Concepts are built by a process of seeing relationships,

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[1] O. J. Harvey, D. E. Hunt, and H. M. Schroder, Conceptual Systems and Personality Organization (New York: Wiley, 1961), pp. 2-3.

[2] Ibid., pp. 2-3.

categorizing, discriminating, and generalizing about those things which the child sees, hears, and feels in this environment. Classification skills are essentially "preludes" to concept attainment.[1,2,3,4]

The importance of discrimination learning in concept acquisition has been recognized by many. Discrimination learning has been demonstrated to be a primary step in the long road toward concept acquisition.[5] Acquiring discriminations is an undertaking of great importance in everyday life and in school learning. The young child must learn at a very early age to distinguish among the parts of his environment: color, brightness, shapes, sizes, textures, distances, etc. As for learning in school, the student is confronted early with the necessity for learning discriminations among printed colors, shapes, letters, and numerals.

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[1]Robert M. Gagne, The Conditions of Learning (New York: Holt, Rinehart and Winston, Inc., 1965), pp. 155-188.

[2]Irving E. Sigel, "The Attainment of Concepts," Review of Child Development Research (New York: Russell Sage Foundation, 1964), ed. Martin L. Hoffman and Lois W. Hoffman, pp. 209-248.

[3]W. E. Vinacke, "Concept Formation in Children of School Age," Education, 1954, 74, 527-534.

[4]Kenneth D. Wann, Miriam Selchen Dorn, Elizabeth Ann Liddle, Fostering Intellectual Development in Young Children (New York: Teachers College, Columbia University, 1962), p. 10.

[5]S. White, "Learning," Child Psychology, 62nd. Yearbook, Nat. Soc. Stud. Educ. (Chicago: Univ. Chicago Press, 1963).

Gibson[1] describes in an article, the relevance of perceptual learning, which she considers to be a matter of increasing differentiation of part of the environment, for the learning of the child in his early years. The importance of consistent classification and categorization has been recognized by psychologists for over fifty years. The majority of the studies relevant to the area of classification and categorization prior to 1952 are reviewed by Vinacke.[2]

Although the categorical behavior of young children has been under investigation by a number of writers, often however, the terminology used by writers for the categorizations children make, differs. One finds Gagne[3] speaking of "discrimination learning." Piaget[4] writes of the criterion chosen by children in their classifications and divides these classification types into two kinds: graphic collections and nongraphic collections. Sigel[5] lists descriptive,

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[1]E. J. Gibson, "Perceptual Learning," Learning Research and School Subjects (Itasca, Ill., Peacock, 1968).

[2]W. E. Vinacke, The Psychology of Thinking (McGraw-Hill, 1952), Ch. 7.

[3]Robert Gagne, op. cit.

[4]Jean Piaget, Barbel Inhelder, The Early Growth of Logic in the Child (New York: W. W. Norton and Co., Inc., 1964).

[5]Irving E. Sigel, "The Development of Classificatory Skills in Young Children: A Training Program," The Young Child (Ed. Willard Hartup, Washington, D.C.: National Association for the Education of Young Children, 1972), pp. 96-98.

relational-contextual and categorical-inferential classification types. Weikart[1] in his classification content areas lists relational, descriptive, and generic groupings. These writers, although using different terminology and somewhat different groupings, are all speaking about a similar phenomenon--the classifications made by children through their selections of various types of criterion upon which these are based.

Whereas most studies in the area of children's classifications are concerned mainly with the description of children's behavior, Piaget attempts to offer a thoroughgoing explanation of such behavior in developmental terms. He seeks to penetrate more deeply into the psychological mechanism underlying the development of classificatory behavior in a large number of situations.

In his book, The Early Growth of Logic in the Child, Piaget[2] deals with the way in which children gradually build up the structure of class-inclusion. This structure is not a primary datum (it is not genetically given); it is elaborated by a process of gradual construction. Piaget divides classificatory behavior into three stages. The first stage

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[1]David P. Weikart, Linda Rogers, Carolyn Adcock, and Donna McClelland, The Cognitively Oriented Curriculum (Urbana, Ill.: Univ. of Ill., 1971), p. 94.

[2]Jean Piaget, Barbel Inhelder, The Early Growth of Logic in the Child (New York: W. W. Norton and Co., Inc., 1964).

(the one in which the writer's investigation is concerned) of which Piaget speaks is "The pre-classificatory or para-classificatory stage." During stage two, children are able to make classifications considering nothing but similarities and differences; quite different from stage one when children build aggregates on the basis of a variety of considerations (graphic collection). During stage three, children move away from collections which are simply juxtaposed or perhaps subdivided, to hierarchial systems of inclusions. Piaget is interested in discovering what governs the transitions from stage I to stage II to stage III. He finds that the changing from one stage to another is not one of sudden appearance, but rather is a process of growing differentiation and coordination.

The writer is concerned with the stage which Piaget identifies as stage I. He calls this the pre-classificatory or para-classificatory stage.[1] Children at stage I do not arrange elements in collections and sub-collections on the basis of similarity alone. They are unable to overlook the spatial configuration of the objects, and what they do is to unite them in "graphic collections."

The term "graphic collection" is used to describe a spatial arrangement of the elements to be classified, where it seems clear that such a configuration plays an

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[1]Piaget, op. cit., Chapter I., 1964.

essential part in the eyes of the subject. In other words, the child is clearly unable to divorce properties from the graphic arrangement which he produces. Thus, he may place a triangle above a square, because he thinks these two forms must be somehow related. The triangle may remind him of the roof of a house, while the square can be the main part of the building. To him, this means that the triangle must be placed over the square and nowhere else. Here the spatial configuration plays an essential part in determining the intensive properties of the arrangement. After studying the classifications of geometrical shapes made by children, Piaget was interested in finding out if the geometrical character of the materials is what induces children to make graphic constructions instead of classifying the pieces. To answer this question, Piaget asked children to classify objects rather than geometrical shapes. He found that young children will group a doll with a cot, instead of classifying the baby with people and the cot with furniture. This is what Binet found for his definition: younger children give replies like, "A mother is for making supper" instead of defining the term by its genus and specific difference. The point in both cases is that children are using pre-concepts and not true concepts. At that level, abstraction is irreversible and nonoperational, which means that the relation of class-inclusion eludes them. Here we see the difference between similarity and belonging. A cot

"belongs with" a baby, although it is not similar to a baby, and similarly, making supper "belongs with" a mother, although it is hardly an essential property which she shares with all mothers. This is an illustration of the way in which part-whole relations tend to take the place of logical relations of class-inclusion. This is very much the same as when children make complex objects out of geometrical shapes. Piaget reached these conclusions in his study of very young children, in regard to graphic collections which they make. He found that there is a stage of the graphic collection, which may be long or short depending on the materials used and the instructions given. This stage invariably precedes the stage of the nongraphic collection (this being a collection based on similarity and difference alone). There does not appear to be any definite sequence of sub-stages within the stage of the graphic collection. Piaget found that a large number of graphic collections of all types are produced by children of 2-1/2 to 5 years. Nongraphic collections were rare below the age of 5-1/2, although in some cases they were found as early as 4-1/2.[1]

Criteria of Categorizations

When discussing the kinds of classifications children make, it is helpful to divide these classifications

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[1]Piaget, op. cit., (1964).

into manageable, and thus meaningful groups. One basis for this grouping of classifications is the criterion used by children to classify their environment. Sigel[1] divides the classifications children make into three manageable groups: descriptive classifications, relation-contextual classifications, and categorical-inferential classifications. These groupings will be discussed in greater depth, as they form the basis of the writer's classification groupings used in this study.

All objects or events are multi-dimensional. Size, shape, color, and function are among the attributes possessed by all objects. Some object attributes are observable; i.e., present in the physical nature of the item, while others are inferred or indications of actions that can be imposed upon an object. A group of objects organized because they share common color qualities have been classified along a physical dimension; if the objects are grouped because they "can all be eaten" or "thrown," they have been classified on the basis of actions. Other types of non-observable criteria, such as function, class membership, and the like, can be used as a basis of classification. Each dimension or attribute of an object or an instance becomes a possible criterion by which to create a classification.

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[1]Sigel, op. cit., (1972), pp. 96-98.

Sigel[1] describes his classification groupings as follows: Descriptive classifications are based on physical criteria, such as form, color, or structure. A second mode of categorization is relational-contextual. This refers to groupings made on the basis of the interdependence of items in an array. Items are related by virtue of use--for example, "you use a match to light a cigarette," or "use a spoon to stir coffee." A third category of orientation is categorical-inferential. This is the application of a class label to an array of stimuli, in which every instance of the array is a member of the class. It is the common definition of the term concept. Placing a group of objects such as a saw, screwdriver, and axe together "because they are all tools," is an example of this type of response.

A great number of studies have been conducted on young children's use of descriptive classifications. The criteria most often studied in relation to descriptive classifications are form-shape, color, size, mass, weight, and volume. Studies concerning the above listed criteria will now be reviewed.

Form-Shape

Since form is a salient feature which must be discriminated to identify objects in space and to differentiate

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[1]Sigel, op. cit., (1972), pp. 96-98.

between objects, specific attention has been paid to the development of form discrimination. There is evidence that even very young children can discriminate between certain shapes and some aspects of depth.[1,2,3] Ling[4] reported that children as young as six months are able to discriminate forms.

The child not only has to learn to distinguish one object from another by comparing their intrinsic features; he also has to learn to identify forms, even when the background or context, within which he sees the forms, changes. Munn and Steinung[5] found that children as young as fifteen months were able to accomplish this feat. Crudden[6] found that intelligent children between the ages of sixty-five months and seventy-eight months were able to make form

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[1]R. L. Fantz, "The Origin of Form Perception" Scient. Am., 204, N:5, 1961, pp. 66-72.

[2]R. D. Walk and E. J. Gibson, "A Comparative and Analytical Study of Visual Depth Perception," Psychol. Monogr., 75, Whole N: 519, 1961.

[3]W. Epstein, "Experimental Investigations of the Genesis of Visual Space Perception," Psychol. Bull., 61, 1964, 115-128.

[4]B. Ling, "Form Discrimination as a Learning Cue in Infants," Comp. Psychol. Monogr., 17, No. 2, 1941, 66.

[5]N. I. Munn and B. B. Steinung, "The Relative Efficacy of Form and Background in a Child's Discrimination of Visual Pattern," J. Genet. Psychol., 39, 1931, 73-90.

[6]C. H. Crudden, "Form Abstraction by Children," Journal of Genetic Psychology, 58, 1941, 113-129.

abstractions when the position of objects changed. Rice[1] found that a diamond lying on its side was difficult for children below five years to identify, but between age five and six, children were able to identify the sameness of the object even when it was oriented differently.

The degree to which a child can generalize the identification of a form concept has been studied by Long.[2] He investigated generalization of the concept of roundness by training children, between the ages of three and six years, to make discriminations between a ball and a block. He varied the degree of roundness of the stimuli from spheres to ovals, and so on. While all of Long's subjects showed some ability in this respect, it was easier for the older children. The younger children had difficulty in extending the concept of roundness to cylinders and other figures. Vernon[3] and Denisova[4] also found that young children are less aware of exact differences between shapes. When confronted with a complex shape, they tend to see an undifferentiated mass,

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[1]C. Rice, "The Orientation of Plane Figures as a Factor in Their Perception by Children," Child Development, 1, 1930, 111-143.

[2]L. Long, "Conceptual Relationships in Children: the Concept of Roundness," Journal of Genetic Psychology, 12, 1941, 247-254.

[3]M. D. Vernon, A Further Study of Visual Perception (Cambridge University Press, 1962).

[4]Susanna Millar, The Psychology of Play (Penguin Books, 1968), p. 127.

plus some outstanding detail, and to respond in terms of that one variable only.

In a study by Sigel and McBane,[1] they found middle-class and lower-class negro children in kindergarter differed in their responses to form. Lower-class children used form responses such as shape and contour, in contrast to isolating a structural part of the object; e.g., handles, wheels, legs, etc. as did the middle-class children.

Color

Color as a basis of organization plays a significant role in psychological theory. The individual who produces color-based percepts is considered less mature emotionally than one who emphasizes form. This is based on the assumption that color is a more primitive response, developing earlier and consequently reflective of immaturity.[2]

Hurlock and Thompson[3] found that children are able to discriminate colors early and are able to do so before

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[1]I. E. Sigel and B. McBane, "Cognitive Competence Level of Symbolization Among Five-Year-Old Children," (in J. Hellmuth, ed. The Disadvantaged Child, Vol. I), Seattle: Special Child Publications, 1967, pp. 435-453.

[2]Martin L. Hoffman and Lois Hoffman, Review of Child Development Research (New York: Russell Sage Foundation, 1964), pp. 229-230.

[3]E. B. Hurlock and J. L. Thompson, "Children's Drawings: An Experimental Study of Perception," Child Development, 5, 1934, 127-138.

they can name those colors. Cook[1] reports that more children, two years of age, can match colors than name them. By approximately four years of age, about 90 percent of the children could match colors and about 80 percent could name them. Children apparently discriminate and identify color before being able to apply the label.

