ABSTRACT

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This action research study examined the selection of color used in six object drawings of young children. Study sample size consisted of eighteen Kindergarten students from a public elementary school in Prince George's County Public School System, Maryland. This study was organized into three phases. Each phase asked student participants to draw six familiar objects (tree, house, boy, dog, girl, car) while limiting the amount of color selection in each phase. The use of logical color and expressive color was investigated and scores were given to each drawing in order to compare logical color usage. Color trends were also documented to show possible color associations in young children's representation of everyday objects. The results found that there was an increase in the use of logical color as the selection of color in each phase was minimized. Strong color trends were shown in the representation of the tree and boy images.

COLOR SELECTION IN OBJECT DRAWINGS OF YOUNG CHILDREN

By

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Dedication

To my dad, Charles Jesuit, who teaches by example that with courage, strength, and determination, anything is possible.

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Chapter I: Introduction to the Study

Background

The drawings of young children have interested many individuals in the field of education. Studies have been performed by researchers, psychologists, teachers, and parents in order to determine the significance of children's drawings. Through the process of observing and analyzing the drawings of young children, insights can be gained as to the social/emotional, physical, and intellectual development of each child. The progression of drawings that children make over a period of time can show significant growth and development, as well as determine academic capabilities and skills characteristic of their developmental level (Brittain & Lowenfeld, 1987).

According to Lowenfeld, children begin their drawing process as early as they can physically hold a drawing utensil. From their first attempts at a drawing, consisting of random marks and lines, to their first representational drawing, children are making efforts to communicate to the world around them and establish meaning through the images they create (Brittain & Lowenfeld, 1987). It is through their drawings that children express the views and interpretations of their experiences.

Purpose of the Study

Children from the ages of four to seven have a natural tendency to utilize expressiveness in making artistic choices. At this stage of development, referred to as the Preschematic Stage, children create drawings consisting of spontaneous and non-realistic color choices (Brittain & Lowenfeld, 1987). Although it can be stated that children in this stage make distinct lines and shapes that are characteristic of their development, it

has not yet been noted that there is a definite trend in the colors that they use to represent objects and images in their drawings.

This case study is characteristic of action research in which the professional educator (teacher) assumes the role of the researcher of the study. Action research is designed to promote research in the classroom, hereby providing opportunities for the classroom teacher to contribute to the field of education through the process of research.

The purpose of this research is to examine the drawings of everyday images that Kindergarten children make in order to establish a trend or commonality in the colors that they use. The use of logical colors (realistic colors) as opposed to expressive or non-realistic colors will also be explored. This study will present its student participants with the task of drawing six separate objects under three different phases. Each phase will present the student participants with a new direction as to the number of colors they may use in drawing each object. Each drawing activity will challenge the students to utilize their critical thinking and problem-solving skills in selecting the colors they desire to use in their drawings. This study will examine the colors chosen by the students to draw the objects in each phase in order to determine any common color trends or commonalities as well as to establish the number of logical color choices representative of each object.

This examination of the relationship between the color choices of the student participants and the objects drawn will have a significant benefit to people in the field of education, particularly educators in early childhood and art. This thesis may benefit educators in assessing the intellectual abilities of students through the analysis of children's drawings. In addition, this study may be used to propel further research in determining the significance of the images and drawings of young children.

Scope and Methodology

1. Research Questions

This study will examine the following research questions: (1) What number of students uses logical colors in object drawings? (2) Do students use logical colors when limitations are set? (3) What color trends are evident throughout the study?

2. Scope

An analysis and evaluation of color selection in children's object drawings will be conducted in an attempt to find commonalities of colors and sets of colors chosen by the student participants of the study. The scope of this thesis will include: (1) a review of literature containing theories and studies of children's drawings; (2) a review of the color selection in the object drawings of student participants; and (3) a review of color schemas, logical color choices, and the effects of a controlled environment on color selection. This thesis will conclude with a summary of the results from the data collected as well as recommendations for further research and topics for future study.

3. Methodology

The methodology used in this research study consists of four significant steps. First, a comprehensive literature review was conducted. Texts, journal articles, and other library informational resources on the topic of color and children's drawings were used to gain a foundation of knowledge and understanding in this area of study. Next, a study was conducted in three phases where Kindergarten student participants were asked to draw six familiar objects. Each phase of the study gave the participants a different direction to follow concerning the numbers of colors they were to use in each of their

drawings. Then, participants' drawings were examined and data were compiled from each phase of the study. Finally, analyses were performed using the data collected from the drawings. Both descriptive statistics and qualitative analysis were used to evaluate the data.

As previously stated, this study was divided into three phases. In each phase of the study, student participants were asked to draw six objects: a tree, a house, a boy, a dog, a girl, and a car. These objects were selected according to their familiarity to children in this age group. The order of drawing each object remained constant throughout the course of the study. In each phase student participants were given a paper on which six boxes were pre-drawn horizontally. Prompts and directions were given to the student participants prior to and during each phase of the study. In order to maximize the possibility of obtaining a true result of their color choice and minimize the risk of copying from other student participants, each student participant was separated from the class and performed their drawings in a secluded space within the classroom. The teacher/researcher was present throughout the drawing sessions, observing the students, as well as giving prompts and repeating directions as needed.

Phase 1 of the study asked student participants to draw the six familiar objects using the crayons provided by the teacher/researcher. In a cup, the crayon colors of red, orange, yellow, green, blue, purple, brown, and black, were available for students to choose. There were no limits given as to the number of colors that student participants may use.

Phase 2 of the study (which began approximately one month after the culmination of Phase 1) asked student participants to draw the six specified objects in the same order

as was asked in Phase 1. In this phase, participants were given the same cup of crayons to use. However, they were asked to use any two colors to draw each of the six objects. Students were not required to use the same two colors for all object drawings. This is the first phase in which a limitation was set.

Phase 3 of the study (which began approximately one month after the culmination of phase 2) again asked student participants to draw the six specified objects in the same order as Phase 1 and Phase 2. This time, a tray with pre - arranged sets of colored crayons was presented to each student. In this phase, student participants were asked to choose one set of pre - arranged colors to draw each object. Again, students were not required to use the same color set for all object drawings. This is the second phase in which a limitation was set.

Drawings from each student participant in each phase of the study were collected and data concerning the colors that were selected by the participants were gathered. Participants' identities were masked and each participant was assigned a number for data gathering and analysis. For the purpose of this study, drawings were evaluated according to participants' classification in four categories: (1) gender; (2) age; (3) academic ability; and (4) socio-economic status. Academic ability was determined through information obtained from individual assessments of each student according to school district's mandatory assessment process. Socio-economic status of each student was obtained through the use of the FARM program (Free and Reduced Meals). This federal program offers free and reduced breakfast and lunch services to students dependent upon the annual income of their parent/guardian. The number of children in the household

combined with the annual wage of the parent/guardian determines the qualification for this service.

The objective of this thesis is to determine whether a correlation between color choices and objects drawn can be found in young children. The use of logical colors (realistic colors) as opposed to expressive or non-realistic colors will be analyzed and data will be compiled in relation to the four categories.

Organization of Study

This section serves as a brief description of the organization of each chapter of the thesis. It is organized into five chapters, as briefly described below.

Chapter I includes the background, purpose, scope and methodology, as well as the organization of the study. The background section presents a brief description of children's drawings and the significance of utilizing the drawings of young children in educational settings. The purpose for conducting the research is set and the problem which the study is designed to confront is identified. The scope and methodology of the study are briefly reviewed. Within this chapter, research questions, the scope of the study, and the process of conducting the research are identified and described.

Chapter II contains a literature review of various materials and informational resources collected about the subject of children's drawings. It includes theories regarding the drawings of children established by Victor Lowenfeld, Rhoda Kellogg, and Jean Piaget. Specific studies concerning color preferences and color usage by young children will also be discussed in this chapter.

Chapter III describes the participants, phases of the study, and methodology used in this research. The verbal prompts given to student participants are also included in this chapter.

Chapter IV includes the data collected from the drawings of each phase as well as qualitative analyses of the data. Samples of student object drawings that are pertinent to the analysis will be included.

Chapter V provides a conclusion to the study with a summary of the data, as well as an interpretation of the results of both the descriptive statistics and qualitative analyses. This chapter will conclude with recommendations for further research and topics for future study.

Chapter II: Literature Review

Introduction

An extensive amount of research has been recorded on the topic of children's drawings. Theories regarding the drawings of young children have been established by leading figures in the fields of art education, psychology, and child development. Many past theories that have been generated concerning the development and analysis of children's drawings are pertinent in education today. Three leading researchers in the topic of children's drawings will be discussed in this chapter. Viktor Lowenfeld, Rhoda Kellogg, and Jean Piaget have each contributed to the understanding and appreciation of child development as demonstrated through drawings. The theories established by each researcher will be presented throughout the first section of this chapter.

The theories of Lowenfeld, Kellogg, and Piaget will be utilized in this chapter to establish the drawing capabilities and trends in the developmental stages of a Kindergarten-aged child. It is pertinent to this study that theories on young children's drawings be addressed because this study investigates colors used in the drawings of young children, rather than merely the selection of color (of pre-drawn or outlined images, for example).

In addition to addressing theories behind children's drawings, this chapter will also focus on color topics as selected from studies conducted on color preference and usage in young children. The topics that will be addressed in this section include color preference, color - emotion relationships, and color choice in object representations.

Each topic will be discussed and findings derived from studies pertaining to each topic will be addressed.

Perspectives in Drawing Theories of Young Children

Throughout the course of many decades, there have been various individuals known for their research, analysis, and writings about the development of young children as seen through the drawings they produce. The following three individuals and their theoretical perspectives of children's drawings will be presented: Viktor Lowenfeld, Rhoda Kellogg, and Jean Piaget.

1. Viktor Lowenfeld

In the field of art education, Viktor Lowenfeld is well - known for his attention to the importance of children's drawings in determining a progression of developmental levels. He has developed a theory of stages of drawing development which defines appropriate drawing activities according to the age level of children. In his text, *Creative and Mental Growth,* Lowenfeld (1987) outlines these various stages of development and suitable art activities for each stage of personality growth (Kelly, 2004). The stages of artistic development, as referred to by Lowenfeld, consist of the Scribbling Stage (occurring 2 to 4 years of age); Preschematic Stage (4 to 7 years); Schematic Stage (7 to 9 years); Drawing Realism (9 to 12 years); and Psuedo - Realistic Stage (12 to 14 years) (Lowenfeld & Brittain, 1987).

Throughout his text, Lowenfeld (1987) describes his belief that individual self - expression in art promotes cognitive development and personal growth, stressing the importance of encouraging spontaneous self - expression and thus, discouraging the

formal teaching of drawing which Lowenfeld believes would inhibit children from using their art for the purpose of self - expression (Thomas & Silk, 1990). Lowenfeld's model of artistic development also suggests that the personal growth of children is "a naturally unfolding process that is constant and cannot be essentially changed" (Freedman, 1997).

Lowenfeld addresses in his developmental stages the topic of schemas in children's drawings. Freedman (1997) states that Lowenfeld describes schemas as symbolic forms that children make to represent many generic types of objects. Objects such as a person, tree, or flower, for example are popular schemas of children and can be observed in many of their drawings (Freedman, 1997). According to Lowenfeld (1987), schemas are stable concepts that remain constant and unchanging until a child requires another mode of representation, at which time, through experimentation and observation of the environment a new schema will be developed (Freedman, 1997). Until the end of the Preschematic stage (age seven), children will have established schemas and as a result will create drawings with less flexibility (Lowenfeld & Brittain, 1987).

In addition to the development of children's drawings through artistic stages, Lownfeld also is known for his "visual - haptic expressive" theory, referring to the mode of perceptual organization and conceptual categorization of the external environment. At age twelve, it becomes possible to see examples of these two types within a child's development (Lowenfeld & Brittain, 1982). According to Lowenfeld (1982), a visually minded person would be classified as one who acquaints himself with his environment through the eyes, whereas a haptic child is one who concerns himself with personal body sensations, experiences, and emotions.

Lowenfeld's artistic stages of development are concerned with children ranging from two to fourteen years of age. In order to focus on the developmental stage which defines the behaviors of the five year old child, the Preschematic Stage (the developmental stage in which Kindergarten - age students are classified) will be presented in detail.

Prior to the Preschematic Stage, Lowenfeld (1987) believes that children begin their drawing experience by making random marks on paper until approximately the age of four where recognizable objects begin to appear in their drawings. It is at this time that children make their first recognizable attempts and this occurs until children reach the age of seven (Lowenfeld & Brittain, 1987). This stage is the beginning of graphic communication where Lowenfeld (1987) indicates a child of high intellectual ability on the basis of detailed drawings which reflect the child's awareness of the world around him.

During this stage, the first representational symbol attempted by children is a human/person which consists of a head - feet image (Lowenfeld & Brittain, 1987). According to Lowenfeld (1987), when children make this head - feet representation of a person, they are not trying to copy the environmental world so much as they are drawing the parts that they know and see of themselves. However, this may not be a visual representation at all. Therefore, the first attempts of the drawing of a person should be viewed as an abstraction or schema from a large array of complex stimuli which demonstrates the beginnings of an ordered process. It is not to be looked at as an immature visual representation (Lowenfeld & Brittain, 1987).

An interesting point that Lowenfeld makes reflects a universal view of the child's first drawings of a human. All children make the shapes of a circle to represent the head and two vertical lines representing legs in drawing a person (Lowenfeld & Brittain, 1987). There may be no differences between children of different socioeconomic or cultural influences (Golomb, 1992).

On the topic of color in children's drawings, Lowenfeld (1987) states that there is often little relationship between the colors children select and the objects they attempt to represent and that the conventional use of color (green grass, blue sky) may not appear in children's drawings until age eight (Schematic stage). According to Lowenfeld (1987), being critical of the use of color or pointing out the "correct" or realistic color for objects would interfere with a child's freedom of expression. Children's use of color is for color's sake in which the color chosen is not for the purpose of imitating subject matter because they do not grasp an exact color relationship (Lowenfeld & Brittain, 1987). Therefore, children's choice of color may not be realistic in its imitation of their environment, but rather meaningful and expressive to the individual child.

Throughout the Preschematic stage, children are anxious to express themselves in creative ways which may not be characteristic of the manner which adults may deem logical. The drawings that children make in this stage are considered a reflection of their growth and development where children portray relationships and thoughts about the real world (Lowenfeld & Brittain, 1987).

Lowenfeld (1987) states that a child's flexibility and frequent changes in concepts and schemas are vital factors of this developmental stage in which meaningfulness in the subject matter drawn by young children emphasizes the emotional impact of an

experience. An emotional reaction to a meaningful experience or object may result in an exaggeration of a particular part of their drawing which focuses on their experience (Lowenfeld & Brittain, 1987). The drawings of children in this developmental stage generally contain images that are perceived as important to the child.

In the Preschematic stage and all of Lowenfeld's stages of artistic development, the emotional, physical, and social growth of the child are evident in the drawings they create. Lowenfeld (1987) describes art and the drawings of young children as a process. It is through this process that changes in behavior and growth patterns develop and meaningful changes occur in the products that children make (Lowenfeld & Brittain, 1987).

2. Rhoda Kellogg

Known for her extensive collection of children's drawings, Rhoda Kellogg has produced a detailed analysis of the shapes and patterns found in the drawings of young children throughout the course of many years (Thomas & Silk, 1990). Her drawing collection contains the products of children ranging in age from approximately two to five years. Although Kellogg studied a large number of drawings, her research is unsystematic and may not clearly define the progressions and orders of complexity of the drawing development of individual children (Thomas & Silk, 1990).

Kellogg (1970) believed that there is a universal pattern of development in the drawings and art of young children. It is suggested by Kellogg (as cited in Thomas & Silk, 1990) that the simple forms and shapes that children make in their drawings can be found in the drawings of children from diverse cultural backgrounds. However, because of a possible lack of clarity in her analysis and system of data collection, the number of

examples of children's art from primitive cultures in her collection is unknown (Thomas & Silk, 1990).

