COLOR AND COLOR PREFERENCE AS FACILITATORS OF RETENTION OF SIGHT VOCABULARY WORDS IN PRIMARY AND ELEMENTARY SCHOOL CHILDREN

By

MARY EDNA PAYNE

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Thesis Approved:

Thesis Adviser

Dean of the Graduate College

PREFACE

This investigation was designed to study the facilitative effects of color and color preference upon primary and elementary school children. The primary object was to determine if a significant difference in retention of vocabulary words existed as a function of color preference, grade level, or color of the words presented.

The author wishes to express her appreciation to her major advisor, Dr. Thomas S. Parish, assistant professor of the Department of Applied Behavioral Sciences, for his guidance and assistance in the preparation of this study. Appreciation is also expressed to other members on the committee, Dr. Paul G. Warden, and Dr. Joseph Pearl, associate professors of the Department of Applied Behavior Sciences.

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Indebtedness is acknowledged to the Gerrard Publishing Company for allowing publication of the Dolch Basic Sight Vocabulary Words.

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CHAPTER I

NATURE OF THE PROBLEM

Introduction

In today's educational setting, much emphasis is placed upon individualization of student programs. Educators are becoming more and more concerned with individual differences and various levels of cognitive development within the classroom environment.

If individuality is to be incorporated into a progressively oriented classroom, it should begin early in a child's educational development. One way of promoting individuality is to give special consideration to a child's preferences, particularly, color preference.

The primary and elementary teachers' sensitivity to individual color preference could be incorporated into behavioral objectives and needs assessment programs. One way of accomplishing this is for teachers to be aware of each student's color preference when implementing lesson plans.

The student's performance may improve as a result of utilizing an individual color preference. For example, being able to write spelling words or working math problems in one's preferred color as opposed to traditional led pencils could enhance motivation and visual memory (Jones, 1965; Winkler, 1968).

To further enhance the effectiveness of this approach, teachers

could provide various colors of paper to accompany colored pencils, thus allowing students to pick and choose their own color combination for each particular day.

In working with children the E has observed that children perform more enthusiastically at a task when allowed to utilize color of their own choosing.

Purpose of the Study

The purpose of this study is to see if color and color preference facilitate the retention of sight vocabulary words in primary and elementary school-age children. Differences in words retained in preferred colors as compared with words retained in non-preferred colors will also be examined.

Clarification of Terminology

Color preference: Color preference is defined in this experiment as that color designated by the subject from a color chart.

Learning: Learning is defined in this experiment as the greatest number of sight vocabulary words retained following exposure to the experimental procedure.

Organization of the Study

Chapter I introduces the purpose of the study, including a clarification of terminology. A review of related research is included in Chapter II. The procedures and measuring devices in the experiment are discussed in Chapter III, along with the hypotheses. Chapter IV

includes the results from the experiment, followed by Chapter V which presents the discussion, summary and conclusions, and recommendations for future research.

CHAPTER II

REVIEW OF SELECTED LITERATURE

Introduction

Color has been used extensively for many years in our educational, as well as industrial, systems in America. The significance of color did not escape early educational researchers. Gale (1933), made worthwhile contributions concerning the effect of color in early childhood development. Since that time, others have continued adding to the base of these findings, and knowledge concerning eclectic responses related to color has been expanded over a period of years (Birren, 1950; Guilford, 1937; Lüscher, 1969; Suchman & Trabasso, 1966).

Studies Related to Color as a Facilitator of Learning

Several studies have been conducted which suggest that the addition of color facilitates learning (Katzman & Nyenhuis, 1972; Saltz, 1963; Weiss & Margolius, 1954). Essentially, it is believed that learning will be more complete as the number of cues in the learning situation increase (Carpenter, 1953; Dale, 1946; Gibson, 1954): Dwyer (1971) made this interpretation:

> . . . that the more qualities a visual shares (color, where appropriate) with the object or situation to be depicted, the more realistic the visual, and therefore, the easier to learn (p. 40).

Since color is one of the cues available in most learning situations,

it seems reasonable that its effects should be investigated.

In the use of media, color increases the effectiveness of the material by making it more attractive, thereby evoking more attention on the part of the learner. The Burke Marketing-Research study (1960), found that the use of color prompted greater recall of seeing the commercials, and that viewers were better able to remember specific details from color commercials (Gallup & Robinson, 1965).