Katz,[2] working with children age three to six, found that for the youngest children, color was a much more important attribute than form. Descourdres[3] studied the preference of color, form, or number concepts. She found that some children as young as three used color or form consistently, while others vacillated and tried to use both. She noted that even those who preferred form, could change to color preferences when necessary. The preference for form was found to increase regularly from preschool to adulthood, while color choices diminished steadily. Brian and Goodenough[4] found that children initially prefer form. Color becomes preferred about the age of three; color

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[1]W. M. Cook, "Ability of Children in Color Discrimination," Child Development, 2, 1931, 303-320.

[2]L. I. Katz, Comparative Psychology of Mental Development, ed. by H. Werner (Rev. ed.; Chicago: Follett, 1948).

[3]A. Descourdres, (Lois Hoffman and Martin Hoffman), Review of Child Development Research (New York: Russell Sage Foundation, 1964), p. 230.

[4]C. R. Brian and F. L. Goodenough, "Relative Potency of Color and Form Perception at Various Ages," Journal of Exp. Psychology, 12, 1929, 197-213.

preference then gradually decreases until age six, when form again becomes dominant. The findings of Brian and Goodenough[1] can be integrated with Piaget's[2] report on children within the sensory-motor period, where the children are motoric and manipulatory. It may be more adaptive for children to deal with objects on the basis of form. The comprehension of permanence may come about just because of form saliency. If the children during the preschool period are oriented toward objects on a topological basis, it would appear that form is a salient criterion in differentiating the environment. This may explain the dominance of form during this period.

The findings of the Colby and Robertson[3] study provide some evidence to show that a few children before five years of age can handle color, form, and size simultaneously as bases for classification. This is surprising in view of the contrast to Piaget's[4] findings, which indicate that the multiple abstractions do not occur until the period of concrete operations (seven to eleven years of age).

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[1]Brian and Goodenough, op. cit.

[2]Jean Piaget, The Origins of Intelligence in Children (New York: International University Press, 1952).

[3]M. G. Colby and J. B. Robertson, "Genetic Studies in Abstraction," Journal of Comparative Psychology, 33, 1942, 385-401.

[4]Jean Piaget, The Psychology of Intelligence, (London: Routledge & Paul, 1950).

The variability in color-form preferences found by Colby and Robertson[1] might be due to personality differences. Honkavaara[2] was able to identify two types of respondents: color reactors, who prefer to organize material on the basis of color, and form reactors, who prefer form. She found that children of lower I.Q. were more often form reactors. Kagan and Lemkin[3] found six differences in regard to color and form dominance. They found girls to be more form-dominant than boys. Sigel[4] found that color was generally the most prevalent response among lower-class children. They say that this fact may indicate the emphasis on color responses in kindergarten. They found that the lower-class children in kindergarten, used color as their primary descriptive criterion.

Size

Abstraction of size attributes require the child to ignore the other potent and observable attributes of color, form, and meaningfulness. The size of an object is relative

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[1]Colby and Robertson, op. cit.

[2]S. A. Honkavaara, "A Critical Reevaluation of the Color and Form Reaction, and Disproving of the Hypothesis Connected with it," J. Psychol., 45, 1958, 25-36.

[3]J. Kagan and J. Lemkin, "Form, Color, and Size in Children's Conceptual Behavior," Child Development, 32, 1961, 25-28.

[4]Sigel, op. cit., (1972), p. 96.

to external measures or to other objects, whereas color and form are judged by intrinsic attributes.[1] Kagan and Lemkin[2] and Sigel[3] have found size to be a less salient organizational cue than color or form for the very young child.

The degree to which children classify objects as biggest, middle-sized, and littlest was studied by Thrum.[4] Working with subjects aged two to five, she found the most difficult concept for children to select correctly was middle-sized. The youngest child, who chose all three of the relative sizes correctly, was three years and three months of age. It appears that the concept of relative size seems a difficult one to learn even though form discriminations are possible early. Long[5] attempted to train children between the ages of four and seven years to discriminate large stimulus from a small one. He found that once the children learned to discriminate differences of a wide range, they could generalize to narrower ones but they had difficulty, however, when the gross size differences were maintained but the forms were of different shapes.

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[1]Hoffman, op. cit., p. 232.

[2]Kagan and Lemkin, op. cit.

[3]I. E. Sigel, "Developmental Trends in the Abstraction Ability of Children," Child Development, 24, 1953, 131-144.

[4]M. E. Thrum, "The Development of Concepts of Magnitude," Child Development, 6, 1935, 120-140.

[5]L. Long, "Size Discrimination in Children," Child Development, 12, 1941, 113-118.

Mass, Weight, and Volume

The major works in the understanding of the child's attainment of concepts of mass or quantity, weight, and volume stems from the investigations of Piaget and the research he has stimulated. Piaget and Inhelder[1] found that there is a natural ordinal scale of conceptualization of quantity, weight, and volume. Quantity is understood in conservational terms by the age of seven or eight; weight by the age of nine or ten; and volume around the age of eleven or twelve. Russel,[2] in his survey of the literature, reports that the findings point to a steady improvement with age. Kooistra[3] studied children of superior intelligence and found that 50 percent or more of the responses, displayed that conservation had been achieved at age five for mass, age six for weight, and age seven for volume.

Factors Affecting the Types and Frequencies of Children's Categorizations

Age as a Factor

It has been documented by the studies reviewed above, that many children age three, four, and five are able to

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[1]Jean Piaget and Barbel Inhelder, The Early Growth of Logic in The Child (New York: W. W. Norton & Co., Inc., 1964).

[2]D. Russell, Children's Thinking (Boston: Ginn, 1956).

[3]W. H. Kooistra, "Developmental Trends in the Attainment of Conservation, Transitivity, and Relativism in the Thinking of Children" (Unpublished doctoral dissertation, Wayne State Univ., 1963).

attend to and discriminate objects on the basis of color, size, shape, mass, etc. The question of interest becomes--what influences the types and frequencies of attributes (criteria of classification) selected by young children in their pursuit to organize the environment which surrounds them? Why do some children attend to and verbally express a preference for color attributes as opposed to functional attributes such as roles people play?

Over the years, studies of classification skills with various populations have been conducted. These studies indicate that classification competence and styles vary with age, sex, and type of child.[1,2]

Piaget's[3] works indicate that between the ages of two and four, the child categorizes on the basis of single characteristics of objects, and is unable to classify the multi-faceted aspect of stimuli simultaneously. The child is conceptualizing on single salient features of the environment. The young child's conceptualization is perceptual-

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[1]J. Kagan, H. A. Moss, and I. E. Sigel, "The Psychological Significance of Styles of Conceptualization," (In J. C. Wright & J. Kagan, eds. "Basic Cognitive Processes in Children," Monogr. Soc. Res. Child Develpm., 1963, 28, No. 2).

[2]I. E. Sigel and Helen Hanesian, "Styles of Categorization and Their Intellectual and Personality Correlates in Young Children," Human Development, 10, 1967, 1-17.

[3]J. H. Flavell, Developmental Psychology of Jean Piaget (Princeton, N. J.: Van Nostrand, 1963).

dominant, since his organization, classification, and primitive conceptions are determined to a large measure by the potency of the physical attributes.

Sigel[1] believes that the child's cognitive status at the preschool level is such that he tends to be dominated in his cognitive judgments by the apparent characteristics of stimuli and by his limited range of experience. The preschool children tend to believe what they see.

Between the ages of four to seven, the child's thought is in a state of transition toward increased symbolic functioning. The child now has the ability to think in terms of classes, to see relationships, and to handle number concepts. The child can classify material on the basis of objective similarity.[2]

Sigel,[3] using his classification system, found that relational-contextual responses increase with age concomitantly with color and form, indicating that awareness of functional relations increases in its saliency of sorting tasks with increasing experience. With increases in age, use of descriptive part-whole responses increase for all type of materials, with a decrease in relational-contextual and an increase in inferential-categorical classifications.

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[1]Sigel, op. cit., (1972), p. 94.

[2]J. McV. Hunt, Intelligence and Experience (New York: Ronald Press, 1961).

[3]Sigel, op. cit., (1972), p. 99.

Verbal Facility as a Factor

Some psychologists have argued that lack of verbal facility, more than other learned mediating responses, accounts for young children's failure to use implicit rule and generalities and to respond instead to the concrete perceptual aspects of a task.[1,2] On the other hand, modern British and American cognitive psychologists tend to stress the importance of grouping, classifying-chunking-information in the development of planning and speech, rather than vice versa.[3]

Social Class Status as a Factor

Sigel[4] engaged in a recent study, which sheds much light on the influence of social class status on the types and frequencies of young children's classifications. He embarked on a study, using a middle-class group and a lower-class group of Negro children between the ages of three and five. As a result of this study, he found that differences

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[1]C. N. Cofer and J. P. Foley, "Mediated Generalization and the Interpretation of Verbal Behavior," Psychol. Rev., 49, 1942, 513-540.

[2]H. H. Kendler and T. S. Kendler, "Inferential Behavior in Preschool Children," J. Exp. Psychol., 51, 1956, 311-314.

[3]G. A. Miller, E. Galanter, and K. R. Pribran, Plans and the Structure of Behavior (New York: Holt, Rinehart & Winston, 1960).

[4]Sigel, op. cit., (1972), pp. 92-111.

in criteria selected for classification, as well as capabilities for classifications between lower and middle-class children are evident. The lower-class child shows high preferences for use of color and/or form. These children rarely, if ever, use part-whole responses to objects, i.e., grouping an array of animals and saying "They have legs," or grouping an array of humans and saying "They have eyes." These form responses denoting shape and contour are in contrast to isolating a structural part of the object, e.g., handles, wheels, legs, etc. The middle-class children used parts of the objects as a basis for grouping, much more frequently than did the lower-class children. Such part-whole responses were rarely found among the lower-class group. Color was generally found to be the most prevalent response among these lower-class children, when observed in kindergarten. It was found that for the lower-class children, the frequency of relational-contextual responses decreased with exposure to kindergarten for children who had had no previous Head Start experience. Sigel expects this to be a "primitive" orientation reflected in the child's application of his own experience to the context of the sorting task. The child does have at home, direct experience with those objects in an action sense. He uses such things as a pencil and a notebook, he writes with crayons on paper, and the like. The relational-contextual responses found in lower-class children before school experiences, lessens,

with an increase in color responses. He says that this fact may indicate the emphasis on color responses in kindergarten. Relational-contextual responses are indicative of a nonreflective and nonconceptual orientation. It contraindicates analytic reasoning and thinking and would be expected to be a prevalent response pattern among lower-class children.

Mode of Presentation of Material as a Factor

Of particular interest, in regard to the writer's study, is Sigel's[1] finding that classification performance is also influenced by the mode of symbolic level of the material. Sigel found that lower-class children perform very differently when they are working with three-dimensional objects, as compared to their pictorial representations. Children provided with meaningful three-dimensional objects may or may not classify them the same way they classify representatives of these objects--pictures, schematic drawings. Sigel concluded that the existence of a classification skill may well be influenced by both the nature of the stimuli and the type of representation, interacting with the developmental and experiential status of the child. This finding indicates the need to replicate many of the studies on the

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[1]Sigel, op. cit., (1972)

categorical behavior of young children which were conducted under test-like settings, using pictorial representations of objects rather than actual objects.

Nature of the Items as a Factor

It has been found that the nature of the items influences how children categorize. When meaningful materials are used, children ages seven to eleven tend to ignore such structural properties as color, texture or material the objects are made from and focus instead on the meaning of the items. Items depicting human figures are categorized on different bases from those depicting objects or animals. Children aged seven and eight, when presented with pictures depicting human figures as a fireman, cowboy, nurse, and so on, used labels which were descriptive of parts of the stimuli; for instance, selecting the fireman and soldier "because both have uniforms" or classify hammer, and saw, because "these are used to build with." Younger children of four and five using similar type materials respond differently from the older children. Boys aged four tended to pay more attention to the background and structural aspects of the stimuli; for example, these have grey lines, or these have dark backgrounds. Girls, however, tended to organize materials on the basis of the meaningful parts of the pictures; for example, these have legs or these have arms.

The kind of content then with which the child is working, influences the basis of organization.[1]

Summary

Chapter II presents a summary of the research in two areas: play behavior of young children and categorical behavior of young children. The review of literature on the play behavior of young children, concerned the relation between children's play behavior and the variables of age, intelligence, sex, environmental conditions, and the nature of the play equipment, which affect it. The review of literature on the categorical behavior of young children concerned the various kinds of criteria used in making categorizations: form-shape, color, size, mass, weight, and volume. Factors affecting the types and frequencies of children's categorizations were also reviewed.

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[1]Hoffman, op. cit., pp. 221-222.

CHAPTER III

METHODOLOGY

Purpose

The purpose of this chapter is to report the design of the study and to describe how it was conducted. The major focus of the investigation was upon the categorical behavior of young children engaged in spontaneous play, based on the premise that children of different ages vary in the criterion they choose in making these categorizations.

Much of the literature on the categorizations of children comes from research conducted in a structured setting. The material to be categorized by children is selected by the researcher. This allows for some control and comparison among children. However, this forced-choice type of categorizations does not give us information about the frequency and the nature of categorizations made by young children engaged in spontaneous play. For this reason, the writer has chosen an observational study which may yield information not accessible through controlled, laboratory studies.