Through the process of analysis of children's drawings and art, Kellogg (1970) creates an investigation which focuses on the characteristics of line formations made by children, particularly in the form of scribbling and drawing. Kellogg's (1970) categorizations of line formations are organized into a system of classification in four stages. These four stages cover the period from which the child's first scribbling occurs until approximately age five, a time at which children often create schemas favored by society (Kellogg, 1970).

The four stages that Kellogg (1970) creates include the Pattern Stage, consisting of the classifications of Basic Scribbles and Placement Patterns; the Shape Stage, containing the Emergent Diagram Shapes and Diagrams classifications; the Design Stage, characteristic of the classifications of Combines, Aggregates, and Balanced Line Formations. The last of Kellogg's four stages, the Pictorial Stage, includes the classifications of Humans and Early Pictorialism (Kellogg, 1970). Each stage and its classifications of line formations will be discussed in further detail in order to show Kellogg's theory of an evolving progression of child growth through drawing.

The first of Kellogg's four stages is the Pattern Stage, a self - taught stage which begins as early as two years of age (Kellogg, 1970). In this stage, Kellogg (1970) addresses the classifications of Basic Scribbles and Placement Patterns. During the period of Basic Scribbles, Kellogg (1970) believes that the visual interest in the simple act of scribbling is an essential component to a child's acquisition of line making capability. There are twenty types of markings each demonstrating movements of

variations of muscular tension that do not require visual guidance (Kellogg, 1970). Kellogg (1970) views these twenty basic scribbles as the building blocks of art, important because they permit a detailed and comprehensive description of the work of young children. A child has the ability at age three or four to place a single type of scribble on one piece of paper comprised of spontaneous movements with or without eye control (Kellogg, 1970). This action, according to Kellogg (1970) may demonstrate a child's progression of visual awareness. The earliest evidence that Kellogg (1970) has found of controlled shaping in children's work is during the period of Placement Patterns. When children's markings progress to this classification, they contain their scribbles into a designated space or "frame" requiring control of the eye to position markings in relation to the edge of the paper (Kellogg, 1970). Occurring by the age of two, Placement Patterns suggest purposeful circles, rectangles, triangles, squares, arches, and various odd shapes (Kellogg, 1970).

The Shape Stage, the second of Kellogg's (1970) four stages, is also a self - taught stage which includes the classifications of Emergent Diagram Shapes and Diagrams. When children are engaged in the classification of Emergent Diagram Shapes (between the ages of two and three), they make marks that consist of single lines employed to form crosses and to outline circles, triangles, and other shapes (Kellogg, 1970). Kellogg (1970) considers this stage as emerging because it provides a transition between the Pattern Stage and the Diagram classification. Developmentally, the Diagrams indicate a child's increasing ability to make controlled lines and employ memory (Kellogg, 1970). In opposition to Basic Scribbles, Placement Patterns, and Emergent Diagram Shapes in which a child's markings are spontaneous and visually

stimulating, the Diagrams are evidence of a child's first planning and deliberation of a drawing activity (Kellogg, 1970).

The third stage that Kellogg (1970) distinguishes is the Design Stage, consisting of children between the ages of three and four. Included in this stage are the classifications of Combines, Aggregates, and the Balanced Line Formations of Mandalas, Suns, and Radials (Kellogg, 1970). The Combines are essentially units of two Diagrams in which identifiable circles, squares, triangles, and crosses gradually become irregular and undifferentiated forms (Kellogg, 1970). Combines are created as a result of these shapes and forms becoming superimposed onto another (Thomas & Silk, 1990). Kellogg (1970) refers to Aggregates as larger numbers of scribbles that lie in close proximity (Thomas & Silk, 1990). When a child begins to form Aggregates, Kellogg (1970) believes he begins to function as an artist with a repertory of visual ideas. There is an infinite amount of possible Aggregates and the characteristic of line formations (bold, subtle, simple, intricate, large, small) can be attributed to the child's attention span occurring at the time of the markings (Kellogg, 1970).

In addition to the Combines and Aggregates that a child creates during the Design Stage, Kellogg's (1970) Balanced Line Formations of Mandalas, Suns, and Radials are significant to the progression of development throughout this stage. The Mandalas, a Sanskrit word for circle, are often Combines that are formed of a circle or square that are divided into quarters by a cross (Kellogg, 1970). This is a frequently occurring Combine that Kellogg (1970) considers inherently pleasing to children (Thomas & Silk, 1990). Kellogg (1970) states that Mandalas are essential not only as a part of the sequence of child art development, but also because they are a link between the art of children and the

art of adults. Suns are characteristic of linear lines that form marks moving from the center or outline of the circle, resembling the rays of a sun and, although simple in structure, do not appear before the child has drawn complex Aggregates (Kellogg, 1970). A Radial formation is one with lines that radiate from a point or small area in a shape which can influence the placement of arms and legs in a Human drawing, occurring next in the progression of developmental stages (Kellogg, 1970).

The remaining stage in Kellogg's stages of child art development is the Pictorial Stage which, according to Kellogg (1970) occurs when children enter the age of four and continues throughout their early childhood years. Included in this stage are the classifications of Humans and Early Pictorialism containing the images of animals, buildings, vegetation, and other subjects (Kellogg, 1970). Kellogg (1970) suggests that the way in which the child combines the Scribbles and the Diagrams determines a particular appearance to the Human image and to all subsequent pictorialism. When the first Human is made, the child joins the face Aggregate with the body parts that from a modified Mandala. The details of hands, feet, and hair show clearly that aesthetics outweighs realism in child art with each mark distinguishing its own story (Kellogg, 1970).

The transfiguration of the Human into the horizontal Animal becomes effective for the four and five year old child (Kellogg, 1970). According to Kellogg (1970), this is the time in which Early Pictorialism would begin to occur and may be grouped into the categories of Animals, Buildings, Vegetation, and Transportation. Kellogg (1970) believes that at this stage five year old drawings are not as pure as nursery school age children because of the influence of school and formal art lessons in providing formulas

for copying which lessens the 'purity' of their work. It is to be noted that Kellogg's studies occurred during the decade of the fifties where school art lessons had an impact on the creative development of the young child. In today's society, art education in the early childhood years encourages creativity and models art lessons according to the developmental needs of young individuals. Kellogg remains consistent in utilizing her classifications in the Early Pictorial images children make. Kellogg (1970) states that Buildings are drawn by combining Diagrams in various ways, not as a result of observing houses on the street. In addition, it is observed by Kellogg (1970) that Buildings or Houses made by children are drawn similarly all over the world, supporting a universal approach to child art development. The popular Vegetation images drawn by children are Trees and Flowers, in which Kellogg's classifications of Scribbles, Diagrams, Combines, Aggregates, Mandalas, Suns, and Radials are all evident. Accoding to Kellogg (1970), Flowers, Trees, and Transportation drawings (boats, cars, trains, airplanes) are not drawn in sizes found in nature or the external world, but in sizes needed to complete Patterns or to achieve aesthetic goals. Transportation images, consisting of Combines and Aggregates, are also made in combination with other classifications in representation of the objects (Kellogg, 1970).

Throughout Kellogg's four stages of child development in art and their subsequent classifications, progression of growth in children ages two to five can be determined through the building and combination of marks. Kellogg (1970) believes that the child relies on the basic shapes of art and arranges them in relation to one another to pictorialize objects and scenes. Like Lowenfeld's model, Kellogg's theory of drawing

development corresponds to the belief that children's growth and development cannot be changed because it is a naturally unfolding process (Freedman, 1997).

3. Jean Piaget

Jean Piaget has dominated for many the world of developmental and cognitive theories of children (Kelly, 2004). Piaget has conducted an extensive amount of research and has created many approaches and explanations of the progression of social, emotional, and cognitive growth in children. On the topic of child development in art, for Piaget, children's drawings were interesting only as a support to his own stage theory of child development (Kelly, 2004). Because there is no distinct analysis of children's drawings made by Piaget (Thomas & Silk, 1990), his cognitive theory of development presents a theoretical approach of child development through drawing.

Piaget's stages of cognitive development are based on maturation and age of the child (Kelly, 2004). The growth of intelligence in childhood progresses through a series of stages which are determined by the age of the child (Thomas & Silk, 1990). In Piaget's system of cognitive development, learning from experiences in the external world plays a significant role in the development of a child's cognitive ability (Kelly, 2004).

Piaget's theory of cognitive development can be described by attributing the interpretation of an experience by a child. Piaget believed that the environment of children is received by assimilation or accommodation. Through assimilation, the preconceptions of the child are used to understand new stimuli, whereas the accommodation requires an adjustment to these new stimuli (Thomas & Silk, 1990). The process of assimilation occurs when a child utilizes his prior knowledge when confronted

with a new experience. The child then addresses this new experience and adapts accordingly. The action of assimilating or accommodating to a situation or experience can be a determining factor in a child's development. In the natural way of things, the young child is faced with accommodating to an external world which he may slightly understand. It becomes necessary for there to be an area of activity that is not externally constraining which also provides opportunities for assimilation (Thomas & Silk, 1990).

As stated by Piaget (1969), play is the core activity involving assimilation. Piaget regarded the early scribbles of the very young child as being "pure play" (Thomas & Silk, 1990). In addition to the act of scribbling, Piaget (1969) considered the early scribbles of young children as exercise. From the progression of scribble making to the onset of drawing images, the activity of recreating personally important incidents would also serve as an assimilative function (Thomas & Silk, 1990).

Piaget's view that cognitive development proceeds through a series of distinct stages led him to adopt the classification of stages in children's drawings. Piaget's theory of children's drawing development, originally proposed by Luquet in 1913, is classified by organizational and graphic skills of the child as well as the child's realistic intentions (Thomas & Silk, 1990). Piaget's theory focused on the idea that cognitive development occurs throughout a set of sequenced universal stages. These stages are influenced by the chronological age in which the child attains each state (Newton & Kantner, 1997). The child is assumed to progress throughout the drawing stages as he matures cognitively in his development.

Piaget used drawing as evidence in his theory of the child attempting to create a representation of the real world (Thomas & Silk, 1990). A child's drawing was

centralized around mental images and the understanding of space (Piaget & Inhelder, 1967). Piaget assigned to drawing a level of status positioned between symbolic play and mental images. Although Piaget occasionally utilized the drawings of young children to illustrate his theory, studies of drawings were never central in his theory development (Thomas & Silk, 1990).

Piaget proposed that children's drawings were essentially realistic in intention and that the child intended to produce a representation of an object in a recognizable and realistic fashion (Thomas & Silk, 1990). The color usage, shapes, and formation of lines used in the drawings and images of children can be attributed to an attempt to create a true representation of the real world, as opposed to an expressive interpretation. The drawings of young children classified as schematic and unorganized are associated with an inability to construct precise relations to space between objects (Reith, 1997). Because Piaget (as cited by Thomas & Silk, 1990) believed that children as they advance chronologically in age will mature in their cognitive ability, drawing instruction was not deemed a necessary tool. A child's maturation in age will result in a mental image which is more developmentally advanced as opposed to formal instruction of drawing techniques to create a similar outcome (Thomas & Silk, 1990).

Piaget's theory of drawing development parallels his theory of cognitive development with the basis of age and maturation predicting the outcomes and products created by the child. As Piaget attributes the drawings of young children as a developmental process, it can be noted that it is a progression from stages determined by chronological age in addition to a child's ability to assimilate and accommodate to new stimuli in the real world. Although children's drawings were beneficial only to Piaget in

sustaining his own theory of child development (Kelly, 2004), his theory supports a succession of sequential stages which contribute to the overall understanding of the child's intellectual growth and development.

4. Relating Three Theoretical Perspectives

Within the theories presented by Viktor Lowenfeld, Rhoda Kellogg, and Jean Piaget on the topic of child development through drawing, there has surfaced commonalities as well as differences in the theoretical perspectives proposed by each theorist. Although each shares the belief in the importance of children's drawings in predicting the development of the child, Lowenfeld, Kellogg, and Piaget each have established models of analyzing the products of children with the intended purpose of determining the growth and progression of the child. Each theorist attributes different characteristics and trends in the images young children make to distinguish a level of attainment of cognitive and behavioral status. Comparisons will be made in the developmental theories of Lowenfeld, Kellogg, and Piaget in order to relate three theoretical perspectives.

On the topic of proposing a developmental theory of drawing for young children, it can be assumed that both Lowenfeld and Kellogg began their process with the collection and analysis of children's drawings. Inclusions of illustrations from sample child images gave clear definitions and examples of their stages of child art development. Kellogg's approach to the analysis of children's drawings may be deemed unsystematic in nature (Thomas & Silk, 1990). However, it is evident from her text that the drawings from her collection are included and adequately labeled. Lowenfeld, in addition to Kellogg, has referenced the images produced by children in his studies throughout his

text. Piaget, although interested in children's drawings, may lack concrete evidence in the collection and analysis of specific elements in the drawings of young children in support of his theory.

Evident throughout each theory presented by Lowenfeld, Kellogg, and Piaget is their common perspective on a universal trend in the development of young children as seen through their drawings. Each theorist states that children develop in similar ways throughout the course of their young lives through experiences and chronological order. As children develop and progress through stages, there is a sequence of universal patterns that can be observed in the images that young children make. Although each theorist may distinguish different possibilities for growth to occur, it can be concluded that the progression and images that children make are universal in outcome and product.

It is interesting to note that there is a distinct contrast between the self - expressive theory of Lowenfeld and that of Piaget's cognitive theory of development. Where Lowenfeld (1987) believes that children create drawings that are inherently important and reflect their desire to express their experiences and emotions, Piaget proposes that the drawings children make are the product of an intentional effort to represent realistic images (Thomas & Silk, 1990). Regardless of which theory proves this assumption, both theories consider the progression of a young child's drawing in migrating from the stage where this occurs to a stage characteristic of their continued growth.

Because the theories of Lowenfeld, Kellogg, and Piaget became popularized during similar times, it can be assumed that each theorist was familiar with and possibly influenced by the beliefs and findings of the others. This particularly lies true for Rhoda

Kellogg in reference to Viktor Lowenfeld's (1982) "visual - haptic expressive" theory. Kellogg (1970) states in her text, *Analyzing Children's Art*, thather prim ary objection to Lowenfeld's categories is that the haptic and visual aspects of art cannot be separated meaningfully. Kellogg (1970) continues by stating that the haptic aspects which are considered by Lowenfeld as subjective may be in fact found in child art universally, as well as the visual aspects.

In relating the three theoretical perspectives presented by Viktor Lowenfeld, Rhoda Kellogg, and Jean Piaget, it becomes apparent that there are commonalities and differences worth noting between the theories proposed by each. Although there are many current theories concerned with the development of children through drawing and art, these three theorists have created solid and reputable foundations and ideas that some consider valid and true in a society separated from their time by decades. Lowenfeld, Kellogg, and Piaget have influenced the field of education, art, and child development through their distinct theories of children's drawings and development.

Based on the literature in the field of child development through art as presented by Lowenfeld, Kellogg, and Piaget, assumptions made as to the outcomes of color selection in the drawings of young children are as follows:

- Kindergarten-age children will make expressive color choices rather than logical color choices in the drawings they create.
- In relation to gender, girls would use more expressive color choices than boys.
- Logical color choices would increase with age.

- Students with a higher level of academic ability would use more logical color choices.
- Students with a higher economic status would use more logical color choices.

Color Studies with Young Children

The remaining section of this chapter will be devoted to the discussion of three distinct topics pertaining to color and young children. Each topic will be addressed in accordance with recent studies conducted on each topic and their respective findings.

1. Color Preference

Color preference in young children is a topic of much importance in the understanding of the color choices that children make. Many past and present studies have focused on color preferences in individuals of various ages as it relates to a ranking of most preferred color to least preferred color. Such color ranking studies have provided opportunities to compare the colors that are most frequently chosen by young children to those colors that are least preferred. The analysis of color preference in young children may support an assumption that the color choices children make are representative of colors that they deem likeable or favor for personal reasons. A study conducted by Mark Meerum Terwogt and Jan B. Hoeksma (1995) asked children seven years of age to rank colors according to their preference. This study included the colors red, yellow, blue, green, white, and black (Meerum Terwogt & Hoeksma, 1995). Meerum Terwogt and Hoeksma (1995) found that children of this age group chose the color blue most frequently, followed by the colors yellow, red, white, green/black (both colors attaining the same lowest rank). A study by Norman and Scott (as cited by Meerum Terwogt &

Hoeksma, 1995) revealed that "young children prefer the colors red and yellow" (1952). The results from Meerum Terwogt& Hoeksma's (1995) study confirmed this finding with red and yellow being highly preferred by their participants. However, these colors were surpassed by the highest color preference ranking of blue.