In the area of reading and spelling, color has been used extensively in the field of education. One of the greatest proponents for the use of color in acquiring spelling skills is Alex Bannatyne (1969). Color coding letters of the alphabet serves as a stimulus cue for the child to help him recall various sounds with symbols. Each color is a clue for a certain kind of response and facilitates recognition and recall of words to be learned for spelling and reading tasks (Gattegno, 1962; Gattegno & Herman, 1966; Leonore, 1965). Other areas in which color is utilized as an instructional tool in education are in the fields of mathematics, music, special education, and play therapy (Green, 1970; Jones, 1965; Krathwohl, 1972; Payne, 1970).

Winkler (1968) suggested that using color in introducing new and imaginative ways for children to practice difficult spelling words not only increases motivation, but it also helps the child retain the words through visual memory. Jones' study (1965) indicated that it was at least three times harder for nursery school children to match black letters, or black words, than it was to match colored letters or colored words.

Studies Related to Color vs. Form

Color verses form has been investigated by several researchers. In general, nursery school children prefer color; a shift to form preference occurs at about age six years (Brian & Goodenough, 1929; Colby and Robertson, 1942; Goldstein & Scheerer, 1949). Given a simple sorting task which allows for grouping of geometric patterns of either a color or form dimension, similarities or sameness will be classified according to color rather than form in younger children. The shift from color to form, according to Suchman and Trabasso (1966), has been regarded as a correlate of cognitive growth and development.

Suchman (1966) investigated the differences in color-form preference between African children and Euro-American children. Her findings differ from the concept of a universal maturational process in perceptual color-form preference. African children clearly chose color in preference to form into adolescence; Euro-American children clearly selected form over color from kindergarten age into adulthood.

Katz (1971) investigated the hypothesis that children who show a tendency to be cognitively reflective will more likely respond to form more than children who have impulsive tendencies, who usually respond to color. This is due, mainly, to the developmental differences in children of various age levels. Younger children, because they process impulsively, do not decode all relevant stimulus information; whereas, reflective children will tend to be more visually analytic. This data suggests that changes in cognitive tempo associated with age (not age per se) account for the different responses on color-form tests (Zeaman & House, 1963).

Hill and Wickens (1962) investigated the hypothesis that a stimulus' form and color components might evoke a response when combined. They had subjects learn nonsense word color-common word pairs in a non-anticipation sequence. They concluded that two cues (color and form) were more helpful than when used singly because each subject was free to choose his functional stimulus.

Color as a contectual cue has been the interest of several investigators (Dulsky, 1935; Hill & Wickens, 1962; Saltz, 1963; Weiss & Margolius, 1954). Underwood, Hamm, and Ekstrand (1962) found that adult subjects were unable to recall a list of low meaning trigrams (meaningless consonant-vowel-consonant combinations) on different colored cards; but meaningful words replaced the trigrams, the words were remembered after the color cues were removed. Otto and Askov (1968) gave this interpretation:

> . . . with unfamiliar trigrams, familiar colors became the functional stimuli; but because the subjects, being adults, were more accustomed to responding to words than to colors, familiar words were the functional stimuli (p. 159).

Studies Related to Color Preferences in Children

Reavis (1920) investigated the color interests in the primary and intermediate grades. His research concluded that children of the primary grades were more interested in sensations derived from free use of color than in exact representation. Children in the intermediate grades used color primarily for the purposes of representation. Both primary and intermediate grades were interested in strong colors, mainly, red and blue. Children in grades one through four selected

red as their first choice and blue as their second choice. Blue was preferred for the first choice of children in grade five.

Holden and Bosse (1900) conducted one of the earliest investigations of children's preferences for single colors. Results from their study indicated that 57 percent of the children, ages 6-7 years of age selected blue as their color preference, 14 percent selected red, and 29 percent selected a variance of other colors. Children 7 to 8 years of age revealed these findings: 94 percent selected blue as their color preference, 6 percent selected other colors, and none in this age group selected red. Children ranging in ages 8 to 13 years of age suggested similar findings: 93 percent selected blue, 7 percent selected other, and none selected the color red.

Variance in children's color preferences was identified by Suchman and Trabasso (1966) in these findings:

> Color children generalize their preference to a range of hue intensities and do not behave in accord with the folk concept that children prefer only saturated hues. Form children, likewise, generalize their preference to symmetrical, as well as asymmetrical contours and do not evidence a preference for asymmetrical as suggested by Piaget and Inhelder (1956) (p. 185).