Questions were developed to explore the nature of categorizations made by young children engaged in spontaneous

play. These questions resulted in the hypotheses which follow.

Restatement of Research Hypotheses

I. There will be no difference between three-year-old children, four-year-old children, and five-year-old children in the kinds of categorizations made while engaged in spontaneous play.

II. There will be no difference between three-year-old children, four-year-old children, and five-year-old children in the frequencies of their categorizations of the following types:

a. total categorizations (descriptive and relational-contextual).
b. total descriptive categorizations (color, size, shape, mass, physical composition, and number).
c. total relational-contextual categorizations.
d. color.
e. size.
f. shape.
g. mass.
h. physical composition.
i. number.
j. total of descriptive criterion of the following type: color, size, and shape in comparison

to total descriptive criterion of the following type: mass, physical composition, and number.

III. There will be no difference in preference for categorizations made using descriptive criteria over categorications made using relational-contextual criteria by three-year-olds, four-year-olds, and five-year-olds.

IV. There will be no difference between girls and boys in the frequencies of their categorizations using criteria of the following types:

a. descriptive.

b. relational-contextual.

V. There will be no difference between girls and boys in the frequencies of their categorizations using color, size, and shape.

Research Site and Population

The nursery school chosen for this study is one of three preschool programs in Hillsdale, Michigan. The College Nursery School has an enrollment consisting predominantly of children of the college faculty. The Headstart program enrolls children from educationally deprived homes. The Karen Jenkins Nursery School, which was chosen for this study, is a cooperative nursery school, directed by a certified teacher, with the help of an assistant and mothers

of the children. The Karen Jenkins Nursery School was chosen for this study for the following reasons:

1. The school included three age groups, each of which met at different periods during the week.
2. All age groups, while meeting at different hours during the week, met in the same room containing the same toys and equipment, and were under the direction of teachers initiating very similar programs.
3. The program for each of the three age groups included a period of not less than one hour per meeting of spontaneous play.
4. With the exception of one child, the children in the nursery school came from homes considered to be of lower-middle class and middle class status.

The three-year-old group consisted of 12 children, all of whom were born after January 1, 1967, and before January 31, 1968. The four-year-old group consisted of 17 children, all of whom were born after January 1, 1966, and before January 1, 1967. The five-year-old group consisted of 17 children, all of whom were born after January 1, 1965, and before February 1, 1966.

Selection of an Observational Study

The writer has chosen an observational study for the purpose of studying children's categorical behavior

exhibited during spontaneous play. The method of direct observation was used, in which no planned arrangements stand between the observer and the target phenomenon, and the recording of data closely follows observations.

Susan Isaacs,[1] in her study of intellectual growth in young children, in which she obtained her data from the spontaneous play of children, says that watching the spontaneous cognitive behavior of a group of children, under conditions designed to further free inquiry and free discussion, may reveal facts which would scarcely yield to the direct assault of tests or experimentation. Piaget, in his book, Growth of Logical Thinking, implies that the child's own demonstration of experimentation provides a better index to the nature of his thinking than do his verbal responses to questions.[2]

The research goal is that of a normative aim, for the purpose of disclosing central behavior tendencies of preschool children. Mussen[3] sites Goodenough (1928), Thomas (1929, 1933) and Arrington (1939), as supporting the use of observational studies for the purpose of establishing

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[1]Susan Isaacs, Intellectual Growth in Young Children (New York: Schocken Books, 1930), p. 6.

[2]Millie Almy, Young Children's Thinking (New York: Teachers College Press, Columbia University, 1966), p. 7.

[3]Paul H. Mussen, Handbook of Research Methods in Child Development (New York: John Wiley & Sons, Inc., 1960), p. 78.

norms, saying, "Norms based upon direct observation of spontaneous behavior may have greater validity than those established by tests or other 'interference techniques'."[1]

This is a study in which the writer hopes to obtain information about the categorical behavior of young children engaged in spontaneous play, by a systematic means of gathering data. The investigation will consist of recording behavior and analyzing the obtained data. The data will then be subjected to a classification system for the purpose of drawing conclusions.

Selection of the Data-Gathering Instruments

During a pilot study (see Appendix A) conducted by the writer, previous to this research effort, several data collection devices were utilized and evaluated as to their effectiveness in producing reliable data on the categorizations of young children engaged in spontaneous play. Two data collection instruments proved effective, each offering data information not produced by the other. It was decided by the writer that two means of collecting observational data would be employed during the study. A description of these two data collection instruments follows.

A small portable Sony tape recorder, with an all-directional microphone, was carried in a purse, so as not

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[1] Ibid.

to be visible to the children. The teachers were aware of the use of the tape recorder and approved of its use. The recorder collected children's conversations in their entirety. This allowed for accurate collection of the children's verbal responses during their play. The voice quality on the recorder was inadequate, which made it very difficult to recognize the child making the verbal response. For this reason, the data collection sheet (to be described next) was used, on which the child's name was recorded with the first few words of the verbal response. This procedure allowed the writer to identify the child making the verbal response. The recorder was then used to record in detail, what was said by the child.

A data collection sheet was used along with the tape recorder during the observations of the children. A copy of this data collection sheet can be found in Appendix B of this paper. The data collection sheet provided space for the written notation of the date of the observation, class, child's name, age, sex, play area in which the activity took place, brief description of the play situation, the first few words of each child's verbal response (which was used in identifying the child recorded on the tape recorder), and the classification of the data collected. Three items were completed during the actual observation of the children. These were: child's name, play area, and the first few words of the child's verbal response. The

remaining items were completed after the direct observations of the spontaneous play period were ended.

The data collection sheet was a necessary supplement to the tape recorder in collecting data. Written notes on the child's physical activity often gave clarity to the tape recordings. When a child said "This is red," the written notes provided the information which indicated that "this" meant a truck which the child was holding.

Procedures

This study was initiated during the school year of 1970-1971. After the Karen Jenkins Nursery School was selected for the study from the three available preschool programs, the teachers were contacted and a description of the study was presented to them. The teachers agreed to having the writer conduct the study and obtained approval from the parents of the children enrolled in the nursery school.

It was decided that four weeks would be used for the study. This time period was established as a result of the findings gathered during a pilot study engaged in by the writer (see Appendix A). This pilot study indicated the length of time necessary to collect data, useful in the study of children's categorizations exhibited during spontaneous play.

The first week and a half was spent in the classroom getting to know the children, and establishing an atmosphere which allowed them to feel comfortable with the writer's presence. This was accomplished most easily with the three-year-old group. The five-year-old group was, at first, most inquisitive of the writer's presence, but with time, became accustomed to the writer's presence.

The actual recording of data took place over the following two and a half weeks. Six hours of spontaneous play were recorded for each of the three groups. A one hour time block of play was observed on consecutive Monday, Wednesday and Friday afternoons throughout the observational time period for the five-year-old group of children, until a total of six hours of observation had been completed. A one hour time block of play was also observed on consecutive Monday, Wednesday and Friday mornings throughout the observational time period for the four-year-old group of children, until a total of six hours of observation had been completed. A one and one half-hour time block of play was observed on consecutive Tuesday and Thursday mornings throughout the observational time period for the three-year-old group of children until a total of six hours of observation had been completed.

At the end of each play period, the data from the tape recorder was typed and supplemented by information from

the data collection sheet. This yielded the material to be analyzed for evidence of categorical behavior of young children engaged in spontaneous play.

Guidelines Adopted for Participating Adults

Guidelines for participating teachers, mothers and the writer were established in order to make as similar as possible, the general atmosphere in which the spontaneous play occurred. These were as follows:

1. The classroom teacher will initiate the free play period by informing the children, upon their arrival, that they may play if they like. This was not a new procedure, as this was done throughout the school year.
2. The teachers, mothers, and writer will in no way direct the children to any prescribed play area of the room or suggest that they engage in any prescribed play activity. The children will have complete freedom to choose what area of the play room they wish to play, what activity, if any, they wish to engage, and with what children they wish to play. There will be no attempt on the part of the teacher, mothers, or writer to structure group involvement (i.e., encourage isolates to participate in group activity, or split up existing groups of large number).

3. During the play period, the teacher, mothers, and the writer will answer any questions asked of them by the children, but will not intentionally engage children in conversation. The adults present will assist in getting any equipment asked for by the children, but will not offer new equipment of their own accord. The adults will oblige any child asking for assistance, but will not offer more assistance than that specifically asked for by the child.

Guidelines Adopted for the Identification of Spontaneous Play Settings

During the pilot study undertaken by the writer, various procedures were investigated for the purpose of discovering which procedure best served the needs of the study. The guidelines adopted for this study, in regards to the identification of a spontaneous play setting are as follows:

1. The writer will enter the room five minutes after the free play period has begun and proceed to select the first example of spontaneous play, as defined by the writer and delineated in guideline number two.
2. A spontaneous play setting worthy of investigation will include two, three or four children engaged in a play activity simultaneously, free from adult participation.

Guidelines Adopted for the Collection of Observational Data

1. The writer will position himself near the chosen play setting, taking care to become as noninterruptive as possible. Learning how to become a noninterruptive observer takes practice. Improvement in this area came through participation in the pilot study and through investigation of written material on techniques for observing child behavior.[1]
2. The writer will record data through use of the tape recorder and the data collection sheet, as described in the section of this paper concerning the data gathering instruments.
3. The writer will continue to collect data from the selected play setting until one of the following circumstances occur, at which time she will disband this play setting and select a new one:
    a. ten minutes of data collection has taken place in the selected play setting.
    b. less than two and more than four children are participating in the play activity.
    c. adult interference occurred (this was a rare occurrence).

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[1] Nancy Trevorrow Carbonara, Techniques for Observing Normal Child Behavior (University of Pittsburgh Press, 1961).

d. children participating, leave a play activity and initiate a new activity.

4. At such time that the writer disbands a play setting, for reason of circumstances given above, he proceeds immediately to select another play setting, using the same selection guidelines used in the first selection of a play setting. If no play setting exists, as defined under the guidelines adopted, the writer records nothing, continuing to search for a play setting worthy of investigation. It was found, during the pilot study, that difficulty in finding a play setting worthy of investigation was rare (occurring exclusively in the three-year-old group).
5. The writer will continue this process of selection and disbandment of play activities until the play period comes to an end. The play period for the four-year-old group and the five-year-old group was one hour. The play period for the three-year-old group was one and a half hours.

Classification System Adopted for use in the Analysis of Observational Data

Reliability of the classification system is a necessity in an observational study which uses data for the purpose of making interpretive conclusions. For this reason, it was necessary to generate a definition of categorical

behavior through a set of rules which outline the necessary characteristics of data to be included in the analysis of categorical behavior. These rules are given below:

1. Those items considered for inclusion in the analysis of categorizations made by children are:
   a. persons
   b. animals
   c. objects

   Places, situations, events, and other items capable of being categorized by children are excluded from this analysis.
2. The object (person, animal, object) being categorized must be identified through one of the following means:
   a. The object to be categorized is indicated by a direct verbal response or naming, i.e., car, policeman, lion.
   b. The object to be categorized is indicated by an indirect verbal response, i.e., "this, he, it, that." In cases such as this, the observer records the actual name of the object of categorization; i.e., "it," meaning "car"; "he," meaning "policeman"; or "that," meaning "book."
   c. The object to be categorized is indicated by another child in a preceding piece of dialogue.

It must be readily observable that the child making the categorization is referring to the already identified object; i.e., the first child says, "I have a bulldozer." The second child says, "makes dirt pile up in big hills." In this case, the object was identified by the first child and the second child made the categorization.

3. The criterion chosen by the child for the categorization must be expressed through verbal response; i.e., "This car is red." The criterion chosen by the child (red) has been expressed verbally.
4. The criterion for categorization utilized in the analysis are of two general types (descriptive classification and relational-contextual classification), described below:
   a. Descriptive classification: Classification based on physical criteria such as form, color, shape, etc. The types of physical criteria analyzed in this study are:
      1. color; i.e., red, light green, black.
      2. size; i.e., big, long, baby (when referring to size rather than mother-baby relationship), doesn't fit (when referring to object's size).
      3. shape; i.e., it's a U shape (referring to the shape of a horseshoe), square, pointed.

4. Mass; i.e., too much (when referring to quantity of liquid), weight.
5. physical composition; i.e., this is plastic (indicating material of which the object is composed).
6. number (indicating number of parts on one given object); i.e., this car has only three wheels.

b. Relational-contextual classification: Classification made on the basis of the interdependence of items in an array. The types of relational-contextual criterion analyzed in this study are:

1. roles of persons; i.e., doctor gives shots, robber steals jewels, father fixes roof, big boy goes on a date. Roles indicated by child must be of a type easily identified as one specific class role. Activities common to all people; i.e., policeman eats, is not considered a role characteristic of policemen but rather a characteristic of all people. The characteristic identified by the child must be readily classified to certain class roles; i.e., policeman catches bad guys.

2. personal attributes of persons; i.e., firemen are brave, clowns are funny.
3. functions or roles of animals; i.e., fish swim, alligators bite you, ducks lay eggs.
4. personal attributes of animals; i.e., a lion is an enemy, a lamb is a gentle friend.
5. functions of objects; i.e., clothespins hold up clothes, nails make two boards go together, a badge tells who the driver is, chimney helps keep the house warm.
6. personal attributes of objects; i.e., magnet can pick up metal, yellow markers can't show up on yellow paper.