In a similar study, conducted by Marcel R. Zentner (2001), young children ranging in age from two and a half to four and a half years were asked to rank colors by preference. The colors used in this study varied on hue and value and included red, yellow, light green, dark green, light blue, dark blue, pink, brown, and black (Zentner, 2001). The variation of color was an interesting component to this study in that it allowed for a further investigation to the hues and values of color preference. The results of this study paralleled the findings of Norman and Scott (1952) in that red was the most preferred color for both boys and girls (Zentner, 2001). In examining the color preferences of bright colors versus dark colors, results have shown that the overall preference for bright colors was more emphasized for girls than boys (Zentner, 2001). Zentner (2001) suggests that "this gender bias towards greater chromatic sensitivity in females is already present in early childhood." Because of stereotypes and color associations in our society (boys associated with blue, girls associated with pink), it can be assumed that boys may rank blue in preference to other colors, and consequently girls in the same respect may prefer pink. However, Zentner (2001) found that there was no evidence for such gender stereotypes in the color rankings of boys and girls in his study.

Consistent with the findings in color preference in young children previously mentioned, there seems to be a prevalent movement in development of color preference occurring during the early elementary school years (Zenter, 2001). Contrasting the

finding of red as the most preferred color, the color blue has been shown to be the most preferred color of young children in other studies. Although Zentner (2001) has shown that red was the color most preferred by young children in his study, two recent studies (as cited by Zentner, 2001) suggested that the preference for blue over red may be established by the age of seven (Boystzis & Varghese, 1994; Meerum Terwogt & Hoeksma, 1995). This statement may provide an explanation for Zentner's finding as it compares to that of Meerum Terwogt & Hoeksma. Another reason for this shift in color preference from red to blue may be a result of young children acquiring negative connotations for red (such as associations with blood, a stop sign) through the onset of schooling and socialization (Zentner, 2001).

Studies and findings on color preferences in young children may provide insight into the internal mechanisms that children experience when choosing colors. Perhaps the colors children choose are more a result of their personal preference as opposed to a spontaneous impulse or expressive action. It can be said that young children are influenced by external forces which may impact their color choice throughout their development. However, the importance of recognizing children's color preference may offer a possible explanation for the choices children make when using colors.

2. Color - Emotion Relationships

Much emphasis in the research of color and young children has been placed on the relationship between color preference and emotional symbolism. The interest in the connection between color and emotion in young children has lead to many recent studies devoted to obtaining information about a possible relationship between color and emotional preference. Such studies aim to provide substantial data to support a

connection between the colors children prefer in correlation with their emotional preference. In a study conducted by Meerm Terwogt & Hoeksma (1995), it was hypothesized that the domains of color and emotion are connected to each other on the basis of the preferences of each. This hypothesis lead its researchers to make a connection to the colors children prefer (refer to previous section) and the emotions preferred by the young children in their study. Participants in a seven year old age group were asked to rank in order of preference the following emotions: anger, aversion, fear, happiness, sadness, and surprise (Meerum Terwogt & Hoeksma, 1995). It was found by Meerum Terwogt & Hoeksma (1995) that children preferred happiness most frequently, followed by the emotions of surprise, aversion/fear (receiving the same ranking score), sadness, and anger. When analyzed in combination with the color preferred by these children, it was found that there was a distinct correlation between the colors and emotions children prefer. Meerum Terwogt & Hoeksma (1995) state that "colors and emotions that were more similar, as indicated by their preferences, were more likely to be tied to each other." This finding is in support of their initial hypothesis. In addition to this assumption, with further investigation of the emotional preferences, it can be said that the positive emotions (happiness, surprise) took higher positions in preference than the negative emotions (fear, sadness, anger) (Meerum Terwogt & Hoeksma, 1995).

A more specific study, conducted by Marcel R. Zentner (2001), was designed to find a direct relationship between an emotional feature and the color that feature elicits. After participants (consisting of young children between the ages two and a half and four and a half years) of this study were asked to rank colors varying in hue and value in order of preference, they were shown three facial depictions of emotions (anger, happiness,

sadness) and asked to match each emotion to one of six color stimuli (Zenter, 2001). Zentner's (2001) findings correspond to that of Meerum Terwogt & Hoekma's (1995) in that the colors children preferred highly corresponded to a positive emotion, whereas the colors children least preferred were matched to a negatively perceived emotion. Further analysis concluded by Zentner (2001) states that "children tended to match bright colors with a happy emotional expression and dark colors with a sad emotional expression." By the age of three years, the association of bright colors with happy and dark colors with sad seemed to be established (Zentner, 2001). Also interesting were his findings concerning gender differences in color and emotional preference. According to Zentner (2001), the colors of red and brown held emotional connotations for boys in that red was matched more than twice as often with as a face depicting happy and brown was matched four times as often with sad. Furthermore, consistent with both genders, the color blue was consistently associated with the emotion of sad (Zentner, 2001).

In evaluating the findings of Zentner's study, it can be concluded that there are differences in emotional connotations of color occurring past the early childhood years (Zentner, 2001). Evidence was shown by Karp & Karp (as cited by Zentner, 2001) that by age ten, children associated the colors of black and red with the emotion constituting anger (1988). It can be assumed that this tendency will occur in children as they progress from early childhood to elementary age.

The relationship between color and emotion proves to be an important topic in understanding the role of emotional preference in the utilization of color with young children. Research has provided much information into the connection between color preferences as it relates to emotional associations. This is a concept that is evident in

many adult experiences. However, with recent studies it can be said that emotional connotations and color/emotional relationships strongly exist in young children. With the rise in research on this topic, the effect of emotion in eliciting color choices in young children may continue to demonstrate an awareness of purpose in the choices young children make.

3. Color Choice in Object Representations

Research on the topic of color choice in the representation of objects provides a further escalation of possible emotional associations with color possessed by young children. Objects that are characterized by specific attributes may determine a systematic approach to the use of color in symbolizing the interpretation of objects. In understanding the color choices children make when representing objects, it is essential to examine the effect of color preference and emotional context in determining a connection between color usage and object representation.

In a particular study completed by Esther Burkitt, Martyn Barrett, and Alyson Davis (2003), the concept of children's systematic usage of color in object association was tested. According the Burkitt, Barrett, and Davis (2003), this study attempts to "examine children's sensitivity to metaphorical associations of color, rather than examining children's use of color in drawing production tasks." Because children (as cited by Burkitt, Barrett, and Davis, 2003) as young as four years of age demonstrate the ability the use color symbolically (Golomb, 1992), this study also focused on exploring possible developmental trends in children's color choice (Burkitt, Barrett, & Davis, 2003).

Participants of this study (children ranging in age from four years to eleven years) were first asked to complete a color preference task where children ranked and rated ten colors according to their preference (Burkitt, Barrett, & Davis, 2003). The next task, as stated by Burkitt, Barrett, & Davis (2003), asked participants to color three identical figures of objects (tree, man, dog) with each given different personality attributes (nice, neutral, and nasty). Findings indicate that children used their more preferred colors for positively characterized objects, used colors least preferred for negatively characterized objects, and used colors ranked intermediately for neutrally characterized objects (Burkitt, Barrett, & Davis, 2003).

In addition to this finding, Burkitt, Barrett, and Davis also investigated possible trends in common color usage in objects. The results of this examination were interesting in that "black tended to be the most frequently chosen color for completing the drawings of negatively characterized topics" (Burkitt, Barrett, & Davis, 2003). Also noted by Burkitt, Barrett, & Davis (2003) was a similar trend in children's realistic color choices used to represent the dog and tree objects. This consisted of the use of the color brown for dogs depicted as neutral, and the choice of green for trees symbolizing a similar neutral characteristic (Burkitt, Barrett, & Davis, 2003). It may be concluded from this finding that children may possess realistic color associations for known objects which represent common color schemas.

The exploration of the topic of color choice in the representation of objects serves an important purpose in determining common color trends in the drawings of children. It also provides possible reasons for emotional and symbolic associations that young children may possess. Deciphering children's color preferences may contribute to this

understanding. However, the analysis of a sample of young children's color choices when representing objects for common trends may further determine the use of color as a symbolic function in children's drawings.

Summary of the Literature Review

The topics of children's drawings and color studies in young children were presented in order to address these issues as they relate to color selection in the drawings of young children. Pertaining to the subject of children's drawings, three distinct individuals and their respective theories each provided an understanding of child development through the analysis of children's drawings. Recent studies conducted with young children relevant to color preference, color - emotion relationships, and color choice in object representations were presented in order to examine findings and common color trends in young children. The results of the studies presented established possible assumptions for the colors children choose according to emotional preferences and/or symbolic associations in representing objects.

Chapter III: Research Methodology

Introduction

The purpose of this study is to examine the color selection in object drawings of Kindergarten age students. Common color usage or commonalities will be established in order to determine possible color trends used throughout the drawings of six everyday images. The participants' selection and usage of logical colors as opposed to expressive or non-realistic colors will be explored throughout three phases of the study. Each phase will contain a different set of limitations for each student, namely the number of colors that they may chose to perform their drawing task.

This chapter of the thesis will focus on the research methodology used throughout the study. The topics that will be discussed in this chapter include the restatement of the research questions, a description of the participants in the study, a brief explanation of materials used, a review of color classifications, a discussion of the procedures used including verbal prompts given, and a summary of the chapter contents.

Research Questions

There are two major objectives of this thesis. The primary objective is to determine the use of logical color choices as opposed to expressive or non-realistic color choices in the object drawings of student participants. The secondary objective is to find possible color commonalities or trends in the colors children chose to use in their drawings. The research questions established from these objectives and a brief explanation of each are as follows:

1. Question One

What number of students use logical colors in object drawings?

This question will address the use of logical colors (realistic colors) in the choices student participants make as evident in their object drawings. This question will provide a quantitative assumption as to the percentage of students with a logical color choice in comparison to students with an expressive color choice. This question will be explored throughout all three phases of the study in order to determine any trend s in the use of logical colors and to distinguish a relationship between logical color usage and the object it was used to represent.

2. Question Two

Do students use logical colors when limitations are set?

This question will explore the use of logical colors in two phases of the study. Because phase 2 and phase 3 set limitations as to the number of colors participants can use in their object drawings, the analyses of the colors used in these two phases will be important in determining possible increases or decreases in the use of logical colors. Both phase 2 and phase 3 will provide information concerning the use of logical colors when limitations are set.

3. Question Three

What color trends are evident throughout the study?

This question will address any possible common color trends throughout all three phases of the study. This question will explore a possible correlation between common colors used and the objects they were used to represent. A determination of possible

color schemas in Kindergarten age children may be established from the findings of this question.

Participants

Participants in this study consisted of eighteen Kindergarten students from Carmody Hills Elementary School, a general education public school located in Capitol Heights, Maryland. This school, one of 118 elementary schools in the Prince George's County Public School System, receives Title I federal funds because of its high population of low income students. The eighteen student participants were members of one heterogeneous Kindergarten class, varying in abilities and characteristics. The subjects of this study included seven boys and eleven girls, all of African American decent. Student participants ranged in age from 60 months (5 years) to 77 months (6 years, 5 months) with a mean age of 67 months (5 years, 7 months). Academic ability has been categorized into three areas on the basis of academic performance in classroom instruction and assessments. The categories of Below Grade Level (BGL), On Grade Level (OGL), and Above Grade Level (AGL) are used throughout the school system in identifying student academic ability. The eighteen subjects of this study included six students performing below grade level (33%), five students performing on grade level (28%), and seven students performing above grade level (39%). The socio-economic status of student participants can be classified as low or average according to school system's FARM (Free and Reduced Meals) Program. Student participants receiving benefits from this program are identified by the annual wages of parents/guardians. There are ten students receiving free meal status (56%), one student receiving reduced

meal status (5%), and seven students not participating in this program and thus paying full meal coverage (39%).

The following table presents a summary of information gathered regarding the student participants in this study.

Table 1. Participant Data Classifications

Identification Number	Gender (M=male F= female)	Age (in months)	Academic Ability	Socio-economic (FARM)
1	M	69	AGL	Free
2	F	68	BGL	Free
3	M	67	AGL	Pay
4	F	60	BGL	Free
5	M	70	AGL	Free
6	F	73	AGL*	Free
7	F	69	AGL	Pay
8	F	64	OGL	Free
9	M	63	OGL	Pay
10	F	68	OGL	Free
11	M	61	OGL	Free
12	F	70	BGL*	Pay
13	F	62	BGL	Reduced
14	F	68	OGL	Free
15	F	77	BGL**	Pay
16	M	69	AGL	Pay
17	F	63	AGL	Pay
18	M	66	BGL*	Free

* recommended for retention

** premature birth; repeated Kindergarten year; developmentally delayed

Materials

White photocopy paper (8 ½ in. x 11 in.) divided into six boxes was used in all three phases of the study. These pre-drawn boxes were used to distinguish the space where each participant was to draw his object images. Paper was presented to each participant in a horizontal manner. In phase 1 and phase 2, a cup of Crayola crayons with the colors red, orange, yellow, green, blue, purple, brown, and black were presented to student participants, placed on the table in front of the students and positioned above their paper. These crayons were taller than the height of the cup and therefore were in direct view of the participants. The crayons were replaced with a new set of crayons containing the same colors in the same presentation format for both phase 1 and phase 2. In phase 3, five sets of crayons were placed in a line on a tray in front of the students and positioned above their paper. Each set, containing a group of two crayons bound together with a rubber band, was pre-arranged prior to student participants' drawing task and was presented to each participant in the following manner: yellow and purple, green and brown, red and black, brown and black, blue and orange. The tray was rearranged in this order prior to each student participant coming to the table.

Color Classifications

1. Logical Color Choices

For this study, student selected color choices will be deemed logical based on the realistic use of color to represent each object. The following logical color choices remain constant for all three phases of the study. Logical color choices will be defined as colors used to realistically represent an object. The logical color choices for the tree image

would include the color brown in representation of the bark of the tree, and the color green, orange, red, or yellow representing leaves. Logical color choices for the house image include black and red to symbolize brick, brown to symbolize wood, and an additional color to represent the color of the siding and roof of the house which may include red, yellow, green, or blue. The skin colors of brown, or orange used to represent the boy and girl images will be considered a logical color choice, with the additive color chosen from the remaining colors in symbolizing hair and clothes. In the image of a dog, color choices of brown, black, and yellow will be deemed logical in the representation of a dog's fur. The logical color choices for the car image will include the color black in representing the wheels of the car. Any color used to represent the body of the car (because a car can be observed in various colors) will be considered a logical choice.

It is important to note that although a student participant utilizes a color that would not be deemed "logical", it may be considered as a logical color choice dependent upon the student participant's explanation for the reason of choosing that particular color or colors.

2. Expressive (Non - Realistic) Color Choices

Expressive color choices are distinguishable from logical color choices in that expressive colors are used by the student participants in representing an object for personal reasons and which contain colors that are not realistic representations of the images. In this study, all colors that have not been specified as logical color choices will be considered as expressive color choices.

Procedures

Student subjects completed object drawing tasks organized into three phases. Each phase of the study asked students to perform the same activity of drawing six objects: tree, house, boy, dog, girl, and car. The order of drawing each object remained constant throughout the phases. Student subjects completed each drawing task independent from the other students at a designated space in the classroom in order to minimize the risk of copying from other participants and maximize the possibility of obtaining a true result of their color choice. The teacher/researcher was present throughout the drawing sessions giving prompts and directions as needed, as well as for observation purposes. The location of each drawing session consisted of a table in a quiet area of the classroom with materials displayed as described previously for the drawing session. The onset of each phase occurred in succession to the previous phase. After all students completed their object drawing task, the next phase began (each phase lasting approximately one month from the end of the previous phase). Students were called back to the drawing table in the same order for each phase in order to control the duration of time students had between each phase drawing. Each session in each phase of the study lasted approximately ten minutes per student.