Children's color preferences develop and change with age, showing a tendency to move from warm to cool colors with increasing age (Burham, Hanes, & Barthleson, 1963).

Birren (1950), maintains there is a universal color order and it is prevalent in most societies. The order becomes blue, red, green, violet, orange, yellow; whereas in childhood, the color is red, blue, green, violet, orange, yellow. As an individual becomes older, a greater desire for hues of shorter length (blue, green) is preferred over hues of longer wave lengths (red, orange, yellow) (Birren, 1950;

Winch, 1909).

On a discrimination task, Suchman and Trabasso (1966) found that learning is facilitated or retarded depending on stimulus preference. This was indicated when S's whose form/color preferences were determined on a preliminary task, were given cues on a card sorting task in their stimulus preference. Subjects whose stimulus preference was form performed significantly better on the card sorting task when cues were presented in form, as opposed to color. Subjects whose stimulus preference was color performed significantly better on the card sorting task when cues were presented in color, as opposed to form.

Trabasso, Stone, and Elihbert (1966), examined the relationships among children's preferences for color and form attributes, speed of learning on initial problems, and optional shift behavior in discrimination training. Their study indicated that learning was more rapid if S's stimulus preference, either color or form, was dominant.

The prominent implications of existing research on the role of color in learning seems to be that the cue value of color is superseded by more potent cues. Yet there is reason to believe that pupil's age, grade, or developmental stage is critical in determining the value of color cues (Otto & Askov, 1968; Jones, 1968); therefore, what works at one level may, or may not work at another. Otto & Askov (1968) speculated that if children were allowed to choose their preferred colors as cues in learning, perhaps they would be more likely to make optimum use of the cues.

Color has been used as an educational variable for many years (Birren, 1950; Dwyer, 1971; Goldstein, 1939). However as a result of

the limited amount of research done in color as an instructional variable, the role of color in learning is still essentially unclear (Otto & Askov, 1968).

CHAPTER III

DESIGN AND METHODOLOGY

Introduction

In this chapter hypotheses are presented which have been developed from the rationale of material covered in Chapter I. Due to the fact that the rationale is focused primarily upon two main hypotheses, the hypotheses will be classified under two categories: major and minor. Included also are a description of the sample, procedure, and statistical analysis.

Major Hypotheses

Hypothesis I. There will be no significant difference in the number of words recalled as a function of grade level.

Hypothesis II. There will be no significant interaction between color preference and the color in which the words are written with regard to the number of words recalled.

Minor Hypotheses

Hypothesis III. There will be no significant difference in the number of words recalled as a function of color preference.

Hypothesis IV. There will be no significant difference in the number of words recalled as a function of color in which the words are written.

Hypothesis V. There will be no significant interaction between grade level and color preference with regard to the number of words recalled.

Hypothesis VI. There will be no significant interaction between grade level and color in which the words are written with regard to the number of words recalled.

Hypothesis VII. There will be no significant interaction effects between grade levels of Ss, color in which the vocabulary words are written, and color preference.

Description of the Sample

Subjects (Ss)

Ss were selected from the first, third, and fifth grades of Liberty, Lincoln, and Woodlands Elementary Public Schools in Ponca City, Oklahoma. These schools were selected due to their heterogeneous population. Differences in localities of the schools provided greater variance regarding intellectual functioning, race, and socio-economic variables. Subjects were randomly selected from a population of 440. The total population of Ponca City, Oklahoma is 26,400.

Procedure

Teachers from the first, third, and fifth grades from the three school previously mentioned were asked to ascertain their student's color preference three days prior to the experiment. The teachers were provided a chart with the colors red, yellow, and blue demonstrated on the chart, along with the corresponding word below the color. The teachers instructed the students to write the color they like best on

a piece of paper, even if that color were not shown on the chart. Information also included the teacher's name and school.

The E collected and grouped the data according to color preference and grade level. The E then randomly selected 20 Ss from those who preferred red, 20 Ss who preferred blue, and 15 Ss who preferred yellow from each of the three grade levels. A total of 165 Ss were used in this experiment. The E did not have direct contact with the Ss until the time of the experiment in order to avoid contaminating the group of students involved in the experiment.