It will be noted that it is very difficult in many cases, to distinguish the criterion of categorization between the function of an object and the personal attributes of the object; i.e., is a magnet's ability to pick up metal, a personal attribute or a function of magnets? Because this study is not concerned with a comparison between the personal attribute criterion and the function criterion for categorizations made, it is not necessary to differentiate these two criteria. Both types are recorded under "relational-contextual classification," receiving equal weight in the analysis. The important differentiation is

between descriptive classifications and relational-contextual classifications. The entire study depends on the clear-cut differentiation of these two types of classifications.

Scoring Procedures

The scoring procedures involved the use of five steps to be described below. These first five steps included the use of only raw data. During the analysis, the raw data was converted to other forms appropriate for the interpretation of data of this kind.

1. At the end of each play period, the data from the tape recorder was typed and supplemented by information from the data collection sheet. An example of this data gathering device is given in Appendix C.
2. The next step in the scoring procedure, entailed the identification of all examples of categorical behavior (as defined in the guidelines on the classification system adopted for use in the analysis of observational data, pp. 83-86).
3. All examples of categorical behavior were then extracted from the comprehensive dialogue collection sheets and recorded on another sheet given in Appendix D. The identification of the object being categorized and the criterion selected by the child for

this categorization were taken from the categorical dialogue and recorded in the appropriate columns.

4. A tabulation count was then made of all categorical behavior exhibited by the three-year-olds, four-year-olds, and five-year-olds. This count was recorded on the appropriate sheets given in Appendix E, F, G.
5. The data from these three sheets were then totaled and recorded on one comprehensive data sheet given in Appendix H.

Analysis of Data

The analysis procedures include the selection of the appropriate data from the comprehensive data sheet which are necessary for the tests of each of the stated hypotheses. This data is, in turn, organized, analyzed as raw data, or converted to percentage data before analysis. The type of analysis employed for testing each hypothesis is not uniform. A brief delineation of the kind of analysis selected to test each hypothesis follows.

Hypothesis I.--The variables of age and type of categorization were subjected to the Chi-Square Test.

Hypothesis II.--Hypothesis II was divided into ten sub-hypotheses and analyzed separately. Chi-Square tests were employed in the analysis of specified

variables. Comparisons of frequency counts and comparisons of percentage conversion data were also indicated.

Hypothesis III.--Hypothesis III was divided into three sub-hypotheses and analyzed separately. Comparisons of frequency counts and comparisons of percentage conversion data were also employed.

Hypothesis IV.--Hypothesis IV was analyzed through comparisons of percentage conversion data.

Hypothesis V.--Hypothesis V was analyzed through comparisons of percentage conversion data.

Summary

This study included 43 children ages three, four, and five from the Karen-Jenkins Cooperative Nursery School located in Hillsdale, Michigan. Observations of children engaged in spontaneous play were undertaken for the purpose of collecting evidence of categorical behavior of preschool children. The data collected was organized into meaningful units and later utilized in tests of the stated hypotheses.

CHAPTER IV

PRESENTATION OF FINDINGS

The purpose of this chapter is to report the data which comprise the findings of this study. The chapter is organized around the findings relative to each stated hypothesis. The presentation and analysis of the data is followed by a brief discussion of the obtained results. A more lengthy discussion will form the content of Chapter V.

On the following three pages are tables giving comprehensive presentations of the data collected during the study. The summary data in these three tables originate in the recorded data given on the data collection sheets.

Table 1 is a summary table which gives the obtained frequencies of discriminations based on specified criterion. The numbers in the chart represent raw data frequencies. The number 15, found in row one and column one indicates that there were 15 examples of categorizations made by the three-year-old children which were based on the criterion of color.

Table 2 is a summary table derived from the raw data given in Table 1. Columns A,B,C of Table 1 have been

totaled to form one column in Table 2. Columns D,E,F, from Table 1 have been totaled to form one column in Table 2.

Table 3 is percentage conversion data coming directly from Table 2. The information given in all three tables to follow are used to set up new tables for the purpose of testing the stated hypotheses.

Hypothesis I

Hypothesis I states that there will be no difference between the three-year-old children, four-year-old children, and five-year-old children in the kinds of categorizations made while engaged in spontaneous play.

To test this hypothesis, Table 4 was developed showing the obtained frequencies of categorical behavior of three-, four-, and five-year-old children. The obtained table of cell frequencies was then compared to a table of expected cell frequencies. The Chi-Square was used to test for a difference between the obtained frequencies and the expected frequencies. The Chi-Square value observed was 16. The tabled Chi-Square value with two degrees of freedom at an alpha level of .05 is 5.99. The Chi-Square value exceeded the tabled Chi-Square value. The null hypothesis of no difference was rejected. The Chi-Square test indicates that there is a difference between the three-year-old children, four-year-old children, and five-year-old children in the kinds of categorizations made while engaged in spontaneous play.

Table 1. Summary of children's categorical behavior: frequency count.

	*I. Descriptive Criterion							**II. Relational-Contextual Criterion				Grand Total I & II
	A	B	C	D	E	F	Total	A	B	C	Total	
Three-year-old children	15	22	5	0	0	0	42	3	3	16	22	64
Four-year-old children	10	26	3	3	0	1	43	22	2	45	69	112
Five-year-old children	21	32	6	8	4	2	73	33	11	124	168	241

*I. Descriptive Criterion
A - color
B - size
C - shape
D - mass
E - physical composition
F - number

**II. Relational-Contextual Criterion
A - people
B - animal
C - object

Table 2. Summary table of raw data.

	I. Descriptive Criterion			II. Relational-Contextual Criterion	Total I & II Descriptive & Relational-Contextual	No. child. making more II than I categ.	No. child. making same or less II than I categ.
	Columns A,B,C,	Columns D,E,F	Column Total A,B,C, D,E,F				
Three-year-olds	42	0	42	22	64	1	9
Four-year-olds	39	4	43	69	112	10	5
Five-year-olds	59	14	73	168	241	15	1

Table 3. Summary table of converted data (taken from table of raw data).

	I. Descriptive Criterion		I. Descriptive Criterion	II. Relational-Contextual Criterion	Total I & II	% child. making more II than I categ.	% child. making same or less II than I categ.
	Columns A,B,C,	Columns D,E,F,					
Three-year-olds	100%	0	65.6%	34.4%	100%	10%	90%
Four-year-olds	90.7%	9.3%	38.4%	61.6%	100%	66.6%	33.3%
Five-year-olds	80.8%	19.2%	30.3%	69.7%	100%	94%	6%

Table 4. Frequency count of categorical behavior: descriptive criterion and relational-contextual criterion.

	Descriptive Criterion	Relational-Contextual Criterion	Total
Three-year-olds	42	22	64
Four-year-olds	43	69	112
Five-year-olds	73	168	241
Total	158	259	417

The Chi-Square test showed that there was a difference in the kinds of categorizations made by three-, four-, and five-year-old children. However, this test did not indicate where the differences lie. The analysis of data used in testing Hypothesis II reveals where these differences lie.

Hypothesis II

Hypothesis II states that there will be no difference between the three-year-old children, four-year-old children, and five-year-old children in the frequencies of their categorizations of the following types:

a. total categorizations (descriptive and relational-contextual).
b. total descriptive categorizations (color, size, shape, mass, physical composition, and number).
c. total relational-contextual categorizations (people, animal, object).
d. color
e. size
f. shape
g. mass
h. physical composition
i. number
j. total of descriptive criterion of the following type: color, size, shape in comparison to total descriptive criterion of the following type: mass, physical composition, number.

To test this hypothesis, sub-hypotheses were stated and analyzed separately. Tables were produced showing raw data frequencies and the conversions of these raw data frequencies to percentage data. It was then possible to make comparisons among three-year-olds, four-year-olds, and five-year-olds as to the frequencies of their categorizations of specified types.

Hypothesis IIa.--Hypothesis IIa states that there will be no difference between three-year-old children, four-year-old children and five-year-old children in the frequency

of their total categorizations (descriptive and relational-contextual) observed during spontaneous play (Table 5).

Table 5. Total categorizations: descriptive and relational-contextual--frequency count and percent conversions.

	Frequency Count	*Percentage Conversions
Three-year-olds	64	15%
Four-year-olds	112	27%
Five-year-olds	241	58%

*Percentage conversions refer to the percentage of categorizations made by a specified age group in relation to the total number of categorizations made by all age groups.

An analysis of the data reveals that there is a difference in the frequency of total categorizations (descriptive and relational-contextual) between three-year-old children, four-year-old children, and five-year-old children observed during spontaneous play. It was found that 15 percent of all categorizations were made by the three-year-old children. Approximately twice as many categorizations (27 percent) were made by the four-year-old children as were made by the three-year-old children. Five-year-old children made

nearly four times as many categorizations (58 percent) as were made by the three-year-old children. An increase in age is clearly seen to accompany an increase in the frequency of categorizations made by children three-, four-, and five-years-old, while engaged in spontaneous play.

Hypothesis IIb.--Hypothesis IIb states that there will be no difference between three-year-old children, four-year-old children, and five-year-old children in the frequency of their categorizations made on the basis of descriptive criterion of the following kinds: color, size, shape, mass, physical composition, and number.

To test this hypothesis, Table 6 was produced showing raw data frequencies and conversions of these raw data frequencies to percentage data. It was then possible to make comparisons among three-year-old children, four-year-old children, and five-year-old children, as to the frequencies of their categorizations based on descriptive criterion.

An analysis of the data reveals that the stated hypothesis is only partially supported. The data shows no difference between the three-year-old children and the four-year-old children in the frequency of their categorizations based on descriptive criterion. There is, however, a very definite difference between the five-year-old group and the four-year-old group in the frequency of their categorizations based on descriptive criterion. It was found that

Table 6. Categorizations based on descriptive criterion.

	Frequency Count	*Percentage Conversions
Three-year-olds	42	27%
Four-year-olds	43	27%
Five-year-olds	73	46%

*Percentage conversions refer to the percentage of categorizations made by a specified age group in relation to the total number of categorizations made by all age groups.

46 percent of all descriptive categorizations were made by the five-year-old group as compared to only 27 percent of all descriptive categorizations made by the four-year-old group.

Hypothesis IIc.--Hypothesis IIc states that there be no difference between three-year-old children, four-year-old children, and five-year-old children in the frequency of their categorizations made on the basis of relational-contextual criterion.

Table 7 was produced showing raw data frequencies and conversions of these raw data frequencies to percentage data. It was then possible to make comparisons among three-year-old children, four-year-old children, and five-year-old

children, as to the frequencies of their categorizations based on relational-contextual criterion.

Table 7. Categorizations based on relational-contextual criterion.

	Frequency Count	*Percentage Conversions
Three-year-olds	22	8%
Four-year-olds	69	27%
Five-year-olds	168	65%
Total	259	100%

*Percentage conversions refer to the percentage of categorizations made by a specified age group in relation to the total number of categorizations made by all age groups.

An analysis of the data reveals that there is a difference in the frequency of categorizations based on relational-contextual criterion between the three-year-old group, four-year-old group, and the five-year-old group. It was found that 8 percent of all relational-contextual categorizations were made by the three-year-old group. Approximately three times as many relational-contextual categorizations (27 percent) were made by the four-year-old group as were made by the three-year-old group. The

five-year-old group made nearly eight times as many categorizations (65 percent) as were made by the three-year-old group.

Hypotheses IId,e,f,g,h,i.--Hypotheses IId,e,f,g,h,i state that there will be no difference between three-year-old children in the frequencies of their categorizations using criteria of color, size, shape, mass, physical composition, and number.

To test this hypothesis, Table 8 was developed. This table shows the obtained frequencies of categorizations based on criteria of color, size, shape, mass, physical composition, and number of three-year-old children, four-year-old children, and five-year-old children. The obtained table of cell frequencies was then compared to a table of expected cell frequencies. The Chi-Square was used to test for a difference between the obtained frequencies and the expected frequencies.

The Chi-Square value observed was 14.3. The tabled Chi-Square value with ten degrees of freedom at an alpha level of .05 is 18.3. The Chi-Square observed did not exceed the tabled Chi-Square value. The null hypothesis of no difference could not be rejected. Although the Chi-Square test of the data did not show a significant difference, attention to separate criteria in relation to age offers information concerning the descriptive categorizations made by children of different ages.

Table 8. Frequency count of descriptive criterion--separate.

	Color	Size	Shape	Mass	Phys. Compos.	Number	Total
Three-year-olds	15	22	5	0	0	0	42
Four-year-olds	10	26	3	3	0	1	43
Five-year-olds	21	32	6	8	4	2	73
Total	46	80	14	11	4	3	158

Table 9 was developed for the purpose of analyzing the raw data from Table 8. Table 9 gives the percentage conversions from the original raw data found in Table 8.

The tabled values for color and shape do not support the hypothesis that the frequencies of categorizations using criteria of color and size will increase with an increase in age. The five-year-old children had the greatest frequencies using criteria of color and shape. However, the three-year-old children had greater frequencies using criteria of color and shape than did the four-year-old children. The frequencies associated with the criterion of size did increase with an increase in age. However, the increase in frequency was not as great as those associated with other criteria. The criteria of mass, physical composition and

Table 9. *Percentage conversion of descriptive criterion--separate.