1. Phase One

Phase 1 of the study asked students to complete the task of drawing six objects (tree, house, boy, dog, girl, and car) using an unspecified number of colors. In front of the student, a paper divided into six spaces and a cup of crayons were placed on the table. In the cup, the colors of red, orange, yellow, green, blue, purple, brown, and black were

available for students to choose. There was no limit to the number of colors students may use in this phase of the study. The directions given to the each student were as follows:

'I would like you to draw six objects: a tree, a house, a boy, a dog, a girl, and a car. There are six boxes on your paper. When I point to a box, I would like you to draw the object I say. Here is a cup of crayons. You may use any colors you want to draw your object. Give me a "thumbs up" when you are ready to begin.'

The directions were restated throughout the session if a student indicated that they needed additional prompting as to the instructions of the task. This was dependent upon student appeal and/or teacher/researcher observation.

2. Phase Two

Phase 2 of the study asked students to complete the same task of drawing the same six objects (tree, house, boy, dog, girl, and car) in the same order as in Phase 1. However, this phase of the study asked students to choose only two crayon colors to use in drawing each object. Students were given another paper divided into six spaces and the same cup of crayons with the colors red, orange, yellow, green, blue, purple, brown, and black. This is the first phase of the study in which a limitation was set. The directions given to each student were as follows:

'I would like you to draw six objects: a tree, a house, a boy, a dog, a girl, and a car. There are six boxes on your paper. When I point to a box, I would like you to draw the object that I say. Here is a cup of crayons. Last time we did these drawings, I asked you to use any colors you wanted. Today, I would like you to pick only two colors to draw each object. Can you show me two fingers? Good! That is how many crayons I would like you to use. Give me a "thumbs up" when you are ready to begin.'

The directions were restated throughout the drawing session upon the teacher/researcher's observation of students using more or less than two crayons. Additional reminders and prompts were given as needed.

3. Phase Three

Phase 3 of the study asked students to complete the task of drawing six objects in the same specified order as the two previous phases. However, a further limitation was set as to color combinations that students may choose. Students were again given a paper with six spaces placed in front of them at the table. Then, the teacher/researcher presented the students with a tray of five groups of pre-arranged crayon sets. The color combination sets included yellow and purple, green and brown, red and black, brown and black, blue and orange placed from left to right in the middle of the tray. Students were asked to choose one set of pre-arranged colors to draw each object. These color sets were predetermined by the teacher/researcher in order to include possible color selections of logical or expressive color choices for the six object drawings. This is the second phase in which a limitation was set. The directions given to each student were as follows:

'I would like you to draw six objects: a tree, a house, a boy, a dog, a girl, and a car. There are six boxes on your paper. When I point to a box, I would like you to draw the object I say. Here is a tray of crayons. I put the crayons together in groups of two. Can you find the yellow and purple group? Can you find the green and brown group? Can you find the red and black group? Can you find the brown and black group? Can you find the blue and orange group?' (Teacher/researcher assessed each student's color awareness as the student pointed to each group when the question was asked). 'Today, I

am going to ask you to pick one group from the tray to draw each object. Give me a "thumbs up" when you are ready to begin.'

The directions were restated throughout the drawing session prior to each object drawing depending on the teacher/researcher's observation of students' indication that they had not understood the instructions. Upon this assessment, the teacher/researcher repeated the directions and gave additional prompts as needed.

Data Collection and Analysis

At the culmination of each phase, the object drawings of student subjects were collected. The identities of the participants were masked and each student was assigned a number for data purposes. The identification numbers of the student subjects remained consistent throughout all phases of the study.

Each object drawing in each of the three phases of the study was analyzed for the use of logical colors and expressive colors. A scoring system of percentages was used for each object drawing and information was stored in tables in order to organize the data and formulate results. Percentages were derived by dividing the number of logical colors used into the total number of colors used per object drawing. The use of specific colors in each object drawing has also been recorded and information was translated into tables and graphs in order to graphically represent common color trends found in the object drawings completed by student subjects.

Summary

The intention of this study is to investigate the color selection in objects drawn by young children. This study will determine the use of logical colors as opposed to expressive colors in the drawings of six familiar objects completed by Kindergarten age students. Object drawings will also be analyzed to find common color trends present in the representation of these objects. This study is divided into three phases with each phase containing different sets of limitations as to the number of colors a student may use in completing each drawing task. Drawings will be analyzed and data will be collected in order to determine the use of logical colors as well as finding possible color commonalities or trends in the colors students use to represent each object. Throughout this chapter, the topics of research questions, student participants, materials, color classification criteria, and procedures of the study have been presented and discussed.

Chapter IV: Data Analysis and Results

Introduction

Chapter IV contains the results of data collected during Phase 1, Phase 2, and Phase 3 of the study. The organization of this chapter consists of sections pertaining to each phase. Within each section, results concerning the use of logical color and common color trends will be presented. The remaining section of the chapter will focus on the comparison of data throughout the three phases of the study.

Data Analysis

1. Phase One Data

    a. Logical Colors

Logical color scores were formulated by dividing the number of logical colors used by the number of total colors used by that particular child in each object drawing. Using this formula, a raw score (percentage) was established for each student participant. This formula was repeated for each of the six object drawings in Phase 1. The logical color score for each participant was averaged to determine an overall average score for Phase 1. An average score for each object drawing was also included to show the range of logical color scores throughout this phase. The highest obtainable score was 1.00 or 100%. A summary of the scores and averages of Phase 1 are shown in Table 2.

The most evident use of logical color appears in the drawing of the tree where 90% of students used logical colors (green, brown) in its representation. In two instances (11%), the color red was chosen in addition to green and brown to represent apple - like objects within the top section of the tree. In a separate instance, one student used only

the color brown to represent the parts of the bark and leaves of the tree (refer to Appendix A). Because this was a logical color choice, this student attained the total score of 1.00 (100% logical color usage). The least evident use of logical color in Phase 1 is shown in the average score of the house where 29% of students used logical colors. In the object drawings of the boy, dog, girl, and car, there is a range of 37% to 44% of logical color usage. The total average logical color score for Phase 1 was 0.47, establishing that 47% of students used logical colors in the six object drawings of Phase 1.

Table 2. Phase 1 Summary

Student	TREE	HOUSE	BOY	DOG	GIRL	CAR	Average Score
1	1.00	0.16	0.00	0.50	0.66	1.00	0.55
2	1.00	0.20	0.16	0.33	0.00	0.20	0.32
3	1.00	0.00	0.00	0.00	0.00	0.50	0.25
4	1.00	0.20	0.33	1.00	0.25	0.25	0.51
5	1.00	0.00	0.50	0.20	0.20	0.50	0.40
6	1.00	0.00	0.00	0.00	0.00	0.50	0.25
7	1.00	0.66	1.00	1.00	1.00	1.00	0.94
8	1.00	0.25	0.40	0.50	0.00	0.00	0.36
9	1.00	0.00	0.50	0.00	0.00	1.00	0.42
10	1.00	0.00	1.00	0.50	1.00	0.50	0.67
11	1.00	0.00	0.50	1.00	0.50	0.50	0.58
12	1.00	1.00	1.00	1.00	1.00	0.50	0.92
13	0.50	0.00	0.00	0.50	0.00	0.33	0.22
14	0.75	1.00	0.00	0.00	1.00	0.50	0.54
15	1.00	0.00	0.33	0.50	1.00	0.00	0.47
16	1.00	0.50	0.00	0.00	0.00	0.00	0.25
17	1.00	0.25	1.00	0.40	1.00	0.20	0.64
18	0.00	1.00	0.00	0.00	0.00	0.50	0.25
Average	**0.90**	**0.29**	**0.37**	**0.41**	**0.42**	**0.44**	***0.47***

Total Average

Object drawings were then evaluated according to the classifications of participants in four categories: (1) gender; (2) age; (3) academic ability; and (4) socio-

economic status. Student scores were compared to distinguish a possible relationship within groups. Data concerning these classifications are shown in Table 3.

Table 3. Phase 1 Logical Color Classifications

Gender

Boys	*Girls*
0.36	0.53

Age in Months

60	*61*	*62*	*63*	*66*	*67*	*68*	*69*	*70*	*73*	*74*	*77*
0.5	0.58	0.22	0.45	0.51	0.25	0.25	0.58	0.65	0.25	0.36	0.47

Academic Ability

AGL	*OGL*	*BGL*
0.46	0.48	0.45

Socio – Economic Status

Free-Reduced	*Pay*
0.42	0.53

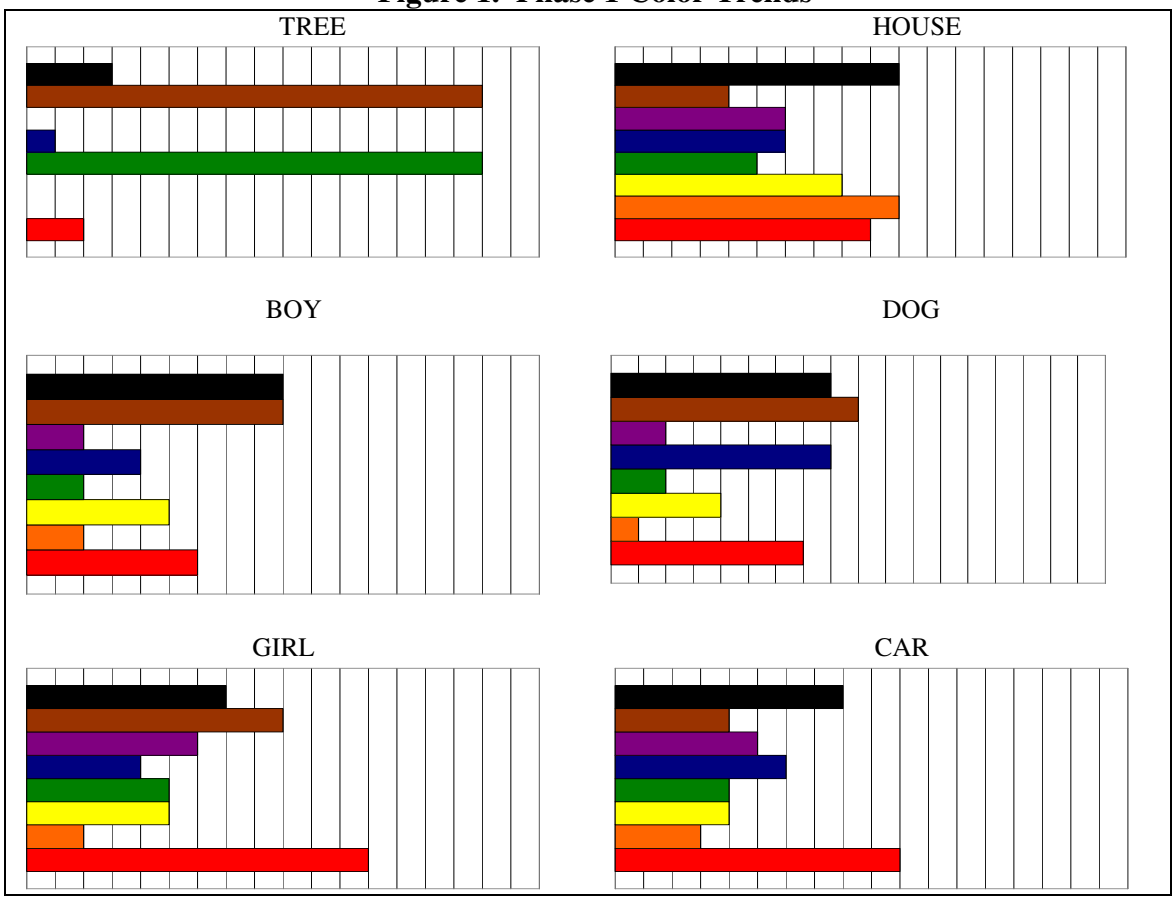
The classification of gender showed that the logical color usage of girls (0.53) was 17% higher than that of boys (0.36). When investigating age as it relates to logical color, no obvious trends can be distinguished. The highest score (0.65) was obtained by students aged 70 months, whereas the lowest score (0.22) can be seen in students 62 months of age. Participant ages extended from 60 months to 77 months of age. In terms of academic ability, students were classified as Above Grade Level (AGL), On Grade Level (OGL), or Below Grade Level (BGL) according to school assessments. All groups scored within the same range, with OGL scoring the highest (0.48) and AGL and BGL earning a score with a 1% difference (AGL 0.46; BGL 0.45). The socio- economic status classification of Phase 1 showed the students who do not qualify for a free/ reduced lunch program (Pay) scored 11% higher than those students receiving free/ reduced meals programs (Free/Reduced). Logical color usage for students categorized in the Pay group

obtained an average score of 0.53, whereas students classified as Free/ Reduced earned an average score of 0.42.

b. Color Trends

In the analysis of possible common color trends, the colors chosen and used by student participants for each object drawing were examined and recorded. Data documenting the frequency of color usage in Phase 1 is shown in Figure 1.

Figure 1. Phase 1 Color Trends



(Y) axis= Colors
Color sequence: Black, Brown, Purple, Blue, Green, Yellow, Orange, Red
(X) axis= Frequency of Color Usage
Vertical units per student (18)

In the object drawing of a tree, there is an obvious color trend in the selection and usage of the colors brown and green. Sixteen out of eighteen students (89% of

participants) used the colors brown and green in their drawing of a tree. The colors purple, yellow, and orange, which can be classified as expressive in the representation of a tree, were not chosen by any student participant. The colors used in the drawing of the house showed no obvious color trends. The colors black and orange were used most frequently with 56% of participants choosing those colors. The color red was selected by 50% of the participants, where the color brown was least frequently used with a 22% selection rate. The colors black and brown (which can be considered logical color choices) were chosen by 50% of participants when representing a boy. The expressive colors of orange, green, and purple had the least frequent color usage with 17% of participant selection. In the object drawing of a dog, 9/18 participants most frequently chose the color brown (logical color choice), revealing a frequency of 50% of student selection. The colors blue and black was chosen by 44% of participants, and orange was the least frequently chosen color with a selection rate of 1/18 participants (6%). When representing a girl, 67% of students (12/18) chose the color red most frequently. The color brown was chosen by 50% of the group, and orange was the least frequently chosen color with 11% of student selection (2/18 participants). Lastly, the object drawing of a car showed red as the most frequently chosen color with 56% of student usage. The color blue was chosen closely with 44% of participants, and orange was least frequently chosen with 17% (3/18 participants).

Throughout Phase 1, data have shown that there is a common color trend in the color selection and usage of the drawing of a tree where 16/18 students chose green and brown in its representation. The color brown showed to be a popular choice of color in

representing the tree, boy, dog, and girl objects, whereas the color orange was shown to be the least frequently chosen color in the object drawings of a boy, dog, girl and car.

2. Phase Two Data

a. Logical Colors

Logical color scores were formulated by dividing the number of logical colors used by the number of total colors used in each object drawing. In Phase 2, which asked students to select a total number of two crayon colors to use in each object drawing, the number of logical colors chosen was divided into the total number of two. All students successfully chose two colors for each object drawing. Using this formula, a percentage score was established for each student participant. This formula was repeated for each of the six object drawings in Phase 2. The logical color score for each participant was averaged to determine an overall average score for Phase 2. An average score for each object drawing was also included to show the range of logical color scores throughout this phase. The highest obtainable score was 1.00 or 100%. A summary of the scores and averages of Phase 2 are shown in Table 4.

The most evident use of logical color appears in the drawing of the tree revealing the highest score of 94% student usage of the colors green and brown in its representation. Attaining a high score of 0.69 by student participants was the object drawing of the boy, showing that 69% of student chose colors that realistically represented that item. The least evident use of logical color usage is apparent in the drawing of the house, which attained a score of 33%. Consistent with the overall total average score in Phase 2 of 0.59 was the remaining objects of the dog, girl, and car.