The Ss were tested in groups ranging from six to ten depending on the number of Ss randomly selected from each school. The E administered ten sight vocabulary words written in red, ten in yellow, ten in blue, and ten in black, respectively. The sight vocabulary words were randomly selected from the Dolch Vocabulary List until words of equal difficulty were chosen to represent each color. Only those words classified at the first grade reading level were used in the experiment. They were selected as follows: 1-five letter word, 2-two letter words, 3-four letter words, and 4-three letter words, making a total of 10 words for each color, giving a total of 40 words used in the experiment. The colors, red, yellow, blue, and black were randomly assigned to each group of words. (See Appendix A)

Using a slide projector, the words were presented at a fixed rate of four seconds per word on a white screen. The slides were prepared using a diazzo transparency method. The order of presentation of the vocabulary words was varied in order to counterbalance any error which might occur due to the position of the color and word. To achieve this, the words were randomly assigned from one to forty to the order

of presentation after each group of S's are tested.

The sight vocabulary words served as a stimulus to elicit a response in the form of word retention. Immediate visual recall was tested following the presentation of the forty vocabulary words written in red, yellow, blue, and black. A ten-minute time limit for writing the words was held constant for each group.

Statistical Analysis

A repeated measures experimental design with one repeated measure and two non-repeated measures was used to analyze the data. The design had two between block treatments, grade level and color preference, and one within block treatment, which was the colors of the vocabulary words presented. An unweighted means was used due to the fact that the number of S's in the color preference level varied across the color treatment. All hypotheses were tested using an analysis of variance.

Level of confidence for all hypotheses was established at the .05 level of significance.

Facilities of the Oklahoma State University Statistics Laboratory were used for computing data for each S.

CHAPTER IV

RESULTS

Major Hypotheses

Hypothesis I. There will be no significant difference in the number of words recalled as a function of grade level.

Hypothesis I was tested and rejected; therefore the alternative hypothesis was accepted which indicates that a significant difference exists in the number of words recalled as a function of grade level.

The Duncan's New Multiple Range Test was used to contrast grade levels in order to determine which grades differed significantly in retention of sight vocabulary words (See Appendix C). The mean of Grade 1 is 11.32. The mean of Grade 3 is 12.5, and 14.47 represents the mean of Grade 5.

Results indicated that Ss from Grade 5 recalled significantly more words from the experiment than Ss in Grade 1 at the .05 level of significance. There was no significant difference in retention between Grades 1 and 3, or between Grades 3 and 5.

Hypothesis II. There will be no significant interaction between color preference and the color in which the words are written with regard to the number of words recalled.

Hypothesis II was tested and accepted; therefore, these findings suggest that a significant interaction did not exist between color

preference and the color in which the words were written with regard to the number of words recalled.

Minor Hypotheses

Hypothesis III. There will be no significant difference in the number of words recalled as a function of color preference.

Hypothesis III was tested and rejected; therefore the alternative hypothesis was accepted which indicates that a significant difference existed in the number of words recalled as a function of color preference.

The Duncan's New Multiple Range Test was utilized for contrasting color preferences in order to determine which color preference differed significantly in the number of words recalled. The mean of words retained by Ss preferring red is 3.66; 3.60 is the mean of words retained by Ss preferring yellow, and 4.00 represents the mean of words retained by Ss preferring blue. (See Appendix D).

Results indicate that Ss preferring blue recalled significantly more words than Ss preferring red or yellow. There was no significant difference in the number of words recalled between Ss preferring red and Ss preferring yellow.

Hypothesis IV. There will be no significant difference in the number of words recalled as a function of color in which the words are written.

Hypothesis IV was tested and accepted; therefore, these findings suggest that a significant difference in the number of words recalled as a function of color in which the words were written did not exist.

Hypothesis V. There will be no significant interaction between grade level and color preference with regard to the number of words recalled.

Hypothesis V was tested and accepted; therefore, these findings suggest that a significant interaction did not exist between grade level and color preference with regard to the number of words recalled.

Hypothesis VI. There will be no significant interaction between grade level and color in which the words are written with regard to the number of words recalled.

Hypothesis VI was tested and accepted; therefore, these findings suggest that a significant interaction did not exist between grade level and color in which the words were written with regard to the number of words recalled.

Hypothesis VII. There will be no significant interaction effects between grade levels of Ss, color in which the vocabulary words are written, and color preference.

Hypothesis VII was tested and accepted; therefore, these findings suggest that significant interaction effects did not exist between grade level of Ss, color in which the vocabulary words were written, and color preference.