	Color	Size	Shape	Mass	Phys. Compos.	Number
Three-year-olds	33%	28%	36%	0	0	0
Four-year-olds	20%	32%	21%	27%	0	33%
Five-year-olds	46%	40%	43%	73%	100%	67%

*Percentage conversions refer to the percentage of categorizations made by a specified age group in relation to the total number of categorizations made by all age groups.

number did increase in frequency with an increase in age. However, this finding must be interpreted with caution due to the fact that the frequency of responses in each of these criterion classes was extremely small. The small frequencies of responses in the criterion classes of mass, physical composition and number were anticipated as a result of the findings of other researchers.[1] For this reason, a hypothesis was stated and tested which allowed for the combination of descriptive criteria into two groups. Group one included

[1]This finding is discussed in greater depth in Chapter V.

the criteria of color, size, and shape. Group two included the criteria of mass, physical composition, and number.

Hypothesis IIj.--Hypothesis IIj states that there will be no difference between the three-year-old children, four-year-old children, and five-year-old children in the frequencies of their selection of descriptive criteria of color, size, and shape total; and descriptive criteria of mass, physical composition, and number total.

To test this hypothesis, Table 10 was developed, showing the obtained frequencies of color, size, shape total and obtained frequencies of mass, physical composition, number total of three-, four-, and five-year-old children. These observed cell frequencies were then compared to a table of expected cell frequencies. The Chi-Square was used to test for a difference.

Table 10. Frequency count of descriptive criterion--grouped.

	Group I color, size, shape	Group II mass, physical comp., number	Total
Three-year-olds	42	0	42
Four-year-olds	39	4	43
Five-year-olds	59	14	73
Total	140	18	158

The Chi-Square observed was 9.93. The tabled Chi-Square value with two degrees of freedom at an alpha level of .05 is 5.99. The observed Chi-Square value exceeded the tabled Chi-Square value. The null hypothesis of no difference was rejected. The Chi-Square test indicated that some statistical association does exist between age and category.

The Chi-Square test showed that there was a difference in the frequency of selection of some criteria over other criteria related to age. However, this test did not reveal where these differences lie. In order to reveal where these differences lie, the frequency counts given in Table 10 were converted into percentage data and presented in Table 11 which immediately follows.

Table 11. Percentage conversions of descriptive criterion--grouped.

	Group I color, size, shape	Group II mass, physical comp., number
Three-year-olds	30%	0
Four-year-olds	28%	22%
Five-year-olds	42%	78%
Total	100%	100%

An examination of this table reveals information indicating that the frequency of responses in group I (color, size, shape) do not increase with age. However, the percentages for the different age groups are very similar, and should thus be interpreted with caution. Had the number of responses been much larger, the percentages could be interpreted with more assurance. The frequency of responses in group II (mass, physical composition, number) are found to increase with an increase in age. Again, the frequency of responses found in group II are extremely small. The percentage findings must be interpreted with caution. The findings concerning the difference between the frequencies of group I and group II are discussed in greater depth in Chapter V.

Hypothesis III

Hypothesis III states that there will be no difference in preference for categorizations made using descriptive criteria over categorizations made using relational-contextual criteria by three-year-olds, four-year-olds, and five-year-olds. This hypothesis is divided into three sub-hypotheses, each dealing with a different age group (three-year-old children, four-year-old children, and five-year-old children).

Hypothesis IIIa.--Hypothesis IIIa states that there will be no difference in preference for categorizations

made using descriptive criteria over categorizations made using relational-contextual criteria by three-year-olds. To test this hypothesis, Table 12 was produced which shows the raw data frequencies and the conversions of these raw data frequencies to percentages. Information from Table 12 allows for comparisons among categorizations using descriptive criteria and categorizations using relational-contextual criteria made by three-year-old children. It was found that 66 percent of all categorizations made by three-year-old children were categorizations based on descriptive criterion. Also, 34 percent of all categorizations made by three-year-old children were categorizations based on relational-contextual criterion.

Table 12. Categorizations of three-year-old children--grouped.

	Descriptive Criterion	Relational-Contextual Criterion	Total
Frequency Count	42	22	64
*Percentage Conversions	66%	34%	100%

*Percentage conversions refer to the percentage of categorizations of a specified type compared to the total number of categorizations of all types.

Table 13 was produced using data taken from Table 2. This table indicates the percentage of three-year-old children making more relational-contextual categorizations than descriptive categorizations. It was found that 10 percent of the three-year-old children made more categorizations based on relational-contextual criteria than categorizations based on descriptive criteria. It was found that 90 percent of the three-year-old children made the same or more categorizations based on relational-contextual criterion.

Table 13. Percentage of three-year-old children preferring type II categorizations and type I categorizations.

Percentage of children making more *II than I categorizations	Percentage of children making same or less II than I categorizations
10%	90%

*Type II categorizations refer to categorizations based on relational-contextual criteria. Type I categorizations refer to categorizations based on descriptive criteria.

Hypothesis IIIb.--Hypothesis IIIb states that there will be no difference in preference for categorizations made using descriptive criteria over categorizations made using relational-contextual criteria by four-year-old children. To test this hypothesis, Table 14 was produced, which shows

the raw data frequencies and the conversions of these raw data frequencies to percentages. Comparisons among categorizations using descriptive criteria and categorizations using relational-contextual criteria produced by four-year-old children were then made.

Table 14. Categorizations of four-year-old children--grouped.

	Descriptive Criterion	Relational-Contextual Criterion	Total
Frequency Count	43	69	112
*Percentage Conversions	38%	62%	100%

*Percentage conversions refer to the percentage of categorizations of a specified type compared to the total number of categorizations of all types.

It was found that 38 percent of all categorizations made by four-year-old children were categorizations based on descriptive criterion. While 62 percent of all categorizations made by four-year-old children were based on relational-contextual criterion.

Table 15 was developed using data taken from Table 2. This table indicates the percentage of four-year-old children making more relational-contextual categorizations than descriptive categorizations.

Table 15. Percentage of four-year-old children preferring type II categorizations and type I categorizations.

Percentage of children making more *II than I categorizations	Percentage of children making same or less II than I categorizations
67%	33%

*Type II categorizations refer to categorizations based on relational-contextual criteria. Type I categorizations refer to categorizations based on descriptive criteria.

It was found that 67 percent of the four-year-old children made more categorizations based on relational-contextual criterion than categorizations based on descriptive criterion. While 33 percent of the four-year-old children made the same or less categorizations based on descriptive criterion than categorizations based on relational-contextual criterion.

Hypothesis IIIc.--Hypothesis IIIc states that there will be no difference in preference for categorizations made using descriptive criterion over categorizations made using relational-contextual criterion by five-year-old children. To test this hypothesis, Table 16 was produced showing raw data frequencies and the conversions of these raw data frequencies to percentages. It was then possible to make comparisons among categorizations using descriptive criteria

and categorizations using relational-contextual criteria made by five-year-old children.

Table 16. Categorizations of five-year-old children--grouped.

	Descriptive Criterion	Relational-Contextual Criterion	Total
Frequency Count	73	168	241
*Percentage Conversions	30%	70%	100%

*Percentage conversions refer to the percentage of categorizations of a specified type compared to the total number of categorizations of all types.

It was found that 30 percent of all categorizations made by five-year-old children were categorizations based on descriptive criterion. While 70 percent of all categorizations made by five-year-old children were based on relational-contextual criterion.

Table 17 was produced using data taken from Table 2. This table shows the percentage of five-year-old children making more relational-contextual categorizations than descriptive categorizations.

It was found that 94 percent of the five-year-old children made more categorizations based on relational-contextual criterion than on descriptive criterion. While

Table 17. Percentage of five-year-old children preferring type II categorizations and type I categorizations.

Percentage of children making more *II than I categorizations	Percentage of children making same or less II than I categorizations
94%	6%

*Type II categorizations refer to categorizations based on relational-contextual criteria. Type I categorizations refer to categorizations based on descriptive criteria.

6 percent of the five-year-old children made the same or less categorizations based on descriptive criterion than on relational-contextual criterion.

A table showing the number of children making more II than I categorizations reveals interesting contrasts as to the preference of children of different ages for different types of criterion. Table 18 shows the number of children making more type II than type I categorizations.

To test the hypothesis of no difference in preference for categorizations made using descriptive criterion over categorizations made using relational-contextual criterion by three-year-old, four-year-old, and five-year-old children, Table 18 was developed showing the obtained frequencies of children making more type II than type I categorizations. The obtained table of cell frequencies

Table 18. Summary table of preferences for different types of criterion by three-year-old children, four-year-old children, and five-year-old children.

	Number of children making more II than I categorizations	Number of children making same or less II* than I categorizations
Three-year-olds	1	9
Four-year-olds	10	5
Five-year-olds	15	1

*Type II categorizations refer to categorizations based on relational-contextual criterion. Type I categorizations refer to categorizations based on descriptive criterion.

was then compared to a table of expected cell frequencies. The Chi-Square was used to test for a difference. The Chi-Square value observed was 11.5. The tabled Chi-Square value with two degrees of freedom at an alpha level of .05 is 5.99. The observed Chi-Square value exceeded the tabled Chi-Square value. The null hypothesis of no difference was rejected.

The data given in Table 19 clearly indicates the preferences of children of different ages for different types of criterion. Only 10 percent of all the three-year-old children observed made more categorizations based on relational-contextual criterion. While 67 percent of all

Table 19. Summary percentage table of preferences for different types of criterion by three-year-old children, four-year-old children, and five-year-old children.

	Percentage of children making more II than I categorizations	Percentage of children making same or less *II than I categorizations
Three-year-olds	10%	90%
Four-year-olds	67%	33%
Five-year-olds	94%	6%

*Type II categorizations refer to categorizations based on relational-contextual criterion. Type I categorizations refer to categorizations based on descriptive criterion.

the four-year-old children observed made more categorizations based on relational-contextual criterion than on descriptive criterion. It was found that 94 percent of all the five-year-old children observed made more categorizations based on relational-contextual criterion than on descriptive criterion. Three-year-olds prefer to base their categorizations on descriptive criterion, while five-year-old children prefer to base their categorizations on relational-contextual criterion.

Hypothesis IV

Hypothesis IV states that there will be no difference between girls and boys in the frequencies of their categorizations using criteria of the following types:

a. descriptive criteria

b. relational-contextual criteria

To test this hypothesis, Table 20 was produced which shows the percentage of descriptive categorizations made by girls and boys; and the percentage of relational-contextual categorizations made by girls and boys. An examination of Table 20 makes it possible to determine what percentage of the categorizations of a specified type were made by boys and what percentage were made by girls.

Table 20. Descriptive and relational-contextual categorizations made by girls and boys.

	Descriptive Criterion	Relational-Contextual Criterion
*Girls	50%	39%
Boys	50%	61%
Total	100%	100%

*The number of girls in the study was 21. The number of boys in the study was 20. In calculating the percentage data given above, the number of boys and girls was considered to be equal.

Table 20 indicates that there was no difference in the frequency of categorizations based on descriptive criterion between girls and boys. Of all the descriptive categorizations produced, 50 percent were made by girls and 50 percent were made by boys. There was a difference in the frequency of categorizations based on relational-contextual criterion between girls and boys. It was found that 61 percent of all the relational-contextual categorizations were made by boys. Whereas only 39 percent of the total relational-contextual categorizations were made by girls.

Hypothesis V

Hypothesis V states that there will be no difference between girls and boys in the frequencies of their categorizations using descriptive criteria of the following types:

a. color

b. size

c. shape

To test this hypothesis, Table 21 was developed which shows the percentage of categorizations based on the criteria of color, size, and shape made by girls and boys. It was then possible to determine what percentage of the categorizations of a specified type were made by boys and what percentage were made by girls. The percentage data in this table is a product of conversions of frequency data to percentage data.

Table 21. Descriptive categorizations based on criteria of color, size, and shape made by girls and boys.

	Color	Size	Shape
*Girls	65%	50%	14%
Boys	35%	50%	86%
Total	100%	100%	100%

*The number of girls in the study was 21. The number of boys in the study was 20. In calculating the percentage data given above, the number of boys and girls was considered to be equal.

It was found that 65 percent of all the categorizations based on the criterion of color were made by girls. While 35 percent were made by boys. No difference was found in the frequency of categorizations based on size between girls and boys. Boys made 86 percent of all the categorizations based on the criterion of shape. Girls made only 14 percent of all the categorizations based on the criterion of shape. It appears that boys produce more categorizations based on shape; whereas girls produce more categorizations based on color.

Summary

This study was developed around the belief that children of different ages select different kinds of criterion as the basis of their categorizations. Preschool children were observed during their spontaneous play for

the purpose of gathering evidence of categorical behavior of these children. The collected data was then organized and subjected to analysis procedures. The analysis procedures revealed information which either supported or failed to support the stated hypotheses. It was found that three-year-old children, four-year-old children, and five-year-old children do differ in the kinds of categorizations they make while engaged in spontaneous play. It was also found that three-, four-, and five-year-old children differ in the frequencies of their categorizations of certain types. The frequencies of some types of categorizations, however, did not differ with different aged children. The analysis also revealed quite clearly, that there are differences of preferences of children of different ages for different types of criterion. Some differences were found between boys and girls in relation to the frequencies of categorizations based on criteria of different types.