These objects each obtained a score of 0.53, showing that 53% of students used logical colors in the representation of these objects.

Table 4. Phase 2 Summary

Student	TREE	HOUSE	BOY	DOG	GIRL	CAR	Average Score
1	1.00	1.00	0.50	1.00	0.50	0.00	0.67
2	1.00	0.00	1.00	0.00	0.00	0.50	0.42
3	1.00	0.50	1.00	0.00	0.00	0.50	0.50
4	1.00	0.00	1.00	1.00	0.50	1.00	0.75
5	1.00	0.00	1.00	0.50	0.00	0.50	0.50
6	1.00	0.00	0.50	0.00	1.00	0.50	0.50
7	1.00	1.00	0.50	1.00	1.00	0.50	0.83
8	1.00	1.00	1.00	0.00	1.00	0.50	0.75
9	1.00	1.00	0.50	1.00	1.00	1.00	0.92
10	1.00	0.00	1.00	1.00	1.00	0.00	0.67
11	1.00	0.00	0.00	0.00	1.00	0.50	0.42
12	1.00	0.00	1.00	0.00	0.50	1.00	0.58
13	1.00	0.00	1.00	0.50	0.50	0.00	0.50
14	1.00	0.00	0.00	1.00	0.00	0.00	0.33
15	0.50	0.00	1.00	0.50	1.00	1.00	0.67
16	0.50	0.50	0.50	0.00	0.50	1.00	0.50
17	1.00	0.00	0.00	1.00	0.00	1.00	0.50
18	1.00	1.00	1.00	1.00	0.00	0.00	0.67
Average	**0.94**	**0.33**	**0.69**	**0.53**	**0.53**	**0.53**	***0.59***

Total Average

An evaluation of object drawings in Phase 2 was completed with the organization of data within the categories of gender, age, academic ability, and socio- economic status. A possible relationship between groups was distinguished by comparing student scores in each of these four categories. Data concerning these classifications are shown in Table 5. When investigating the effect of gender on logical color choice, Phase 2 findings show that there is a 1% difference in logical color usage in boys and girls. This similar outcome between gender groups shows boys scoring 0.60 and girls obtaining a score of

0.59. Results from the comparison of age to logical color usage in Phase 2 show no obvious trends in age as it relates to logical color.

Table 5. Phase 2 Logical Color Classifications

Gender

Boys	*Girls*
0.6	0.59

Age in Months

60	*61*	*62*	*63*	*66*	*67*	*68*	*69*	*70*	*73*	*74*	*77*
0.75	0.42	0.5	0.71	0.67	0.5	0.47	0.66	0.54	0.5	0.75	0.67

Academic Ability

AGL	*OGL*	*BGL*
0.57	0.62	0.6

Socio – Economic Status

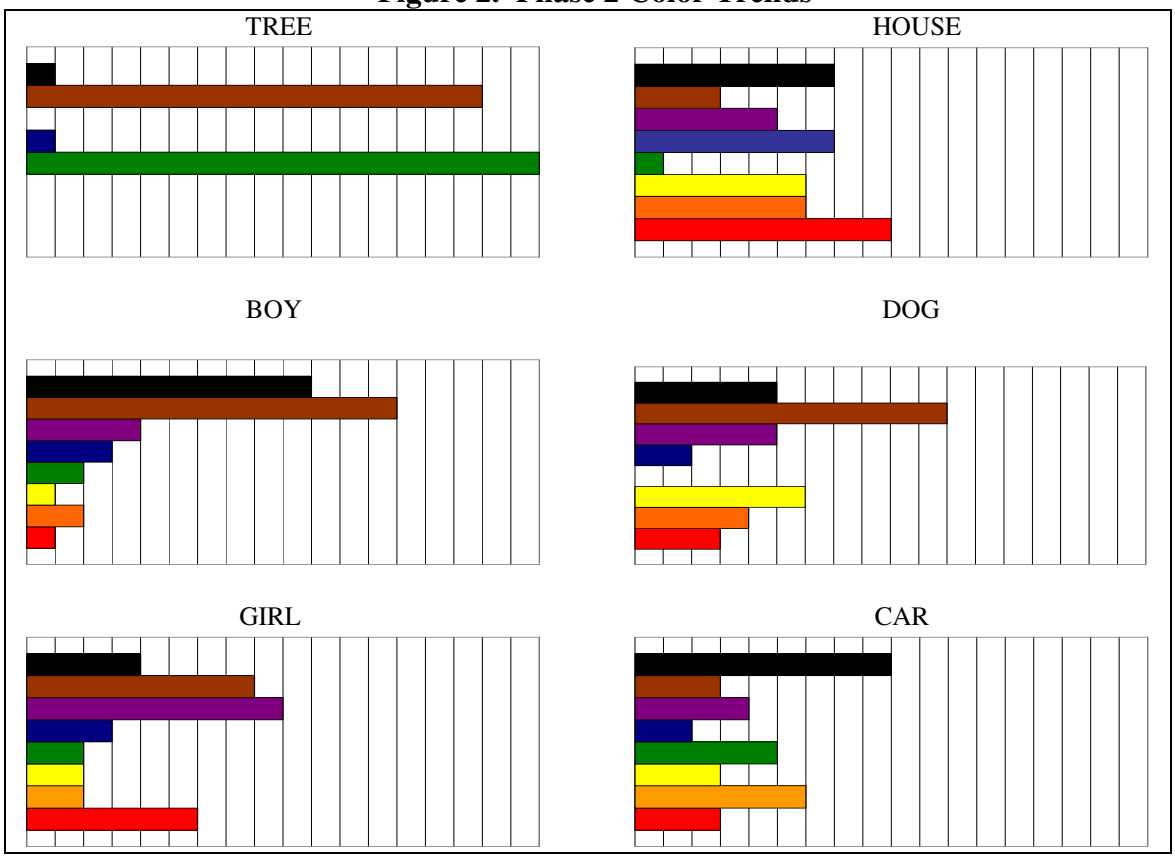
Free-Reduced	*Pay*
0.56	0.64

The highest score of logical color usage was obtained by students 60 months and 74 months of age with 75% usage, while the lowest score was obtained by students 61 months of age (42%). As to a relationship between academic ability and logical color in Phase 2, each group investigated (Above Grade Level, On Grade Level, Below Grade Level) scored within the same range. There is a 2% difference in the scores attained by the OGL group and BGL group. Students classified as OGL scored 0.62, while BGL students scored 0.60. Students who perform Above Grade Level (AGL) earned the lowest score of 0.57, with a difference of 3% from the BGL group. In terms of the socio-economic status of student participants, data shows that students classified as Pay (those who do not quality for the Free/Reduced Meals Program) attained the highest score of logical color usage with 0.64. Students who received the Free/ Reduced Meals Program (Free/Reduced) show a score of 0.56, indicating an 8% difference between groups.

b. Color Trends

The colors chosen and used by student participants in the representation of each object drawing were analyzed to find possible color trends in Phase 2. The colors used in each object drawing were recorded and data was then formulated to investigate color commonalities among objects. Data documenting the frequency of color usage in Phase 2 is shown in Figure 2.

Figure 2. Phase 2 Color Trends



(Y) axis= Colors
Color sequence: Black, Brown, Purple, Blue, Green, Yellow, Orange, Red
(X) axis= Frequency of Color Usage
Vertical units per student (18)

The drawing of the tree indicates an obvious color trend in the frequency of usage in both the colors green and brown. Eighteen out of eighteen students chose the color green when drawing a tree, resulting in 100% of student participants. The color brown

was chosen with a frequency rate of 89% (16/18 student participants). The colors of purple, yellow, orange, and red (which can be classified as expressive in the representation of the tree) were not chosen by any student, therefore receiving a score of 0% color usage. The house object drawing for Phase 2 indicated no obvious color trends. The color red was used most frequently with nine students out of eighteen (50% of total participants) choosing this color to represent a house image. The colors black and blue revealed the second highest frequency rate of 39% usage. The color green showed to be the least frequent color used with one student out of eighteen choosing this color (6% usage). The image of the boy in Phase 2 showed that 72% of student participants (13/18 students) used the color brown, attaining the highest frequency of color usage in the representation of a boy. The color blue was chosen with the second highest frequency rate of 56%. The colors red and yellow were the least frequently chosen colors with 6% of student usage. In the investigation of color usage in the object drawing of a dog, 61% of students logically chose the color brown to represent this image. The color yellow was chosen by 33% of student participants, and the color green was shown as the least frequently used color with 0% usage by student participants (0/18 students). Phase 2 object drawing of a girl found that purple was the most frequently chosen color with nine students out of eighteen using this color in their image (50% of student participants). The color brown was chosen with the second highest frequency rate of 39%. The least frequently chosen colors for the girl object drawing was green, yellow, and orange with 11% of participant usage. In the object drawing of a car, 50% usage of the color black indicated it as the most frequently chosen color. The color orange was shown with the second highest frequency rate of 33%. The least frequently chosen color to represent the

car image was revealed with 11% student usage of the color blue (2//18 student participants).

Throughout Phase 2, data have shown that there is a distinct common color trend in the object drawing of a tree, where 18/18 students used the color green and 16/18 students used the color brown in the representation of this image. This resulted in a total of 100% usage of the color green and 89% usage of the color brown. Excluding the total percentage of student usage of the color green in the tree drawing, this color was shown to be the least frequently chosen color for the remaining objects of the house, boy, dog, and girl. Consistent with the frequency of usage of the color brown in the tree drawing, this color along with the color blue showed to be the most frequently used colors throughout all object drawings in Phase 2.

3. Phase Three Data

a. Logical Colors

Logical color scores were formulated by dividing the number of logical colors used by the number of total colors used in each object drawing. In Phase 3, which asked students to select a pre-arranged group of two crayon color combinations to use for each object drawing, the number of logical colors chosen was divided into the total number of two. All students successfully chose one color combination for each object drawing. (There were no restrictions as to the number of times students may use any particular color combination throughout the object drawing series. Directions specified students to choose only one color group per object.) Using this formula, a percentage score was established for each student participant. This formula was repeated for each of the six object drawings in Phase 3. The logical color score for each participant was averaged to

determine an overall average score for Phase 3. An average score for each object drawing was also included to show the range of logical color scores throughout this phase. The highest obtainable score was 1.00 or 100%. A summary of the scores and averages of Phase 3 are shown in Table 6.

Table 6. Phase 3 Summary

Student	TREE	HOUSE	BOY	DOG	GIRL	CAR	Average Score
1	1.00	1.00	1.00	1.00	0.50	1.00	0.92
2	1.00	1.00	1.00	0.00	1.00	0.00	0.67
3	1.00	1.00	1.00	0.00	0.50	0.50	0.67
4	1.00	0.00	1.00	1.00	0.00	0.50	0.58
5	1.00	0.00	1.00	0.50	1.00	1.00	0.75
6	1.00	1.00	0.00	0.00	1.00	1.00	0.67
7	1.00	1.00	1.00	1.00	1.00	0.00	0.83
8	1.00	0.00	1.00	0.00	1.00	0.00	0.50
9	1.00	1.00	1.00	1.00	0.50	0.00	0.75
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00
11	1.00	0.00	1.00	0.50	0.00	0.00	0.42
12	1.00	0.00	1.00	0.00	0.50	0.00	0.42
13	1.00	0.00	1.00	0.50	0.00	0.50	0.50
14	1.00	1.00	1.00	0.00	1.00	0.00	0.67
15	1.00	0.50	0.00	0.50	0.50	0.00	0.42
16	1.00	0.00	1.00	0.00	0.00	0.50	0.42
17	1.00	1.00	1.00	0.00	0.50	0.00	0.58
18	1.00	0.50	1.00	1.00	0.00	1.00	0.75
Average	**1.00**	**0.56**	**0.89**	**0.44**	**0.56**	**0.39**	***0.64***

Total Average

As shown in the averages of student scores per object, the most evident use of logical color appears in the drawing of the tree, where the average score of 1.00 was attained. This indicated that 100% of student participants chose the color combination of green/brown in the representation of the tree. The object drawing of the boy showed that 89% of students chose logical color combinations to represent this image. In one

instance, a student's rationale for choosing the blue/orange color combination was to draw a Caucasian boy. Although the combination of blue/orange may be considered expressive in the representation of a boy image, a logical thought process was evident in the explanation given. Therefore, a total possible score of 1.00 (100% logical color usage) was attained for its logical color choice (see Appendix B). The least evident use of logical color was shown in the drawing of the car. This image attained a score of 0.39, indicating that 39% of student participants chose color combinations to logically represent this object. The total average for logical color usage in Phase 3 was 64%.

An evaluation of object drawings in Phase 3 was completed by categorizing data into the four categories of gender, age, academic ability, and socio- economic status. A possible relationship between groups was distinguished by comparing student scores in each of these four categories. Data concerning these classifications are shown in Table 7.

Table 7. Phase 3 Logical Color Classifications

Gender

Boys	*Girls*
0.67	0.62

Age in Months

60	*61*	*62*	*63*	*66*	*67*	*68*	*69*	*70*	*73*	*74*	*77*
0.58	0.42	0.5	0.67	0.75	0.67	0.78	0.72	0.58	0.67	0.5	0.42

Academic Ability

AGL	*OGL*	*BGL*
0.69	0.67	0.56

Socio – Economic Status

Free-Reduced	*Pay*
0.67	0.58

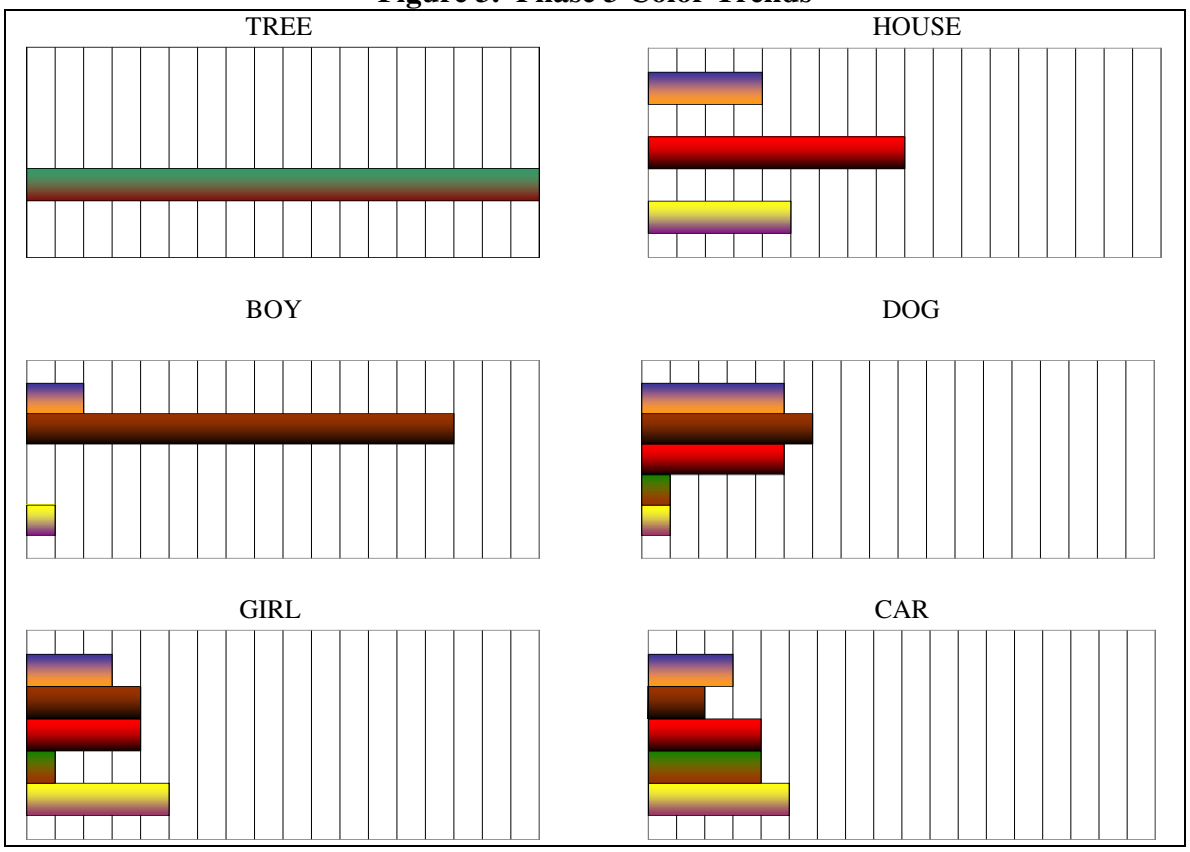
In establishing a possible relationship between logical color usage and gender, Phase 3 indicates a 5% difference in the logical color usage of boys and girls, where boys scored a total of 0.67 and girls obtained a total score of 0.62. The investigation of age as it related of logical color shows no obvious trends for Phase 3. Students aged 68 months obtained the highest use of logical color with 78% logical color usage. The lowest score of logical color usage is shown by students aged 61 months (42%). Results from the comparison of academic ability as it relates to logical color indicate slight differences in percentages between groups. Students in the Above Grade Level group (AGL) showed the highest use of logical color with 69% usage (with a score of 0.67). Following this group, students On Grade Level (OGL) performed with 67% logical color usage (with a score of 0.67). Establishing the lowest use of logical color usage in Phase 3 was Below Grade Level (BGL) students, earning 56% of logical color usage (with a score of 0.56). This comparison revealed a 13% difference in the use of logical color between the AGL and BGL groups. Investigating socio-economic status as a possible relation to logical color, students qualifying for the Free/Reduced Meals program (Free/Reduced) attained the highest score of logical color usage with 0.67. Students not qualifying for this program (Pay) received a score of 0.58. This distinguishes a 9% difference of logical color usage as it relates to socio-economic status for Phase 3.

b. Color Trends

The color combinations chosen and used by student participants in the representation of each object drawing throughout Phase 3 were analyzed to find possible color trends. The color combinations used in each object drawing were recorded and data was then formulated to investigate color commonalities among objects. Data documenting the frequency of color usage in Phase 3 is shown in Figure 3.