CHAPTER V

DISCUSSION

The findings from the experiment did not support the hypothesis that a significant interaction exists between words retained in specific colors (red, yellow, blue, or black) and grade level; although findings did suggest a significant difference in retention of vocabulary words between grade levels. (See Appendix E).

Otto (1967) investigated the usefulness of color as a cue with good and poor readers. He states:

> The purpose of his first study was to determine (a) whether paired-associated learning would be enhanced with the addition of color cues, and (b) whether any facilitative effect which might be found would differ from good and poor readers (p. 161).

Logically, the poor readers were expected to gain more from the addition of color than good readers, because of their apparent need of additional cues. Seventy-two children in grades 2, 4, and 6 learned a list of five geometric form trigram pairs. Findings suggested that poor readers required more trials to learn the list, and the number of trials required decreased as grade level increased, but the addition of color cues had no significant effect. Some possible suggestions for the absence of a significant color effect was suggested by Otto (1967):

> 1. The geometric forms in the list were so dissimilar that further cues to distinguish them were not needed. This is in line with previous findings that color cues enhance

> learning only when intralist similarity is high. 2. Presenting both the stimulus and response items in each pair in a single color may have tended to decrease the salience of the color cue. 3. The subjects were unaware of the systematic use of color in the task (p. 162).

As in the Otto (1967) study, results from the present study indicate that performance improved among Ss as grade level increased. This is suggested by the significant difference in retention of vocabulary words among fifth graders as compared with the amount retained by first graders.

Another similar finding was that the addition of color cues had no significant effect. Perhaps as suggested in Otto's (1967) study, presenting the stimulus and response items in each pair may have tended to decrease the salience of the color cue.

Contrary to Otto and Askov's study (1968), apparently the pupil's age, grade, or developmental stage is not a critical issue in determining the value of color cues. This is postulated due to the fact that results failed to indicate a significant interaction between color cues and grade level.

Some possible explanations for the absence of a significant interaction between grade level and word retention in specific colors are suggested: Like the Underwood, Ham, and Ekstrand study (1962), familiar words, rather than color, may have been the functional stimuli for Ss participating in the study. Children at the elementary school level are usually presented material written in black, with emphasis on form rather than color.

Since the shift from color to form occurs around the age of 6, and is regarded by Suchman and Trabasso (1966) as a correlate of cognitive growth and development, Ss in the experiment could be responding to

form rather than color, since each S was six years of age or older.

Tha abense of a significant interaction between grade level and retention of words written in specific colors suggests that perhaps the traditional use of the colors black and white for classroom material does not have a deleterious effect upon visual memory or retention of meaningful materials. Words written in red, yellow, or blue were not retained with any greater significance than words written in black.

Otto and Askov's (1968) most recent study was to examine the relative roles of, and possible interactions, among intra-list similarity, order of presentation, and color in children's paired-associate learning. The author states:

> A high similarity list, comprising six "words" made up from three Greek letters arranged in all possible combinations, and a low similarity list-six three-letter words made up from 18 non-repeated Greek letters-served as stimuli; the responses were spoken three-letter English words. Each list was printed in black and in six distinctive colors (p. 163).

Analysis of variance revealed significant effects of intra-list similarity, order of presentation, and an interaction between them, but there was no significant color effect. The suggestion was that color appears to be a less potent cue than serial order, or at least among second graders used in the study, though there is some evidence of color cue selection.

Contradictory to the Otto (1967) study, intra-list similarity in this study was not enhanced with the addition of color cues. Although precaution was taken to select vocabulary words of equal difficulty, significant differences between words retained in various colors as compared with words retained in black was not obtained. Perhaps, as speculated by Otto and Askov, lack of awareness of the systematic use of color in

the experiment may have affected results. Other implications arising from the Otto and Askov (1968) study were that the role of color in learning seems to be that the cue value of color is superceded by more potent cues which are difficult to pin-point and single out as defined variables.

Another finding from the present experiment was a significant difference in retention of vocabulary words within color preferences, indicating that Ss with a particular color preference tended to recall more words from the experiment. Results indicated that Ss preferring blue differed significantly by retaining more vocabulary words than Ss preferring red or yellow at the .05 level of significance. There was no significant difference in retention of words between Ss preferring red or Ss preferring yellow.