Although some of the differences concerning the categorical behavior are presented very briefly in this summary, information regarding specific types of categorizations must be found in the individual analyses of each stated hypotheses.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Chapter V is devoted to the interpretation of findings reported in Chapter IV, and to the presentation of those conclusions and recommendations which seem warranted, as a result of the examination of the data. In Chapter I the objectives of the study were outlined. One of those objectives was to confirm or fail to confirm the available research evidence on the categorical behavior of young children. This was felt to be an important aspect of this study, due to the fact that the writer was not able to find evidence of research which examines the categorical behavior of preschool children exhibited during spontaneous play. There was, however, an abundance of research literature concerning the categorical behavior of preschool age children exhibited during "test-like" situations. The conclusions to be presented next, will therefore consider not only the findings of this study but also the findings of this study in relation to the relevant research reviewed in Chapter II.

Conclusions

This study was designed to examine the categorical behavior of young children in relation to the variables of

age and sex. Observational data extracted from the verbal responses of preschool children engaged in spontaneous play was collected, organized and analyzed for the purpose of disclosing the relationship of the variables identified as age and sex of children to the specified types of categorical behavior. Within the scope of this study, certain conclusions appear justified and are now presented.

A global conclusion can be reached concerning the relation between age and the type of criterion children select in making categorizations, from a look at the information revealed in the analysis of data related to Hypothesis I. There was a difference between the three-year-old children, four-year-old children and five-year-old children engaged in this study, in the kinds of categorizations they made while engaged in spontaneous play. It is important to note that this global conclusion does not infer that all types of categorical behavior are related to age. The relation between age and categorical behavior must be reviewed in terms of specific types of categorical behavior. The remainder of the stated hypothesis will deal with specific types of categorizations in relation to age and sex, and thus the conclusions reached on the basis of specified types of categorical behavior will be more meaningful.

The frequencies of specified types of categorical behavior were the focus of Hypothesis II. It was found

that when all types of categorizations were considered, a very definite difference in frequencies associated with age appeared. The five-year-old children made significantly more categorizations than four-year-olds. Also, the four-year-olds made more categorizations than three-year-olds. This finding is what one would have anticipated in light of evidence from research which links an increase in age with an increase in verbal fluency, as well as a maturity of categorical behavior. One must be cautious in reaching the conclusion that since younger children do not exhibit evidence of an abundance of categorizations verbally, that they can not. This study indicates only that younger children do not make as many categorizations verbally as their older peers.

When categorizations based solely on descriptive criterion were analyzed in relation to age, it was found that the five-year-old children made twice as many categorizations as did the four-year-old children. There was, however, no difference in the frequencies of categorizations based on descriptive criterion between the four-year-old children and the three-year-old children.

When categorizations based solely on relational-contextual criterion were analyzed in relation to age, it was found that there was a very definite increase in the frequency of categorizations based on relational-contextual criterion in relation to an increase in age. This finding,

along with the findings of others concerning verbal fluency and the kinds of categorizations made in testing situations, gives confidence in drawing the conclusion that an increase is accompanied by an increase in the frequency of certain types of categorical behavior.

Categorizations based on descriptive criterion were analyzed as a total unit and the findings were presented above. Sub-hypotheses taken from this overall hypothesis were then developed and analyzed. The descriptive criteria examined included: color, size, shape, mass, physical composition, and number. A Chi-Square test indicated that there was no overall difference associated with age in relation to kind of descriptive criterion. However, when the raw data was converted to percentage data, some information was revealed. It was found that the frequency of categorizations using color as the criterion was greater for the five-year-old children than the younger children. Surprisingly though, the three-year-olds produced more color-based categorizations than the four-year-olds. There was a very slight association between increase in age with an increase in frequency of categorizations based on size. In regards to the criterion of shape, five-year-olds had the greatest frequency but only slightly more than the three-year-olds. Interestingly enough, the four-year-old children had the fewest number of categorizations based on the criterion of shape. The information produced as a result of the analysis

of the frequencies of responses using mass, physical composition and number, must be viewed with utmost caution, due to the fact that the number of categorizations made which were based on these criteria, was extremely small. The percentage conversions may thus give an inflated picture of the relationship. Perhaps the most valid conclusion that can be reached concerning the criteria of mass, physical composition and number is that children ages three-through-five make very few categorizations using these criteria as their basis.

When the criteria of color, size and shape were grouped and compared to the criteria of mass, physical composition, and number grouped, some interesting findings were revealed. It was found that while there were slight differences in frequencies of categorizations based on color, size and shape in relation to age, the greatest difference in frequencies related to age came when related to the total of mass, physical composition and number. Because cell frequencies were combined and thus increasing the number of observations in a cell, the conclusions drawn from this analysis must still be accepted with great caution.

The findings related to Hypothesis I and all the sub-hypotheses of II are generally quite consistent with the findings revealed in other research which took place in "test-like" settings. Generally speaking, an increase in

age is associated with an increase in the frequency of many types of categorical behavior.

Perhaps the most interesting findings coming from this study and also perhaps the most valuable findings, concern the preferences of children of different ages for categorizations based on certain types of criterion. In "test-like" studies of the categorical behavior of young children, it is most difficult to ascertain a preference for certain types of criterion of children of different ages, due to the fact that the materials used in assessing categorical behavior are structured, and may to some degree bias the selections made by children. Categorizations made during spontaneous play, on the other hand, may offer the child the opportunity to express a true preference for certain types of criterion. The choice is not completely open, in that the nature of the play equipment does to some extent structure the setting for available categorizations. Generally, I think it can be said that spontaneous play settings allow greater freedom for the child to express true preference for certain types of criteria than do "test-like" settings.

It was found that out of all the categorizations made by the three-year-old children, 66 percent were based on descriptive criterion and 34 percent were based on relational-contextual criterion. It was also found that out of all the categorizations made by the four-year-old

children, 38 percent were based on descriptive criterion and 62 percent on relational-contextual criterion. When all the categorizations made by the five-year-old children were considered, it was found that 30 percent were based on descriptive criterion and 70 percent based on relational-contextual criterion.

This same data used in the analysis just reviewed was analyzed in another way which offered more information concerning the preferences of children of different ages for certain types of criterion. The number of three-year-old children making more relational-contextual categorizations was determined. Only 10 percent of the three-year-old children made more relational-contextual categorizations than descriptive categorizations. The number of four-year-old children making more relational-contextual categorizations was 67 percent. The analysis revealed that 94 percent of the five-year-old children made more relational-contextual categorizations than descriptive categorizations. There was a definite increase in the number of children making more relational-contextual categorizations than descriptive categorizations with an increase in age. This finding should be viewed with caution because, again the number of children was small and thus the percentage conversions may inflate the differences revealed. The differences are, however, so great that it may be safe to draw the conclusion that five-year-old children exhibit a definite

preference for relational-contextual criteria as the basis of their categorizations, while three-year-old children exhibit a definite preference for descriptive criteria as the basis of their categorizations. This conclusion gains further support when one considers the fact that descriptive criteria, as identified in this study, require predominantly visual discriminations. Whereas, relational-contextual criteria, as identified in this study, require more than simple visual discriminations. Higher mental processes are involved. In light of this fact, it seems somewhat reasonable to predict that younger children, who lack the mental maturity of older children, will select criteria which involve simple visual discrimination; while the older children, who have attained a greater degree of mental maturity, and thus be able to handle more difficult discriminations, may prefer to make discriminations based on relational-contextual criterion.

Another variable of interest in its relation to the types of categorizations made is sex. It was found that there was no difference between the girls and boys in the frequencies of categorizations based on descriptive criterion. There was, however, a difference revealed between boys and girls in the frequency of their categorizations based on relational-contextual criterion. Of the total categorizations made on the basis of relational-contextual criterion, 39 percent were made by girls and 61 percent were made by boys.

When the criteria of color, size and shape were considered in relation to sex, it was found that there was no difference between boys and girls in the frequency of their categorizations based on size. Quite the opposite was found when criterion of color was analyzed in relation to sex. It was found that 65 percent of all categorizations based on the criterion of color were made by girls. Boys made 35 percent of the total number of categorizations based on color. A difference was also found when the criterion of shape was considered. Girls made 14 percent of the total categorizations based on the criterion of shape. Whereas, boys made 86 percent of the categorizations based on the criterion of shape. The findings regarding the criteria of color and shape in relation to sex were a surprise to the writer. It is difficult, at least from the writer's viewpoint, to reach a conclusion based on these findings. The data certainly indicate that there is a relationship between sex and the criteria of color and shape. It is difficult to hold the belief that such very young children have already developed preferences for certain types of criteria. Perhaps a look at some other variable, which might be affecting the types of categorizations made by children of different sexes, may be warranted.

In summary, it may be stated that some tentative conclusions may be reached, concerning the relationship between types of criteria selected in making categorizations

to the age and sex of preschool children who are similar to the children observed in this study. An increase in age is generally accompanied by an increase in the frequencies of all types of categorical behavior examined in this study. Children differ in their preference for certain types of criterion in relation to age. A conclusion of a most tentative nature is that sex is a factor related to the frequencies found for categorizations based on certain types of criterion.

Recommendations

As a result of this study, the writer is interested in further investigations concerning the nature of play of young children. The following suggestions are directed to the writer herself and to other individuals interested in engaging in research studies for the purpose of gaining information concerning the nature of young childrens' play.

I. There were a number of hunches that evolved as a result of this study which suggest possible areas for future investigation. One hunch that developed was that not only the age of the child, but also the nature of the equipment determines the kinds of categorizations made by young children. This study then could be modified for the purpose of discovering what effects the variable of equipment has on the play behavior of young children. Findings

concerning the nature of equipment in relation to play behavior may suggest guidelines for nursery school teachers.

II. Another recommendation is that the research completed here be repeated with modification of the characteristics of the sample. An analysis of children's categorical behavior in relation to the variable of ecological background might reveal some interesting information. An investigation of this nature might indicate the degree to which the variable of age overpowers the variable of ecological background. Smilansky's work, reviewed earlier, presented findings that children from Israel with low socio-economic backgrounds engage in very little sociodramatic play. The writer's observations made during this study, hint at the idea that sociodramatic play may provide the setting for more relational-contextual categorizations than do other types of play. Future studies on the categorical behavior of preschool children might attempt to compare the categorizations made by children as described by Smilansky, with the children in this study.

III. Another study which the writer proposes uses the same research design as the one used here but allows for an extended period of two or three years for investigation. The greater length of time over which the data would be gathered should yield the evidence concerning developmental trends in children's categorical behavior.

IV. Similar to the recommendation offered above, the writer proposes a longitudinal study in which the design includes observations of individual children over long periods of time. Such a study would permit the observer to record possible consistencies and changes as they manifest themselves in each child.

V. As was mentioned earlier, the writer was able to find very little information from the literature concerning the behavior of young children during spontaneous play. There is a great deal of information concerning the "play" behavior of young children in test-like settings, which structures to some extent the kinds of responses available to the child. The writer is proposing an extension of this study in which the play behavior of six-, seven-, and eight-year-old children exhibited in spontaneous play settings be investigated. The writer cannot conclude recommendations for future work without a comment concerning the need to extend concern for spontaneous play to children of all ages.

BIBLIOGRAPHY

BIBLIOGRAPHY

Almy, Millie. "Spontaneous Play: An Avenue for Intellectual Development." The Bulletin of the Institute of Child Study. Toronto, Ontario: University of Toronto. (May 1969). 266.

_____. Young Children's Thinking. New York: Teachers College Press, Columbia University, 1966.

Axline, Virginia M. Play Therapy. New York: Ballantine Books, Inc., rev. ed., 1969.

Bailey, N. "Mental Growth During the First Three Years. A Developmental Study of Sixty-One Children by Repeated Tests." Genetic Psychology Monograph, 14, (1933).

Baldin, B. T. "Child Development." Canadian Nurse, 25, (1929), 607-611.

Biber, Barbara. "The Five to Eights and How They Grow." Childhood Education, XVIII, (October 1941), 67.

_____. "Young Deprived Children and Their Educational Needs." International Bulletin, Washington, D.C.: Association for Childhood Education, (January 1967), 6.

Bishop, M. B. "Mother-Child Interaction and the Social Behavior of Children." Psychological Monograph, (1951).

Blatz, W. E. and Bott, H. Parents and the Preschool Child. New York: William Morrow and Co., 1929.

Bower, Eli M. "Play's the Thing." Today's Education - NEA Journal, (September 1968).

Boynton, P. L. and Ford, F. A. "The Relationship Between Play and Intelligence." Journal of Applied Psychology, 17, (1933), 194-301.

Brian, C. R., and Goodenough, F. L. "Relative Potency of Color and Form Perception at Various Ages." Journal of Experimental Psychology, 12, (1929), 197-213.

Brown, Nancy. Play: The Child Strives Toward Self-Realization. Washington D.C.: National Association for the Education of Young Children, 1971.

Buhler, C. "The Child and Its Activity with Practical Material." British Journal of Educational Psychology, 3, (1933), 27-41.