In examining the color combinations used in the drawing of the tree, results indicate an overwhelming trend in the usage of the colors green/brown. All students (18/18 participants) chose this color combination in the representation of the tree, indicating 100% of student usage. The remaining four possible color combination choices (yellow/purple, red/black, brown/black, and blue/orange) were not chosen by any student participant. Color trends for the house drawing in Phase 3 indicated the color combination red/black with the most frequent usage with nine out of eighteen students choosing this combination (50% of student participants). The combinations brown/black and green/brown were not chosen by any student, resulting in the least frequent color usage of 0%. The color combination of brown/black was used most frequently in the drawing with a frequency of usage of 83% (15/18 student participants). The least frequent color combination choice was red/black with 0% usage. The combination of blue/orange was chosen by two students (11%), representing one logical color choice with reasoning to represent the image realistically. The other instance was an expressive representation of a boy.

Figure 3. Phase 3 Color Trends



(Y) axis= Color Combinations
Color sequence: Blue/Orange, Brown/Black, Red/Black, Green/Brown, Yellow/Purple
(X) axis= Frequency of Color Usage
Vertical units per student (18)

In the drawing of the dog, 33% of student participants chose the color combination brown/black, resulting in the most frequently chosen combination. Both the combinations blue/orange and red/black were chosen with a 28% frequency rate. The least frequently chosen combinations, green/brown and yellow/purple, attained 6% of student usage (1/18 students per color combination). In examining the color usage in the drawing of the girl, the color combination yellow/purple was the most frequently chosen colors with five out of eighteen students selecting this combination (28% frequency). The combinations red/black and brown/black were used by 22% of student participants (4/18 students). The color combination green/brown, the least frequently used colors,

was chosen by one student participant resulting in 6% of student selection. The color trends in the drawing of the car indicated the color combination yellow/purple as the most frequently used colors with 28% of student usage. The combinations red/black and green/brown were shown with four out of eighteen students choosing these combinations, resulting in 22% of student usage. With 11% (2/18 students), the color combination brown/black was the least frequently chosen color combination in the drawing of the car.

Throughout Phase 3, data have indicated an overwhelming color trend in the representation of the tree. The total number of student participants (18) chose the color combination green/brown when drawing this image. This resulted in 100% of student usage. With the exception of the tree drawing, the green/brown color combination was shown to be the least frequently chosen color combination throughout the following four objects: house, boy, dog, and girl. In the drawing of the car, this color combination was used by less than 1/3 of the class, obtaining a small percentage of student usage (22%).

4. Data Comparison of Phases

Logical Colors. Throughout the three phases of the study, comparisons were completed in order to find possible relationships between objects and logical colors. A comparison of the average scores throughout phases can be found in Table 8. (Further examples of student images as they progress throughout the three phases of the study can be found in Appendixes C through F).

Table 8. Average Logical Color Scores

Phase 1	TREE	HOUSE	BOY	DOG	GIRL	CAR
	0.90	0.29	0.37	0.41	0.42	0.44

Phase 2	TREE	HOUSE	BOY	DOG	GIRL	CAR
	0.94	0.33	0.69	0.53	0.53	0.53

Phase 3	TREE	HOUSE	BOY	DOG	GIRL	CAR
	1.00	0.56	0.89	0.44	0.56	0.39

The drawing of the tree showed an increase of 4% from Phase 1 to Phase 2, then increasing 6% from Phase 2 to Phase 3. A total increase of 10% is indicated from Phase 1 to Phase 2. This object drawing had the highest outcome of total logical color score in all three phases (see Figure 4) and was the only object to attain a total score of 100% (in Phase 3). There is an increase of 4% in the drawing of the house from Phase 1 to Phase 2, followed by a 23% increase from Phase 2 to Phase 3. The drawing of the boy showed a 32% increase in logical color use from a score of 0.37 in Phase 1 to 0.69 in Phase 2. A 20% increase from Phase 2 to Phase 3 resulted in a total logical color score of 89%. This rise in score indicated the largest overall difference of 52% in logical color from Phase 1 to Phase 3 (see Figure 5). There was a 12% increase in logical color usage in the drawing of the dog from Phase 1 to Phase 2. However, a decrease of 9% is shown from Phase 2 to Phase 3. The drawing of the girl in Phase 1 increased 9% in logical color from Phase 1 to Phase 2, and then continued to increase slightly 3% from Phase 2 to Phase 3. The sixth object drawn, the car, showed an increase of 9% from Phase 1 (0.44) to Phase 2 (0.53).

However, the logical color score decreases 14% from Phase 2 to Phase 3, resulting in a score of 0.39. This was the only object to attain a score lower in Phase 3 than that attained in Phase 1. The logical color scores for the remaining objects (tree, house, boy, dog, and girl) indicated a score in Phase 3 which was higher in comparison to Phase 1.

The comparison of data distinguishes the usage of logical colors throughout the three phases of the study. Logical color scores earned by student participants within each phase can be found in Table 9.

Table 9. Average Scores of Participants

Student	Phase 1	Phase 2	Phase 3
1	0.55	0.67	0.92
2	0.32	0.42	0.67
3	0.25	0.50	0.67
4	0.51	0.75	0.58
5	0.40	0.50	0.75
6	0.25	0.50	0.67
7	0.94	0.83	0.83
8	0.36	0.75	0.50
9	0.42	0.92	0.75
10	0.67	0.67	1.00
11	0.58	0.42	0.42
12	0.92	0.58	0.42
13	0.22	0.50	0.50
14	0.54	0.33	0.67
15	0.47	0.67	0.42
16	0.25	0.50	0.42
17	0.64	0.50	0.58
18	0.25	0.67	0.75
	0.47	***0.59***	***0.64***

Total Averages

This table shows individual scores of students and the average logical color score attained in Phase 1, Phase 2, and Phase 3. The average score of logical color usage in the preliminary stage of the study (Phase 1) indicated the baseline score of 0.47 or 47% of logical color usage. An increase of 12% was shown from Phase 1 to Phase 2 (0.59),

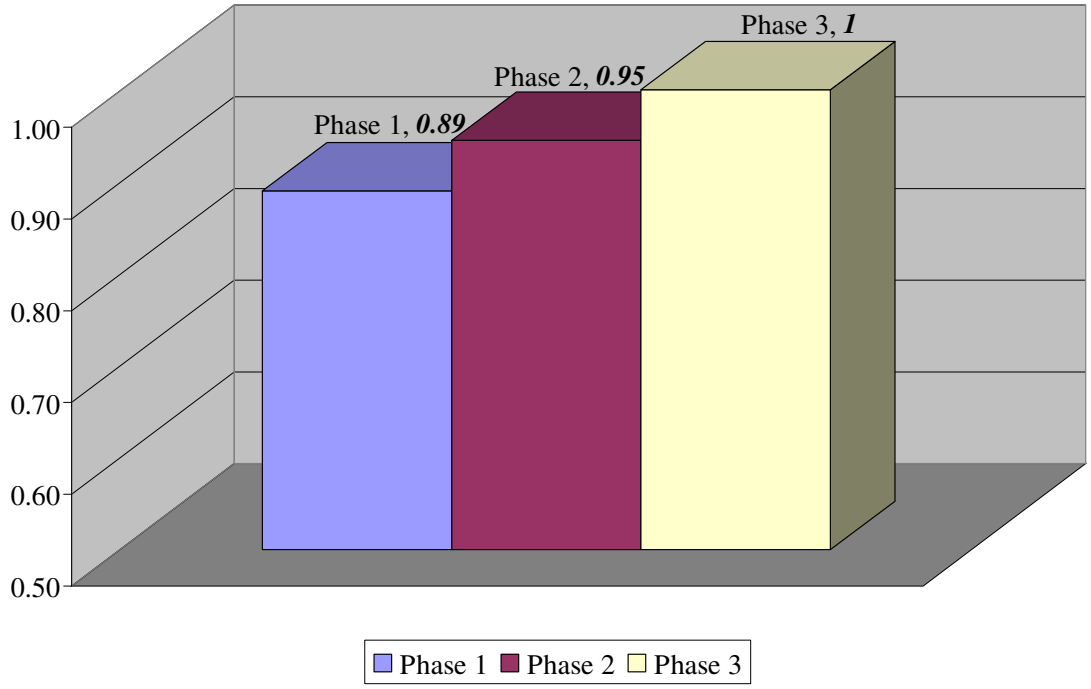
revealing that 59% of students chose logical colors throughout this phase. From Phase 2 to Phase 3, there was a 5% increase in logical color usage (0.64). When comparing the preliminary phase of the study (Phase 1) to that of the last phase (Phase 3), a total increase of 17% was indicated.

Data collected within each phase were organized into four categories of classification (gender, age, academic ability, and socio-economic status) and then compared throughout the three phases of the study. The comparison of gender suggested an increase of logical color usage of boys of 24% from Phase 1 (0.36) to Phase 2 (0.60). This score continued to rise 7% from Phase 2 to Phase 3 (0.67). The logical color usage of girls in Phase 1 increased 6% to Phase 2 (0.59), and then continued to rise 3% to Phase 3 (0.62). These results indicated a considerable increase in the logical color usage of boys and a steady increase in the logical color usage of girls throughout the three phases. In comparing the data gathered in the category of age, results were conclusive as to no obvious trends in logical color usage as it relates to the age of student participants. In examining logical color usage as compared to academic ability, the AGL group showed an increase of 11% from Phase 1 (0.46) to Phase 2 (0.57), and then continued to increase 12% from Phase 2 to Phase 3 (0.69). An increase of 14% in logical color usage of the OGL group from Phase 1 (0.48) to Phase 2 (0.62) continued to show a 5% increase from Phase 2 to Phase 3 (0.67). Accordingly, the logical color score of the BGL group in Phase 1 (0.45) increased 15% in Phase 2 (0.60). However, a decrease of 4% was shown from Phase 2 to Phase 3 (0.56). The results of the comparison of academic ability indicated a consistent rise in logical color score in both the AGL and OGL groups. The only decrease in score was identified in the BGL group in Phase 3. The relationship

between logical color usage and socio-economic status across the three phases of the study showed an increase of 14% from Phase 1 (0.42) to Phase 2 (0.56) for students receiving Free/Reduced meal plans. This score continued to rise 11% from Phase 2 to Phase 3 (0.67). Students not receiving meal programs (Pay) indicated an 11% increase from Phase 1 (0.53) to Phase 2 (0.64). However, a score of 0.58 in Phase 3 revealed a decrease of 6% from Phase 2. These results show a notable increase in both groups for Phase 1 to Phase 2. Students in the Pay group indicated a decrease in score in Phase 3 as compared to the previous phases.

Color Trends. The frequency of color usage in each object drawing was compared throughout the three phases of the study in order to find possible trends in color selection. In the object drawing of the tree, the colors green and brown increased from 89% usage in Phase 1 to 95% usage in Phase 2, indicating a 6% increase. From Phase 2 to Phase 3, the usage of these colors continued to rise 5%, attaining a total score of 100% of student usage (see Figure 4). This was the only object drawing in which the colors selected and used by student participants reached a total score of 100%. In the drawing of the house, the colors red and black were used most frequently throughout the three phases. From Phase 1 (53%) to Phase 2 (44%), there was a decrease of 9% in the usage of these colors. However, in Phase 3, an increase of 6% was shown with 50% of students choosing the colors red and black in their drawing.

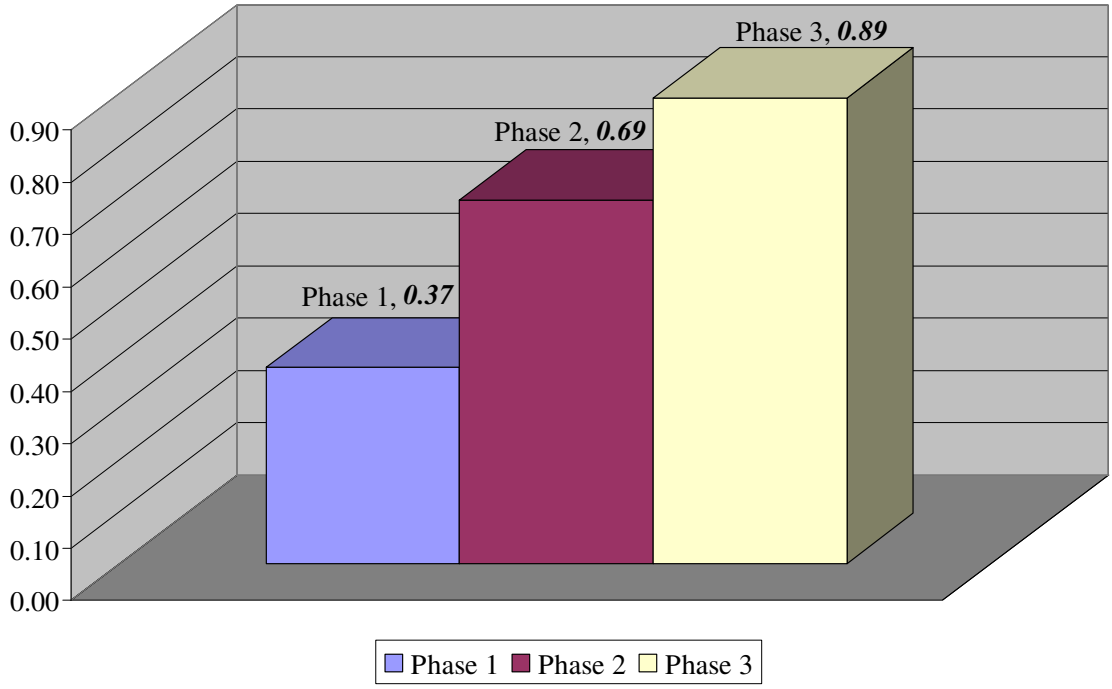
Figure 4. Data Comparison of Tree



The drawing of the boy showed a trend in the colors brown and black, where 50% of students used these colors to represent a boy in Phase 1. An increase of 14% from Phase 1 to Phase 2 (64%) was indicated and from Phase 2 to Phase 3 (83%), a considerable increase of 19% can be seen in the frequency of usage of the colors brown and black (See Figure 5). In the drawing of the dog, there was a noticeable trend in the usage of the color brown, where 50% of students chose this color in Phase 1. This percentage increased to 61% in Phase 2. However, a decrease of 28% in Phase 3 (33%) was shown when it was used in the pre-arranged combination with the color black. In evaluating the drawings of the girl for possible color commonalities, no obvious color trends were indicated across the three phases of the study. However, the color red in Phase 1 was used with a frequency of 67%, the color purple in Phase 2 with 50% student usage, and the color purple (in combination with yellow) in Phase 3 was used most

frequently with 28%. Lastly, the object drawing of the car showed the color red used most frequently in Phase 1 with 56% of student usage and the color black in Phase 2 with 50% of student usage. However, the color combination red/black in Phase 3 was not chosen most frequently for this phase, rather the color combination of yellow/purple with 28%. These results indicated no distinctive color trend in the object drawing of the car throughout the three phases.