It is difficult to respond adequately to Otto and Askov's (1968) speculation that children would be more likely to make optimum use of color cues if allowed to choose their preferred colors. Ss in the present experiment did not retain significantly more words presented in their preferred colors as compared to words presented in their non-preferred colors; however, as a result of the finding that Ss preferring blue retained significantly more words than Ss preferring red or yellow, it could be inferred that Ss preferring blue made greater optimum use of color cues.

In an effort to identify factors which may have contributed to those preferring blue retaining a greater amount of stimulus words than those preferring red or yellow, the E inspected the Ss academic performance in the classroom. This was done in order to investigate the possibility of a relationship of learning, or intellectual ability,

as a function of color preference; however, a standardized measure of intelligence was not available for all Ss; therefore, inferences were not drawn from the existing data. Results from the present study pose significant questions for future research, however, with regard to color preference as a correlate of cognitive functioning.

It should also be mentioned that a white background was held constant for each of the colored word combinations. Differences in contrasts of the various colors against a white background may have confounded the figure with the ground. For example, words written in black would be more easily discriminated than words written in yellow against a white background, due to the differences in the saturation of hues. The question is asked: Would a significant difference occur in retention of words written in preferred colors as compared with words written in non-preferred colors if control for equal contrasting effects among the color/word combinations were taken into consideration? For example, words written in various colors would be written on a corresponding complementary colored background (red on green, yellow on blue, ect.) (Hilgard, 1962).

The colors red, yellow, and blue were selected on the basis of popularity for the various age norms as cited in previously mentioned studies (Holden & Bossee, 1900; Reavis, 1920). Unlike the Ss from the Reavis (1920) study, children in the primary and elementary grades predominantly selected blue as their preferred color over red. These findings are, however, in agreement with Holden and Bosse's (1900) findings. At the fifth grade level, blue, again, was selected more often than red or yellow, which is in agreement with both of the previously mentioned studies. (See Appendix B).

The role of color is essentially unclear (Otto and Askov, 1968); however, its usefulness as a motivational variable and stimulus cue may still be employed among educators in the classroom setting (Morris, 1946; Winkler, 1969).

Recommendations for Further Research

As a result of the findings from this experiment, the following questions are posed for further research:

1. Would results differ if Ss were aware of the systematic use of color in the experiment?

2. Would different results be obtained if Ss were presented an equal number of words written in black as compared with an equal number of words written in various colors?

3. Is it possible that a shift in color preference could effect retention of vocabulary words?

4. What inherent characterisitics do Ss preferring blue possess which would influence visual memory or retention of vocabulary words?

5. Would similar results be obtained using adult Ss?

6. What heuristic value does the color preference blue have with regard to education?

7. Is color preference a correlate of cognitive functioning?

Limitations of the Study

Since the selection of S were taken from the Ponca City Public Schools, results of the study are generalizable only to students living in this area.

Summary and Conclusions

The purpose of this study was to investigate color and color preference as facilitators of retention of sight vocabulary words in primary and elementary school children. Differences in words retained that were written in preferred colors as compared to words retained that were written in preferred colors were also examined.

The experiment was conducted using 165 Ss, randomly selected from the first, third, and fifth grades. Color preferences were established prior to the experiment, and an equal number of Ss preferring red, yellow, and blue were represented in the experiment. Using a slide projector, forty sight vocabulary words, written in various colors, were projected on a white screen at a fixed rate of four seconds per word. Equal number of words were written in the colors, red, yellow, blue, and black. Immediate visual recall was tested following the presentation of stimulus words, and response was measured by the amount of words retained from the experiment within a ten minute time limit.

Analysis of variance revealed that Ss preferring blue retained significantly more words from the experiment than Ss preferring red and Ss preferring yellow at the .05 level of significance. A significant difference did not exist in the number of words recalled between Ss preferring red and Ss preferring yellow.

Another significant finding indicated by the experiment was the difference in retention of vocabulary words among Ss. Ss from the fifth grade recalled significantly more words than Ss from the first grade; however, a significant difference did not exist in the retention of words between first and third graders, or the amount retained

between third and fifth graders.

Results failed to indicate an interaction effect between color preference and the color in which the words were written with regard to the number of words recalled. Neither did the results support the hypothesis that a significant difference existed in the number of words recalled as a function of color in which the words were written.

A repeated measures experimental design with one repeated measure and two non-repeated measures was used to analyze the data. The design had two between block treatments, grade level and color preference, and one within block treatment, which was the colors of the vocabulary words presented. Level of confidence for all hypotheses was established at the .05 level of significance.