_____. From Birth to Maturity: An Outline of the Psychological Development of the Child, 1935.

Carbonara, Nancy Trevorrow. Techniques for Observing Normal Child Behavior. University of Pittsburgh Press, 1961.

Cofer, C. N., and Foley, J. P. "Mediated Generalization and the Interpretation of Verbal Behavior." Psychological Review, 49 (1942), 513-40.

Cohen, Dorothy, and Stern, Virginia. Observing and Recording the Behavior of Young Children. New York, Teachers College Press, 1969.

Colby, N. G., and Robertson, J. B. "Genetic Studies in Abstraction." Journal of Comparative Psychology, 33, (1942), 385-401.

Cook, W. M. "Ability of Children in Color Discrimination." Child Development, 2 (1931), 303-320.

Crudden, C. H. "Form Abstraction by Children." Journal of Genetic Psychology, 58 (1941), 113-129.

Curry, Nancy E. "Consideration of Current Basic Issues on Play." Play: The Child Strives Toward Self-Realization. Washington, D.C.: National Association for the Education of Young Children, 1971, 53.

_____, and Tittnich, Ethel. Play: The Child Strives Toward Self-Realization. Washington, D.C.: National Association for the Education of Young Children, 1971.

Descourdres, A. Review of Child Development Research. Edited by Lois Hoffman and Martin Hoffman. New York: Russell Sage Foundation, 1964.

Dewey, John. Schools of Tomorrow. E. P. Dutton and Co., Inc., 1915.

Epstein, W. "Experimental Investigations of the Genesis of Visual Perception." Psychological Bulletin, 61 (1964), 115-28.

Erikson, Erik H. "The Origin of Form Perception." Scient. Am., 204, N:5 (1961), 66-72.

Flavell, J. H. Developmental Psychology of Jean Piaget. Princeton, New Jersey: Van Nostrand, 1963.

Frank, Lawrence. "Play in Personality Development." 589.

Gagne, Robert M. The Conditions of Learning. New York: Holt, Rinehart and Winston, Inc., 1965.

Gesell, Arnold. The First Five Years of Life. New York: Harper and Row, Publishers, 1940.

_____, and Lord, E. E. "A Psychological Comparison of Nursery School Children from Homes of Low and High Economic Status." Journal Genetic Psychology, 34, (1927), 339-356.

Gibson, E. J. "Perceptual Learning." Learning Research and School Subjects. Itasca, Illinois: Peacock, 1968.

Gilmore, J. Barnard. "Play: A Special Behavior." Current Research in Motivation. New York: Holt, Rinehart, and Winston, (1966), 343-355.

Groos, Karl. Play of Man. Translated by E. L. Baldwin, New York: Appleton, 1901.

Hall, G. Stanley. Aspects of Child Life and Education, Boston: Ginn and Company, 1907.

Harlow, H. F. Maternal Behavior in Mammals. Edited by H. L. Reingold. John Wiley, VIII, 1963.

Harvey, O. J.; Hunt, D. E.; and Schroder, H. M. Conceptual Systems and Personality Organization. New York: Wiley, 1961.

Herron, R. E., and Sutton-Smith, Brian. Child's Play. New York: John Wiley and Sons, Inc., 1971.

Hilderbrand, Verna. Introduction to Early Childhood Education. New York: The Macmillan Co., 1971.

Hoffman, Martin L., and Hoffman, Lois. Review of Child Development Research. New York: Russell Sage Foundation, 1964.

Honkavaara, S. A. "A Critical Reevaluation of the Color and Form Reaction, and Disproving of the Hypothesis Connected with it." Journal of Psychology, 45, (1958), 25-36.

Hunt, J. McVicker. Intelligence and Experience. New York: The Ronald Press Co., 1961.

Hurlock, Elizabeth. Child Development. New York: McGraw Hill Book Co., 1956, 1964.

_____. "Experimental Investigations of Childhood Play." Psychological Bulletin, 31 (1934), 47-66.

_____, and Thompson, J. L. "Children's Drawings: An Experimental Study of Perception." Child Development, 5 (1934), 127-138.

Hutt, C. "Exploration and Play in Children." Symp. Zool. Soc. London, 18 (1966), 61-81.

Hymes, James L., Jr. "Emerging Patterns in Early Childhood Education." Ideas That Work With Children. Edited by Katherine Read Baker. National Association for the Education of Young Children, 1972, 28.

Isaacs, Susan. Intellectual Growth in Young Children. New York: Schocken Books, 1930.

_____. Social Development in Young Children. London: Routledge and Kagan, Paul Ltd., 1933. Rev. ed., 1967.

Johnson, M. W. "The Effect on Behavior of Variation in the Amount of Play Equipment." Child Development, 6 (1935), 56-68.

Kagan, J., and Lemkin, J. "Form, Color, and Size in Children's Conceptual Behavior." Child Development, 32 (1961), 25-28.

_____; Moss, H. A.; and Sigel, I. E. "The Psychological Significance of Styles of Conceptualization." In J. C. Wright and J. Kagan, eds. "Basic Cognitive Processes in Children." Monogr. Soc. Res. Child Development, 28, No. 2 (1963).

Katz, L. I., and Werner, Ed., H. Comparative Psychology of Mental Development. Rev. ed., Chicago: Follett, 1948.

Kendler, H. H., and Kendler, T. S. "Inferential Behavior in Preschool Children." Journal Experimental Psychology, 51 (1956), 311-14.

Kirkpatrick, E. A. Fundamentals of Child Study. New York: The Macmillan Co., 1922.

Kooistra, W. H. "Developmental Trends in the Attainment of Conservation, Transitivity, and Relativism in the Thinking of Children." Unpublished Doctoral Dissertation, Wayne State University, 1963.

Lehman, H. C., and Witty, P. A. "Periodicity and Growth." Journal of Applied Psychology, Vol. II. (1927), 106-116.

_____. The Psychology of Play Activities. New Jersey: Barnes, 1927.

Levin, H., and Wardwell, E. "The Research Uses of Doll Play." Psychological Bulletin, Vol. 59 (1961), 27-56.

Ling, B. "Form Discrimination as a Learning Cue in Infants." Comp. Psychol. Monogr. 17, No. 2 (1941), 66.

Long, L. "Conceptual Relationships in Children: The Concept of Roundness." Journal of Genetic Psychology, 12 (1941), 247-254.

_____. "Size Discrimination in Children." Child Development, 12 (1941), 113-118.

Lowenfeld, Margaret. Play in Childhood. New York: John Wiley and Sons, Inc., 1967.

Millar, Susan. The Psychology of Play. Baltimore, Maryland: Penguin Books, 1968.

Miller, G. A.; Galanter, E.; and Pribran, K. R. Plans and the Structure of Behavior. New York: Holt, Rinehart and Winston, 1960.

Munn, N. I., and Steinung, B. B. "The Relative Efficacy of Form and Background in a Child's Discrimination of Visual Pattern." Journal of Genetic Psychology, 39 (1931), 73-90.

Mussen, Paul H. Handbook of Research Methods in Child Development. New York: John Wiley and Sons, Inc., 1960.

Parten, M. B. "Social Participation Among Preschool Children." Journal of Abnormal and Social Psychology. 27, No. 3 (1932), 243-269.

Piaget, Jean. The Origins of Intelligence in Children. New York: International University Press, 1952.

_____. Play, Dreams and Imitation in Childhood. New York: W. W. Norton and Co., Inc., 1962.

_____. The Psychology of Intelligence. London: Routledge and Paul, 1950.

_____, and Inhelder, B. The Child's Conception of Space. New York: W. W. Norton and Co., Inc., 1948.

_____. The Early Growth of Logic in the Child. New York: W. W. Norton and Co., Inc., 1964.

Rice, C. "The Orientation of Plane Figures as a Factor in Their Perception by Children." Child Development, (1930), 111-143.

Robison, Helen F., and Spodek, Bernard. New Directions in the Kindergarten. New York: Teachers College Press, Columbia University, 1965.

Rosenberg, B. G., and Sutton-Smith, B. "A Revised Conception of Masculine-Feminine Differences in Play Activities." Journal of Genetic Psychology, 96 (1960), 165-170.

Russell, D. Children's Thinking. Boston: Ginn, 1956.

Sears, P. S. "Doll-Play Aggression in Normal Young Children: Influence of Sex, Age, Sibling Status, Father's Absence." Psychological Monographs, 65, N:328 (1951).

Shane, Harold G. "The Renaissance of Early Childhood Education." Phi Delta Kappan, Vol. L (March 1969), 369.

Sigel, Irving E. "The Attainment of Concepts." Review of Child Development Research. New York: Russell Sage Foundation. Edited by Martin L. Hoffman and Lois W. Hoffman (1964), 209-248.

_____. "The Development of Classificatory Skills in Young Children: A Training Program." The Young Child. Edited by Willard Hartup. Washington, D.C.: National Association for the Education of Young Children (1972), 96-98.

_____. "Developmental Trends in the Abstraction Ability of Children." Child Development, 24 (1953), 131-144.

_____, and Hanesian, Helen. "Styles of Categorization and Their Intellectual and Personality Correlates in Young Children." Human Development, 10 (1967), 1-17.

_____, and McBane, B. "Cognitive Competence Level of Symbolization Among Five-Year-Old Children." Edited by J. Hellmuth. The Disadvantaged Child, Vol. I, Seattle: Special Child Publications, (1967), 435-453.

Smilansky, Sara. The Effects of Sociodramatic Play on Disadvantaged Preschool Children. New York: John Wiley and Sons, Inc., 1968.

Spencer, Herbert. Principles of Psychology II. New York: D. Appleton and Co., 1899.

Sutton-Smith, Brian. "The Playful Modes of Knowing." Play: The Child Strives Toward Self-Realization. National Association for the Education of Young Children, (1971), 24.

Terman, L. M. "Mental and Physical Traits of a Thousand Gifted Children." Genetic Studies of Genius, Vol. I., Stanford University Press, 1926.

Thrum, M. E. "The Development of Concepts of Magnitude." Child Development, 6 (1935), 120-140.

Van Alstyne, D. Play Behavior and the Choice of Play Materials of Preschool Children. University of Chicago Press, 1932.

Vernon, M. D. A Further Study of Visual Perception. Cambridge University Press, 1962.

Vinacke, W. E. "Concept Formation in Children of School Age." Education, 74 (1954), 527-534.

_____. The Psychology of Thinking. McGraw-Hill, Ch. 7, 1952.

Walk, R. D., and Gibson, E. J. "A Comparative and Analytical Study of Visual Depth Perception." Psychological Monographs, 75, Whole N:519 (1961).

Wann, Kenneth D.; Dorn, Miriam Selchen; and Liddle, Elizabeth Ann. Fostering Intellectual Development in Young Children. New York: Bureau of Publications, Teachers College, Columbia University, 1962.

Weikart, David P.; Rogers, Linda; Adcock, Carolyn; and McClelland, Donna. The Cognitively Oriented Curriculum. Urbana, Illinois. University of Illinois, 1971.

White, S. "Learning." Child Psychology, 62nd Yearbook, Nat. Soc. Stud. Educ. Chicago: University of Chicago Press, 1963.

Whiting, B. B. Six Cultures: Studies of Child Rearing. John Wiley, 1963.

APPENDIX

APPENDIX A

PILOT STUDY ENGAGED IN BY THE WRITER, PRIOR TO THE FORMAL STUDY

Prior to the formal study engaged in by the writer, a pilot study was undertaken with the guidance of Dr. John McKinney. It was decided that due to the nature of the formal study (observational), much prior work was necessary in order to assure a high degree of reliability in the formal study.

The first section of this paper includes a statement of the objectives of this pilot study. The second section describes the information gained during the pilot study, as well as decisions made by the writer in regards to certain proposals for the formal study.

Objectives of the Pilot Study

1. To try out and select a data collection method which would allow for the reliable collection of data and at the same time, be as noninterruptive of children's spontaneous play as possible.
2. To determine the number of observation hours desirable for the formal study, which would allow for the gathering of sufficient examples of children's categorical behavior.

3. To try out and select desirable guidelines to be used:
   a. in the selection of examples of spontaneous play.
   b. with the purpose of facilitating more uniform and noninterruptive behavior of adults participating in the play settings.
4. To determine the nature of the classification system to be used during the formal study of the categorical behavior of young children. Due to the nature of this study (small sample size and limited time of the study), the types of categorizations made by children during spontaneous play chosen for the formal study, must be exhibited in sufficient quantity.

The observations of play made during this pilot study occurred in the following locations:

1. Jonesville kindergarten class.
2. Mary Proctor Randal Preschool (Hillsdale College).
3. Cooperative Nursery School in Jackson, Michigan.
4. Headstart classroom in Hillsdale, Michigan.

A summary of the information gained during this pilot study in relation to the objectives stated above now follows:

Objective I.--To try out and select a data collection method which would allow for the reliable collection of data and at the same time be as noninterruptive of children's spontaneous play as possible.

Several data collection devices and methods were utilized and evaluated as to their effectiveness in producing reliable data on the categorizations made by young children engaged in spontaneous play. A large Teac tape recorder with two microphones was tried. This unit gave very good results in regard to gathering all dialogue, with excellent voice quality within a certain range. However, it was found that the children move freely from one area of the play room to another during even one play episode, making it impossible to move the heavy unit around with ease or move the microphones from one area to another without disrupting the play setting.