Figure 5. Data Comparison of Boy



Summary

Throughout this chapter, the results of data collected in Phase 1, Phase 2, and Phase 3 of the study were discussed in terms of logical color usage and possible color commonalities or trends. This chapter was organized into sections devoted to each phase, where results associated with logical color were classified into four categories (gender,

age, academic ability, and socio-economic status) and evaluated according to logical color usage scores obtained in each phase.

Data showed that the overall total logical color usage of student participants increased throughout the three phases of the study. In relation to gender, there was an increase in scores in both boy and girl groups. There were no obvious trends in the scores obtained from age groups. In reference to academic ability, an increase was shown in the logical color usage in all subgroups from Phase 1 to Phase 2. The AGL and OGL subgroup scores continued to increase from Phase 2 to Phase 3. However, the BGL subgroup showed a decrease in logical color usage from Phase 2 to Phase 3. Lastly, in relation to socio – economic status, the logical color scores of Free- Reduced and Pay subgroups increased from Phase 1 to Phase 2. However, from Phase 2 to Phase 3, the Free – Reduced subgroup continued to increase while there was a decrease in score in the Pay subgroup.

Color selection in each object drawing was then presented in order to show notable trends in the frequency of color usage. Throughout the phases, color trends in the object drawings of the dog and boy were shown in the usage of green and brown to represent the tree, and brown and black to represent the boy. The color brown was seen in the representation of the dog and girl throughout the phases. In addition to the color brown, the colors red and purple were used to represent the girl. The colors red and black were shown to represent the car in both Phase 1 and Phase 2. However, this color trend was not evident in Phase 3. In the drawing of the house, there were no obvious color trends throughout the phases of the study.

The remaining section of this chapter presented a comparison of data throughout the three phases of the study. Average logical color scores for the drawings of the tree, house, boy, and girl increased throughout phases. The scores for the object drawings of the dog and car increased from Phase 1 to Phase 2. However, there was a decrease in logical color score in these objects from Phase 2 to Phase 3. Total average scores of participants in the study were presented. This showed an increase in logical color usage throughout the three phases. Lastly, colors used to represent each object throughout the three phases were compared to find possible color trends in the usage of color for each object drawing.

Chapter V: Summary and Discussion

Introduction

Chapter V contains a summary of the study in relation to the results presented in Chapter IV. This chapter begins with a discussion of the initial assumptions of the outcomes of the study. These assumptions were made prior to the conduction of the study and will be used in the explanation of the study's results. Conclusions of each phase and a comparison of phases will be established. The remaining sections of this chapter will include a discussion of possible limitations of the study and recommendations for the study and further research on this topic.

Initial Assumptions of Study Outcomes

Prior to conducting the study, assumptions were established on the outcomes of logical color choice in each phase of the study as well as logical color choice within the four classifications of gender, age, academic ability, and socio - economic status. In relation to logical color choices of student participants, it could be assumed that student outcomes would consist of expressive color choices in all six object drawings. This assumption was established in accordance with Lowenfeld's (1987) artistic stages of development (as noted in Chapter II), where students at this age level produce art that is expressive and spontaneous. The increase of logical color choicefrom each phase of the study was assumed to occur based on the increase of color choice limitations in each phase. It was established that an increase in logical thinking would be used throughout the study as each phase was differentiated by color choice amount, therefore resulting in a decrease of expressive color usage and an increase of logical color choice.

Assumptions about logical color choice within the four classifications of gender, age, academic ability, and socio - economic status were also recognized. Based on classroom observations and experience prior to the conduct of the study, it was assumed that boys would be less expressive and girls more expressive in their color choice throughout all three phases of the study, resulting in a higher logical color score for boys.

Assumptions about age as it relates to logical color were established in accordance with Lowenfeld's (1987) Preschematic Stage (classifying children's artistic tendencies from age four to age seven). Student participants with a younger chronological age were assumed to be more expressive in their color choices as compared to older students. This assumption was established because of the younger student's classification in the Preschematic Stage (students between the ages of sixty months and sixty- seven months). Older students were presumed to be more logical in their color choice due to their age (sixty-eight months and older) which would classify them, according to Lowenfeld (1987), as exiting the Preschematic Stage.

It was assumed that academic ability would be a predictor of logical color choice due to academic assessments consisting of logical thinking which group students as Above Grade Level, On Grade Level, and Below Grade Level. Therefore, students classified as Above Grade Level would perform with a higher logical color score than those students classified as On Grade Level. Students classified as On Grade Level would produce a logical color score higher than those students classified as Below Grade Level.

Lastly, in relation to socio-economic status and logical color, it was assumed that students receiving the Free - Reduced Meals program because of their economic need

would be less logical in their color choice (more expressive) than those students not receiving this program (Pay students). This assumption was recognized because of low standardized test scores throughout the school where student participants attended. Prior to the study, students in testing grades (grades 3 and 5) who have been classified as receiving Free- Reduced Meals program have attained lower performing test scores in logical reasoning of both reading and math indicators in comparison to those students not receiving this program (i.e., those considered as Pay students). Because of this state assessment result, it was assumed that students in this study receiving this program because of economic need would be more expressive and less logical in their color choices than those students with higher economic status.

Conclusions

1. Phase One

Logical Color. Logical color was used by 90% of students in the drawing of the tree. This score included one student participant who selected only the color brown to represent a tree which consisted of leaf – less branches in the autumn season. The object drawing of the tree attained the highest logical color score in comparison to the other objects in this phase. It should be noted that this phase of the study occurred in the month of November, where deciduous trees in this environment have mostly shed their leaves. However, the majority of students chose the colors green and brown in their representation. This may be a result of a possible color schema of objects in nature, where the prior knowledge of students creates strong associations in the representation of an object. The object drawing which attained the lowest logical color score of 29% was the drawing of the house. Because houses appear in a variety of colors and students in

this phase where not limited in their color amount, students were more expressive with this object drawing in comparison to the other objects in this phase, utilizing a larger number of colors in their drawing. The remaining objects of the boy, dog, girl, and car obtained scores ranging between 37% and 44%, representative of the average total logical color score for this phase (47%).

In reference to the four classifications of logical color in Phase 1, certain assumptions associated with the sub- groups of gender, age, academic ability, and socio-economic status have been met. When examining the effect of gender on logical color, girls attained a higher score (0.53) than that of boys (0.36). The assumption that girls would perform more expressive than boys was not met in this phase. In evaluating age as it relates to logical color, there were no evident trends shown in logical color score. The assumption that older age yields logical ability may not be an adequate predictor of logical color usage, therefore resulting in the proposition that age does not predict ability. Logical color scores in relation to academic ability showed that the assumption of Above Grade Level students attaining the highest logical color score was not met. The On Grade Level group attained the highest score of 0.48. However, the Below Grade Level group did score the lowest with a logical color score of 0.45. Logical color scores in terms of socio - economic status showed the assumption that students receiving Free - Reduced meals program scored lower in logical color usage in comparison to students who pay full meal coverage to be true. Pay students attained a score of 0.53 followed by Free - Reduced students scoring 0.42.

Color Trends. In Phase 1, two groups of color trends were evident in the object drawings of the tree and boy. In the drawing of the tree, the colors green and brown were

most frequently chosen. Although this phase occurred during the autumn season, the majority of students (with the exception of one participant) used these colors in their representation. Students seemed to choose natural colors to represent a tree. However, these colors were not a realistic representation of some trees at the time when the study was conducted. The result of this finding may explain a possible color schema in the representation of an object in nature. In the drawing of the boy, the colors brown and black were chosen most frequently in its representation. Because student participants were of the African American race, the ethnicity of the students may have resulted in the selection of these colors. The colors used in the remaining objects (house, dog, girl, car) showed no obvious color trends.

2. Phase Two

Logical Color. Logical color was used by 94% of student participants in the object drawing of the tree. The use of expressive colors in the representation of the tree was not evident in this phase. As in Phase 1, the result of a high logical color score for this object may be explained by addressing a possible color association, or schema, with the colors green and brown in the representation of a tree. The object drawing which attained the lowest score of logical color with 33% was the drawing of the house, similar to the finding in Phase 1. The expressive color usage with this object may be a result of the variety of colors associated with a house. However, it should be noted that this phase posed a limitation as to the number of colors that can be chosen to represent each object. Students were asked to select two crayon colors for each drawing. This minimized the color choices. However, it did not seem to limit the expressive color selection of the students. Logical color was used by 69% of students when representing the image of the

boy. This score showed an increase of 32% in logical color usage from the drawing of the boy in Phase 1. The remaining objects (dog, girl, car) all obtained a score of 53% which is consistent with the total average logical color score in Phase 2 (0.59).

The four classifications of gender, age, academic ability, and socio- economic status on logical color choice in Phase 2 showed similar findings to Phase 1. In examining the effect of gender on logical color, the assumption of boys attaining a higher logical color score than girls was slightly true, with a score of 0.60 for boys and 0.59 for girls. However, it should be noted that there is only a difference of 0.1 between each group. In investigating age as it relates to logical color, there were not any obvious trends shown in logical color score, creating supporting evidence that age is not a good predictor of logical thinking or academic ability. According to academic ability on logical color, Below Grade Level students did not satisfy the assumption of attaining the lowest logical color score. This group scored an average of 0.60. However, as in Phase 1, students in the On Grade Level group attained the highest logical color score of 0.62, while students in the Above Grade Level group scored the lowest in this phase with 0.57. In terms of socio-economic status, the assumption that economic status has an effect on logical thinking has been satisfied in Phase 2 with Free - Reduced meals students attaining a lower score (0.56) when compared to Pay students (0.64).

Color Trends. In Phase 2, as in Phase 1, color trends were evident in the object drawing of the tree and the boy. Again as in Phase 1, the colors brown and green were chosen most frequently. However, because this phase asked students to choose only two colors to represent each object, it may have eliminated the possibility of using only the color brown as a color choice and increased the possibility of using the color green. The

selection of these colors may be the result of a possible color association of green and brown with the representation of a tree. The colors brown and black, as in Phase 1, were used most frequently in the drawing of the boy, resulting in possible skin color associations with the student participants' ethnicity. In addition to the object drawings of the tree and boy, there are notable color trends in the drawings of the dog and car. In the object drawing of the dog, the color brown was used frequently to represent this object, showing a possible color association of the color brown with the hair of a dog. The color black was used frequently in the drawing of the car, providing evidence of a logical color choice in the representation of its wheels. The colors purple, brown, and red were used most frequently in the drawing of the girl, providing a possible association with these colors to the image of a girl. However, there was no obvious color trends in the drawing of the house, with all colors used consistently (with the exception of the color green, which was selected by only one student). Because a house can be observed in a variety of colors, students' color selection varied.

3. Phase Three

Logical Color. In Phase 3, logical color was used by 100% of student participants in the drawing of the tree. The use of expressive colors in the representation of the tree was not evident in this phase. As in Phase 1 and Phase 2, the result of a high logical color score for this object may be explained by addressing a possible color association, or schema, with the colors green and brown in the representation of a tree. It should be noted that, differing from the two previous phases, student in this phase were asked to select a pre-arranged group of colors to draw each object. The logical color usage for this object may have increased due to the pre-arranged color combination of green and brown.

The object drawing which attained the lowest score of logical color choices with 39% was the drawing of the car. Because a car can be observed in a variety of colors, students may have chosen color combinations to represent the body of a car and consequently overlooked the element of black to represent the tires. Logical color was used by 89% of student participants in the drawing of the boy. There was a 20% increase of logical color usage for this object from Phase 2. This may be the result of a possible association with realistic images of boys in the representation of this object. The remaining objects (house, dog, girl) obtained logical color scores ranging from 44% to 56%, which were consistent with the total average logical color score for Phase 3 (64%).

With reference to the four classifications of logical color in Phase 3, several assumptions associated with the sub- groups of gender, age, academic ability, and socio-economic status have been met. The assumption of boys scoring higher in logical color usage as compared to girls has been satisfied with boys earning a score of 0.67 and girls scoring 0.62. In relation to age, there were no obvious trends in logical color score, providing evidence, as in Phase 1 and Phase 2, that age is not a predictor of logical thinking or academic ability. When examining the effect of academic ability on logical color, the Above Grade Level group received the highest logical color score of 0.69, followed by the On Grade Level group with 0.67. The Below Grade Level group scored the lowest logical color usage with 0.56. The assumption of academic ability as a predictor of logical color choices was evident in this phase. It can be noted that because this phase asked students to select a pre-arranged group of colors, logical reasoning was heightened, therefore challenging students to utilize logical thinking skills. In terms of socio-economic status on logical color, the assumption of Free - Reduced meals students

attaining a lower logical color score when compared to Pay students was not satisfied in this phase. Free - Reduced meals students earned a score of 0.67, while Pay students scored 0.58. This finding may support the possibility that economic status of students is not a constant factor for logical thinking or ability.

Color Trends. In Phase 3, as in Phase 1 and Phase 2, color trends were evident in the object drawing of the tree and the boy. In this phase, the colors brown and green were chosen most frequently with 100% student participant selection. However, because this phase asked students to select a pre-arranged set of colors, the color combination of green and brown may have reduced the expressive tendency to choose alternative color combinations, increasing the probability of selecting the green/brown combination. This overwhelming color choice may be explained as a result of a possible color schema or the association of green and brown with the representation of a tree. In the drawing of the boy, the colors black and brown were chosen most frequently. As in the previous phases, the color associations of black and brown with the image of a boy may be the result of realistically representing a boy in the ethnicity of the student population. There were no obvious color trends in the drawings of the house, dog, girl, and car. All color combinations were utilized in all drawings, with the exception of the house in which the color combinations brown/black and green/brown were not selected by any student participant.

4. Comparison of Phases

Logical Color. Throughout the three phases of the study, the average score of participants' logical color usage was predicted to increase from phase to phase. It was also assumed that logical thinking in each phase would increase due to color selection

limitations. This would result in an increase in logical color choice. In the examination of logical color throughout the three phases of the study, the objects of the tree, house, boy, and girl met the assumptions of logical color choice increase throughout the phases. Moreover, the object drawing of the boy and car showed an increase from Phase 1 to Phase 2. However, these objects decreased from Phase 2 to Phase 3. The selection of a group of color combinations may have contributed to this decrease due to the more involved task of choosing colors that have been pre-arranged.

The four classifications of gender, age, academic ability, and socio-economic status on logical color usage were compared throughout the three phases of the study. In the sub-group of gender, the logical color score for boys increased dramatically, while girls were showed to have a steady increase. The logical color scores for both groups increased in accordance with the assumption of an increase of logical color throughout phases. When examining age throughout the phases of the study, there were no obvious trends as it relates to logical color. This finding may be due to the basis that intellectual levels and logical thinking are not based on age, but rather on the ability of the students. Therefore, the logical thinking capability of students may be considered a prediction of logical color choices. In relation to academic ability, the On Grade Level group attained the highest logical color score in Phase 1 and Phase 2. Above Grade Level students' creativity in Phase 1 and Phase 2 may have reduced their logical thinking scores, which increased their expressive ability. Below Grade Level students' scores deceased in Phase 3 as a possible result of the heightened logical thinking color selection task in that phase. Logical color scores in Phase 3 correspond with the ability level of students, thus satisfying the assumption that academic ability is a predictor of logical thinking and

consequently logical color choice. The assumptions as to the socio-economic status of student participants in predicting the outcome of logical color usage was met in both Phase 1 and Phase 2. However, in Phase 3, Pay students attained a lower logical color score in comparison to Free - Reduced Meals students. Economic status did not prove to be a prediction of logical color choice in Phase 3 of the study. Therefore, it may be explained that logical thinking which yields logical color selection depends on the ability of the students rather than on socio - economic status.

Color Trends. Throughout the study, color trends within each phase have been evaluated according to the six object drawings. Prior to the study, it was assumed that all student participants because of age (which classified them in Lowenfeld's (1987) Preschematic Stage) would be expressive in their color selection of all object drawings. However, there was a strong color schema of the colors green and brown in the drawing of the tree. Because a child's memory begins at approximately 3 years of age, students in this study would have experienced the changing of leaves in the autumn season approximately three times. It should be noted that young children are active outside mostly in the summer months where leaves are the color green and the bark of the tree is a constant color brown. The students' selection of the colors green and brown to represent the image of the tree may be the result of a strong color schema which associates the colors green and brown with the representation of a tree in its natural, mostly frequently observed setting. The color trend of brown and black for the representation of the boy can be attributed to a possible skin color association due to the ethnicity of student participants. It can be assumed that this color trend would be evident in the drawing of the girl. However, the colors most frequently chosen throughout the

phases to represent the girl were red and purple. This color trend may be a result of a symbolic color association with the image of girls. These colors are popularized in girls' clothing and accessories, as well as toys and dolls designed to appeal to girls in today's society. Lastly, the object drawing of the car presents color trends throughout Phase 1 and Phase 2 that do not culminate to the color trends of Phase 3. In Phase 1, the color red was chosen frequently in the object drawing of the car. This color was used to distinguish the body of the car. In Phase 2, the color black was used most frequently in representing the wheels of the car. However, in Phase 3, the colors red and black as a pre-arranged color combination were not chosen most frequently, as was assumed to occur. This result may have occurred due to a variety of color choices of the body of a car other than the color red, which may have hindered the selection of red and black together. One such instance of color association occurred in Phase 3 when a student shared her thought process aloud with the teacher/researcher. This particular student explained that she chose the color combination blue and orange because her dad drives a blue car and blue was not grouped with black, so she drew orange wheels instead. A logical thought process was evident in the selection of blue and orange to represent the car. This student explanation may support evidence that logical thinking contributes to logical color choices.

Limitations of the Study

When interpreting the findings of this study, there are certain limitations that should be addressed. All participants in the study were of African American decent and attended the same elementary school located in an urban setting. In addition, the elementary school is classified as a low – income in a racially non -diverse environment.

The homogenous background of the student participants may be considered a limitation to the study.

Because this study was a form of action research, where research was conducted in the classroom of the teacher/researcher, it included all students within the class, consisting of a total of eighteen students. This small sample size should also be considered a limitation to the study. As an action research study, it should be noted that because the researcher is the classroom teacher, there is a familiarity to subjects, which may present a bias in the scoring of drawings.

The eight crayon colors (red, orange, yellow, green, blue, purple, brown, and black) although familiar to the students, may be considered a limitation in that they do not promote the logical use of color in the skin tones of the boy and girl. Although the color combinations in Phase 3 were selected as a result of the colors used in Phase 1 and Phase 2 by student participants, the selection of color combinations may need further justification, as well as the inclusion of specific criteria in Phase 3 for classifying colors as logical.

Recommendations for the Study

Because of the possible limitations to the study, it is necessary to present certain recommendations. This study should be replicated to include student participants from diverse ethnic backgrounds as well as from a variety of geographic locations. Moreover, replicating this study with a heterogeneous population may confirm or deny the findings of the study.

In order to prevent bias in this study, an outside individual to evaluate the drawings in addition to the teacher/researcher may minimize possible bias in the analysis

and scoring of drawings. It can also be noted that conducting this study using a larger sample size would validate the findings.

Lastly, the use of a variety of colors representative of skin tones may increase the logical representation of the boy/girl images. The justification of the color combinations used in Phase 3 as well as an additional statement of criteria to evaluate logical color in this phase may contribute to the evaluation of the drawings, which may further support the findings of the study.

Recommendations for Further Research

Further research on the topic of color selection in young children is recommended in order to provide further documentation of the effect color may have on children's representation of objects. It may be valuable to investigate color usage of children in pre-drawn outlined images or objects. Moreover, symbolic color associations that children may possess may also provide interesting findings on the influence of color on children's drawings. Lastly, it is recommended that color schemas in drawings of young children be further studied in order to examine the possibility of a pre-disposed association to color.

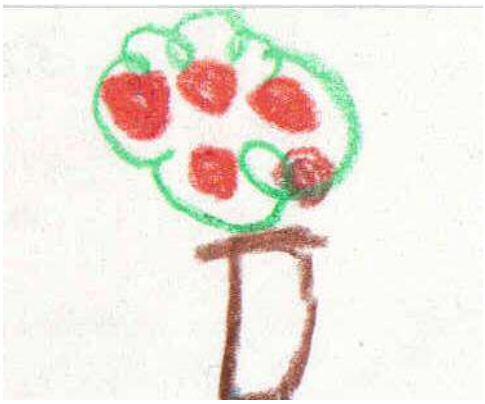
Final Discussion

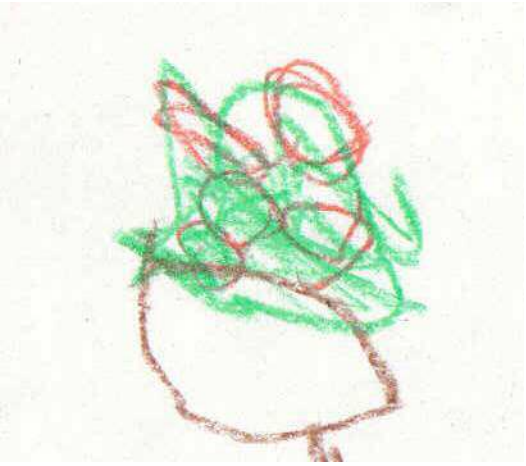
Throughout this study, color selection in the drawings of young children was investigated in order to explore possible relationships between color and the developmental stages of young children. Developmental theories derived from Lowenfeld, Kellogg, and Piaget were used to present a model for interpretation of child drawings. Assumptions as to the outcomes of color selection were established in

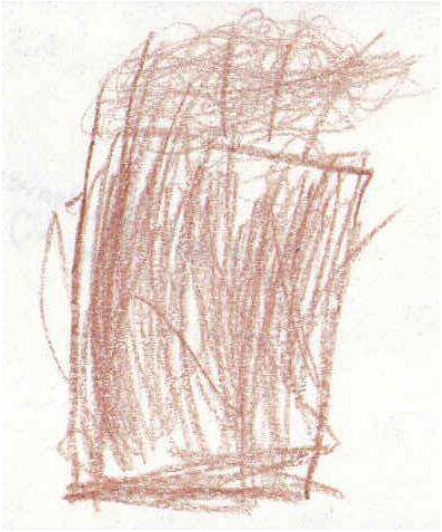
accordance with these theories, and these initial assumptions were used to hypothesize the outcomes of the study. As noted by Lowenfeld (1987), children in the age group consistent with this study would be expressive and spontaneous in the colors that they choose in their drawings. However, the results of this study presented a new finding on the color selection that young children make. There are logical approaches to the selection and usage of color in young children's drawings as well as possible color trends used to represent familiar objects. The findings of this study may provide an insight into the nature of the present-day child, as opposed to the child of the past, as described by Lowenfeld, Kellogg, and Piaget. Because of an increase in testing and academic achievement in today's society (through national, state, and local educational goals), the nature of the child is changing. An interruption in the natural artistic development of the child may be occurring as a result of this change in society's goals. The child, once encouraged to freely express through art, may be hindered by society as expectations to perform are presented at an early age in the academic setting of a school. This change in the nature of today's child warrants further research on a larger scale of children's artistic development as it relates to color selection in the drawings that children make.

Appendix A

Phase 1 Tree Drawings







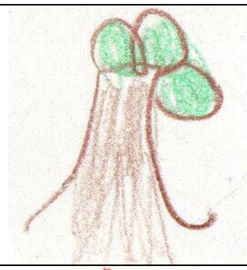
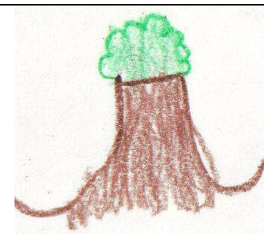
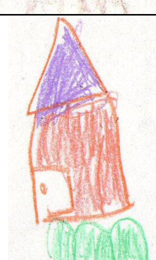
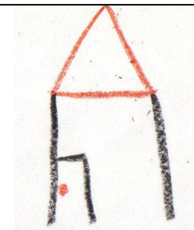
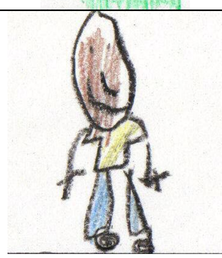
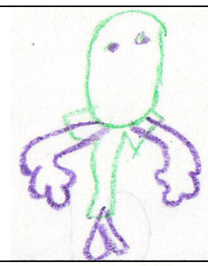
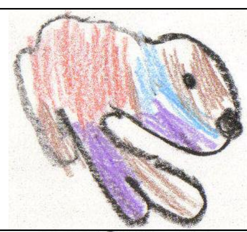
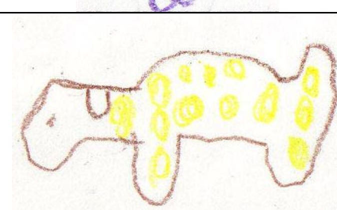
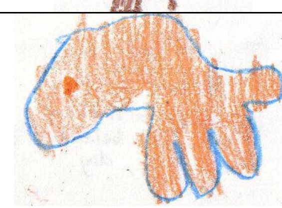
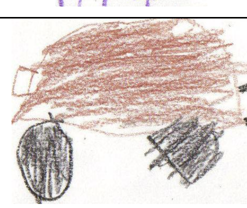
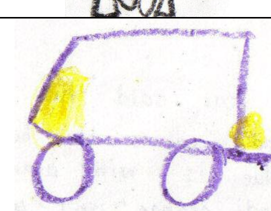
Appendix B

Phase 3 Boy Drawing

Appendix C

Student Participant # 17

Object order from top to bottom: tree, house, boy, dog, girl, car

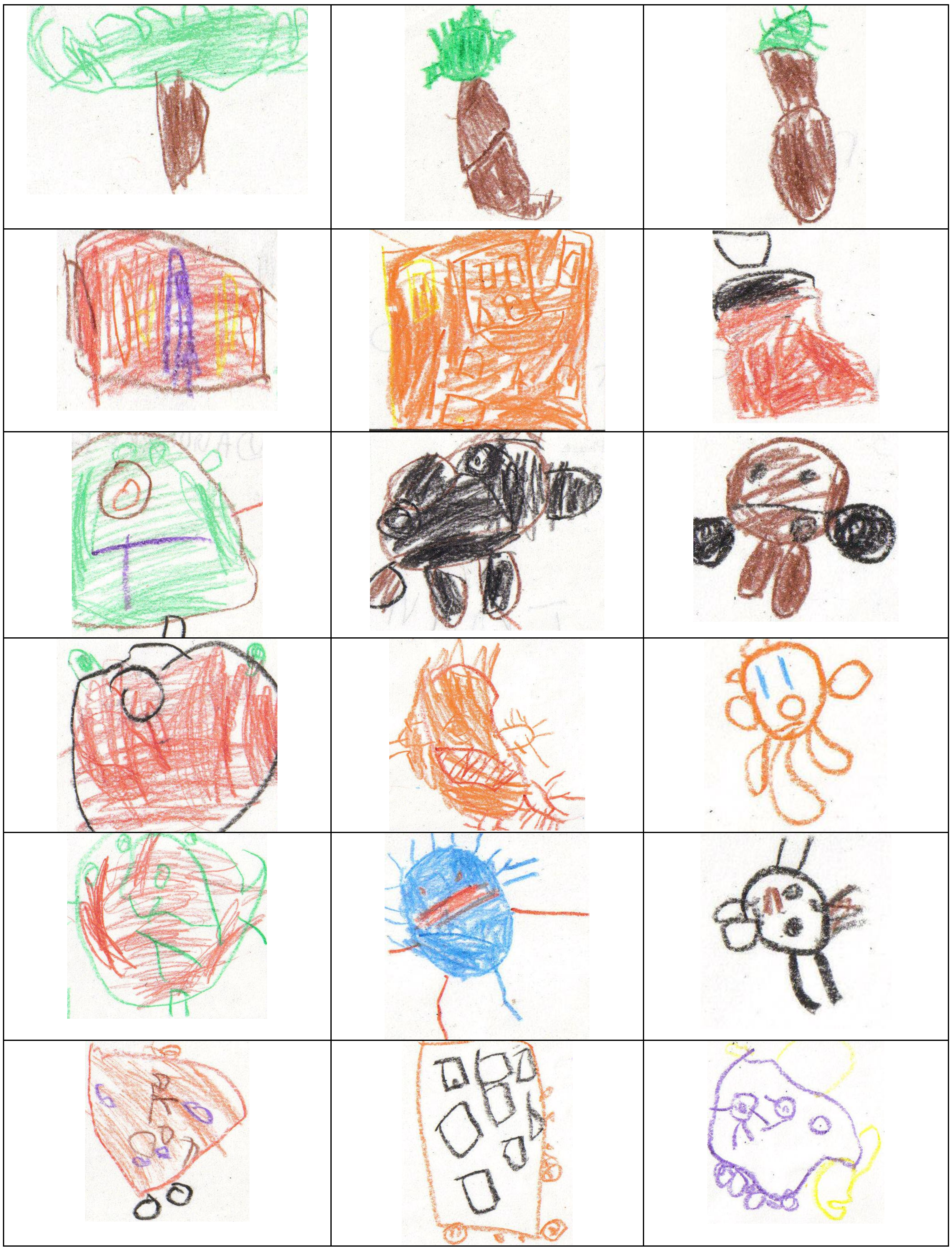
Phase 1	Phase 2	Phase 3
		
		
		
		
		
		

Appendix D

Student Participant # 2

Object order from top to bottom: tree, house, boy, dog, girl, car

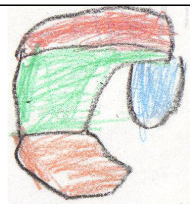
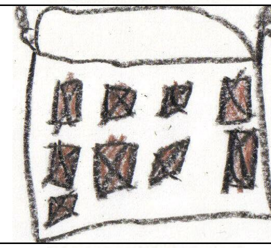
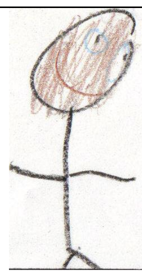
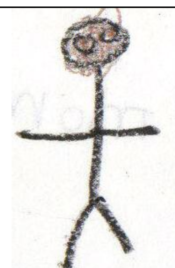
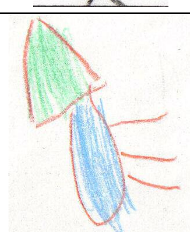
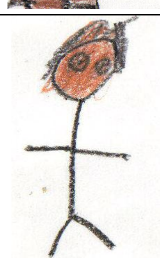
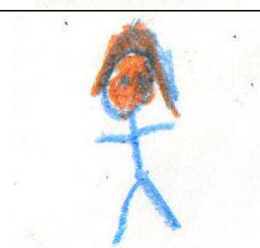
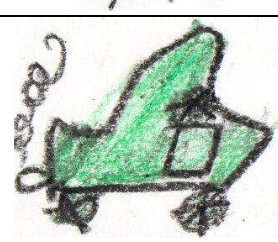
Phase 1 | Phase 2 | Phase 3



Appendix E

Student Participant # 9

Object order from top to bottom: tree, house, boy, dog, girl, car

Phase 1	Phase 2	Phase 3
		
		
		
		
		
		

Appendix F

Student Participant # 1

Object order from top to bottom: tree, house, boy, dog, girl, car

Phase 1 Phase 2 Phase 3

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