A small portable Sony tape recorder with an all-directional microphone was then tried. This recorder was small enough to be placed in a purse. The children were thus unaware of its presence (the teachers were aware of its presence and approved of its use). This recorder collected children's conversations in their entirety. This allowed for accurate collection of the children's verbal responses during their play. The voice quality on the recorder, however, was not entirely adequate. It was difficult to recognize the child making the verbal response,

although the entire response was recorded. For this reason, a data collection sheet was prepared so as to have a record of the child making the verbal response. Notes taken on this collection sheet at the time of the play observations included the child's name, play area and the first few words of the child's verbal response. Other items on the collection sheet were completed after the direct observations of the spontaneous play period were ended (date of observation, class, age, sex). The data collection sheet was a necessary supplement to the tape recorder in the collection of data.

Objective II.--To determine the number of observation hours desirable for the formal study, which would allow for the gathering of sufficient examples of children's categorical behavior.

Many examples of categorizations made by children engaged in spontaneous play were collected. These categorizations were then sorted into types of categorizations. All of these types of categorizations were not chosen for use in the formal study. Those types of categorizations chosen were those occurring in frequency great enough to be of value in making interpretive conclusions. It was found that children do make categorizations concerning events, places and situations in their environment, but at the ages included in the pilot study, not in great enough frequency to be useful in a study of this duration.

As a result of this pilot study, it was decided by the writer that four weeks would be sufficient time for the formal study. The first week and a half in the classroom would be utilized for the purpose of getting to know the children and creating an atmosphere which would allow them to feel comfortable with the writer's presence. The actual recording of the data would take place over a two and a half week period. A total of six hours of spontaneous play would be recorded for each of the three age groups.

Objective IIIa.--To try out and select desirable guidelines to be used in the selection of examples of spontaneous play.

A number of possible guidelines were tried in play settings. The guideline which follows was selected for use in the formal study:

1. The writer will enter the room five minutes after the free play period has begun and proceed to select the first example of spontaneous play, as defined by the writer and delineated in guideline number two.
2. A spontaneous play setting worthy of investigation will include two, three or four children engaged in a play activity simultaneously, free from adult participation.
3. The writer will position herself near the chosen play setting, taking care to be as noninterruptive as possible. Improvement in this area came through

participation in this pilot study and through investigation of written material on the techniques for observing child behavior.[1,2]

4. The writer will record data through use of the tape recorder and data collection sheet.
5. The writer will continue to collect data from the selected play setting until one of the following circumstances occur, at which time she will disband this play setting and select a new one:
   a. Ten minutes of data collection has taken place in the selected play setting.
   b. Less than two and more than four children are participating in the play activity.
   c. Adult interference occurred (was found to be a rare occurrence).
   d. Children participating leave a play activity and initiate a new activity.
6. At such time that the writer disbands a play setting for reason of circumstances given above, she proceeds immediately to select another play setting, using the same selection guidelines used in the first

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[1]Dorothy Cohen and Virginia Stern, Observing and Recording the Behavior of Young Children (New York, Teachers College Press, 1969).

[2]Nancy Carbonara, Techniques for Observing Normal Child Behavior (University of Pittsburgh Press, 1961).

selection of a play setting. If no play setting exists, as defined under the guidelines adopted, the writer records nothing, continuing to search for a play setting worthy of investigation.

7. The writer will continue this process of selection and disbandment of play activities until the play period comes to an end.

Objective IIIb.--To try out and select desirable guidelines to be used for the purpose of facilitating more uniform and uninterruptive behavior of adults participating in the play settings.

These guidelines were adopted after several hours of observation with the purpose of discovering the kinds of adult behavior which might act as interfering elements on the spontaneity of the children's play and might therefore alter the types of categorizations made by the children. The guidelines chosen for the formal study in regards to participating teachers, mothers and the writer are as follows:

1. The classroom teacher will initiate the free play period by informing the children, upon their arrival, that they may play if they like. This was not a new procedure, as this was done throughout the school year.

2. The teachers, mothers and writer will in no way direct children to any prescribed play area of the room or suggest that they engage in any prescribed play activity. The children will have complete freedom to choose what area of the play room they wish to play, what activity, if any, they wish to engage, and with what children they wish to play. There will be no attempt on the part of the teacher, mothers, or writer, to structure group involvement (i.e., encourage isolates to participate in group activity, or split up existing groups of large number).
3. During the play period, the teacher, mothers and the writer will answer any questions asked of them by the children but will not intentionally engage children in conversation. The adults present will assist in getting any equipment asked for by the children but will not offer new equipment of their own accord. The adults will oblige any child asking for assistance but will not offer more assistance than that specifically asked for by the child.

Objective IV.--To determine the nature of the classification system to be used during the formal study of the categorical behavior of young children.

This was a most difficult objective to satisfy. There are an unlimited number of ways one might choose to

study the categorizations made by children. The classification system devised by this writer came about in the following manner. All categorizations made by children were included for analysis. Those categorizations occurring in greatest frequency were then extracted from the larger body of categorizations. After this procedure, those categorizations retained seemed to suggest two broad types of categorizations made by children. The first type was of a descriptive nature, classifications based on physical criteria, such as form, color, shape, etc. The second type of categorizations involved more than mere identifying of physical characteristics. These classifications were made on the basis of the interdependence of items in an array and were labeled relational-contextual classifications.

Reliability of the classification system is a necessity in an observational study which uses data for the purpose of making interpretive conclusions. For this reason, it was necessary to generate a definition of categorical behavior through a set of rules which outline the necessary characteristics of data to be included in the analysis of categorical behavior. These rules are given below:

1. Those items considered for inclusion in the analysis of categorizations made by children are:
    a. persons
    b. animals
    c. objects

Places, situations, events and other items capable of being categorized by children, are excluded from this analysis.

2. The object (person, animal, object) being categorized, must be identified through one of the following means:
   a. The object to be categorized is indicated by a direct verbal response or naming, i.e., car, policeman, lion.
   b. The object to be categorized is indicated by an indirect verbal response, i.e., "this, he, it, that." In cases such as this, the observer records the actual name of the object of categorization, i.e., "it" meaning "car," "he" meaning "policeman," or "that" meaning "book."
   c. The object to be categorized is indicated by another child in a preceding piece of dialogue, but which is readily observable that the child making the categorization is referring to the already identified object, i.e., the first child says, "I have a bulldozer." The second child says, "makes dirt pile up in big hills." In this instance, the object was identified by the first child and the second child made the categorization.

3. The criterion chosen by the child for the categorization must be expressed through verbal response, i.e., "This car is red." The criterion chosen by the child (red) has been expressed verbally.
4. The criterion for categorization utilized in the analysis are of two general types (descriptive classification and relational-contextual classification) described below:
   a. Descriptive classification: Classification based on physical criteria, such as form, color, shape, etc. The types of physical criterion analyzed in this study are:
      1. color, i.e., red, light green, black.
      2. size, i.e., big, long, baby (when referring to size rather than mother-baby relationship), doesn't fit (when referring to object's size).
      3. shape, i.e., it's a U shape (referring to the shape of a horseshoe), square, pointed.
      4. mass, i.e., too much (when referring to quantity of liquid), weight.
      5. physical composition, i.e., this is plastic (indicating material of which the object is composed).
      6. number (indicating number of parts on one given object), i.e., this car has only three wheels.

b. Relational-contextual classification: Classification made on the basis of the interdependence of items in an array. The types of relational-contextual criterion analyzed in this study are:

1. roles of persons, i.e., doctor gives shots, robber steals jewels, father fixes roof, big boy goes on a date. Roles indicated by the child must be of a type easily identified as one specific class role. Activities common to all people, i.e., policeman eats, is not considered a role characteristic of policemen but rather a characteristic of all people. The characteristic identified by the child must be readily classified to certain class roles, i.e., policeman catches bad guys.
2. personal attributes of persons, i.e., firemen are brave, clowns are funny.
3. functions or roles of animals, i.e., fish swim, alligators bite you, ducks lay eggs.
4. personal attributes of animals, i.e., a lion is an enemy, a lamb is a gentle friend.
5. functions of objects, i.e., clothespins hold up clothes, nails make two boards go

together, a badge tells who the driver is, chimney helps keep the house warm.

6. personal attributes of objects, i.e., magnet can pick up metal, yellow markers can't show up on yellow paper.

It will be noted that it is very difficult in many cases to distinguish the criterion of categorization between the function of an object and the personal attributes of the object, i.e., is a magnet's ability to pick up metal, a personal attribute or a function of magnets? Because this study is not concerned with a comparison between the personal attribute criterion and the function criterion for categorizations made, it is not necessary to differentiate these two criteria. Both types are recorded under "relational-contextual classification," receiving equal weight in the analysis. The important differentiation is between descriptive classifications and relational-contextual classifications. The entire study depends on the clear-cut differentiation of these two types of classifications.

APPENDIX B

ON-THE-SPOT DATA COLLECTION SHEET

Date	Class	*Child's Name	Age	Sex	*Play Setting	Brief description of play situation	*First few words of child's verbal response

*Completed during the actual observations.

APPENDIX C

WRITTEN TRANSLATION OF ALL VERBAL RESPONSES FROM TAPE RECORDER

Date Age group Time

Play Setting	Child's Name and Complete Verbal Response	Check for Cat. Behav.

APPENDIX D

COMPILATION OF EXAMPLES OF IDENTIFIED CATEGORICAL BEHAVIOR

Name	Verbal Statement and Additional Notation	Object of Categorization	Criterion

APPENDIX E

DATA SHEET E-THREE-YEAR-OLDS

	I Descriptive Criterion							II Relational-Contextual Criterion				
Three-year-olds	A color	B size	C shape	D mass	E phys. comp.	F no.	I TOTAL	A people	B animal	C object	II TOTAL	more II than I categor.
Larry							0				0	NO
Shawn	5		1				6	1	1	1	3	NO
Joey	1						1			1	1	NO
Billy		4	3				7			8	8	X
Sharon		3	1				4				0	NO
Lisa	3	1					4	1	2	1	4	NO
Annette							0				0	NO
Sara	2	3					5	1		3	4	NO
Tracy	3	5					8				0	NO
Karen	1	6					7			2	2	NO
Total	15	22	5	0	0	0	42	3	3	16	22	

APPENDIX F

DATA SHEET F-FOUR-YEAR-OLDS

	I Descriptive Criterion							II Relational-Contextual Criterion				
Four-year-olds	A color	B size	C shape	D mass	E phys. comp.	F no.	I TOTAL	A people	B animal	C object	II TOTAL	more than I categor. II
Steve		1	1				2	4		5	9	X
John		3					3			2	2	NO
Scott		2					2	2		2	4	X
Greg		2	1				3			2	2	NO
Brian		12				1	13	5	1	9	15	X
Jeff		1					1			4	4	X
Ellen	1						1	1		4	5	X
Jennifer				1			1			3	3	X
Kari							0			3	3	X
Missy				2			2	3		3	6	X
Juli	4	2					6	4		3	7	X
Venessa							0	1	1		2	X
Lisa		1					1	1			1	NO
Joyce	3	1					4	1		3	4	NO
Tammy	2	1	1				4			2	2	NO
Total	10	26	3	3	0	1	43	22	2	45	69	

APPENDIX G

DATA SHEET G-FIVE-YEAR-OLDS

	I Descriptive Criterion							II Relational-Contextual Criterion				
Five-year-olds	A color	B size	C shape	D mass	E phys. comp.	F no.	I TOTAL	A people	B animal	C object	II TOTAL	more than II I categor.
David	2	1	2	1		1	7	2		9	11	X
Adam	2		1		1		4			10	10	X
Steve C.		1					1	2		4	6	X
Jeff	1						1	6	4	1	11	X
Steve L.		1	1	1	2		5	1		10	11	X
Gary	1	8	2	3	1		15	2	1	20	23	X
John							0	3	1	1	5	X
Scott	1						1		1	12	13	X
Curt							0	3		9	12	X
Todd	3	4					7		1	8	9	X
Aleisha	5	2					7	9		9	18	X
Melissa		5		1			6	1		2	3	NO
Lisa				1			1			5	5	X
Kirsten	3	4					7		2	11	13	X
Toni		2		1			3	1		4	5	X
Nancy	3	4				1	8	3	1	9	13	X
Total	21	32	6	8	4	2	73	33	11	124	168	

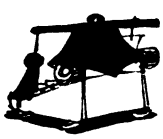
APPENDIX H

SUMMARY OF CHILDREN'S CATEGORICAL BEHAVIOR: FREQUENCY COUNT

	*I Descriptive Criterion							**II Relational-Contextual Criterion				Grand Total I & II
	A	B	C	D	E	F	Total	A	B	C	Total	
Three-year-old children	15	22	5	0	0	0	42	3	3	16	22	64
Four-year-old children	10	26	3	3	0	1	43	22	2	45	69	112
Five-year-old children	21	32	6	8	4	2	73	33	11	124	168	241

*I Descriptive Criterion
- A - color
- B - size
- C - shape
- D - mass
- E - physical composition
- F - number

**II Relational-Contextual Criterion
- A - people
- B - animal
- C - object



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