Results from the present study pose significant questions for future research with regard to color preference as a correlate of cognitive functioning.

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APPENDIX A

LIST OF DOLCH SIGHT VOCABULARY WORDS PRESENTED

Red	Yellow	Blue	Black
at	by	am	can
fly	did	ate	find
funny	had	come	it
give	help	into	know
good	in	is	me
new	let	ride	old
not	look	she	ran
some	pretty	where	round
we	too	who	see
yes	were	you	walk

APPENDIX B

COLOR PREFERENCES OF FIRST, THIRD, AND FIFTH GRADERS

Grade	Red	Yellow	Blue
First	55	25	57
Third	30	18	69
Fifth	35	22	76

COLOR PREFERENCES OTHER THAN RED, YELLOW, BLUE, FOR FIRST, THIRD, AND FIFTH GRADERS

Grade	Green	Pink	Purple	Blue/Green	Orange	Gold
First	7	3	1	1	0	0
Third	6	4	8	2	2	1
Fifth	5	2	10	1	3	0

Grade	Silver	Black	Navy Blue	White	Red Violet
First	0	0	0	0	0
Third	2	1	1	0	0
Fifth	0	0	0	1	2

APPENDIX C

DUNCAN'S NEW MULTIPLE RANGE TEST

	$\bar{X}_1$ 11.32	$\bar{X}_2$ 12.5	$\bar{X}_3$ 14.47
$\bar{X}_1$	--	1.18	3.15*
$\bar{X}_2$	--	--	1.87
$\bar{X}_3$	--	--	--
w_r		2.32	2.88

$\bar{X}_1$ = Mean of Grade 1

$\bar{X}_2$ = Mean of Grade 3

$\bar{X}_3$ = Mean of Grade 5

*Significant at the $p < .05$ level of significance

APPENDIX D

DUNCAN'S NEW MULTIPLE RANGE TEST

	$\bar{A}_2$ 3.60	$\bar{A}_1$ 3.66	$\bar{A}_3$ 4.00
$\bar{A}_2$	--	.06	.40*
$\bar{A}_1$	--	--	.34*
$\bar{A}_3$	--	--	--
w_r		.28	.32

$\bar{A}_2$ = Mean of Yellow Color Preference

$\bar{A}_1$ = Mean of Red Color Preference

$\bar{A}_3$ = Mean of Blue Color Preference

*Significant at the $p < .05$ level of significance

APPENDIX E

F TABLE

Source	S. S.	d. f.	M. S. S.	F
Between S's	867.485	164	—	—
A	1,295.321	2	647.661	5.179**
C	872.572	2	436.286	3.486*
AC	703.879	4	175.969	1.407
Subj. w. gp.	19,508.546	156	125.054	—
Within S's	1,079.580	495	—	—
B	93.323	3	31.108	.764
AB	383.841	6	63.973	1.572
BC	312,426	6	52.071	1.279
ABC	893.463	12	74.455	1.830
BxSubj. W. gp.	14,038.770	468	40.680	—
Total	1, 947.065	659	—	—

A = Color Preference

C = Grade Level (First, Third, Fifth)

B = Treatment Level

**$p < .001$ level of significance (highly significant)

*$p < .05$ level of significance (significant)

VITA

Mary Edna Payne

Candidate for the Degree of

Master of Science

Thesis: COLOR AND COLOR PREFERENCE AS FACILITATORS OF RETENTION OF SIGHT VOCABULARY WORDS IN PRIMARY AND ELEMENTARY SCHOOL CHILDREN

Major Field: Educational Psychology

Biographical:

Personal Data: Born in Pauls Valley, Oklahoma, March 21, 1943, the daughter of Mr. and Mrs. John T. Dobbs.

Education: Graduated from Altus High School, Altus, Oklahoma, in May, 1961; received commission as a Salvation Army officer from The Salvation Army School for Officers' Training in Atlanta, Georgia in 1967; received Bachelor of Science degree in Psychology from Oklahoma College of Liberal Arts in 1972; completed requirements for the Master of Science degree at Oklahoma State University in July, 1974.

Professional Experience: Salvation Army officer at the Little Rock Citadel Corps, Little Rock, Arkansas, 1967-1969; graduated teaching assistant, Educational Psychology and Special Education at Oklahoma State University, fall semester, 1973; School Psychologist at Bi-State Mental Health Foundation in Ponca City, Oklahoma, 1974; held the office of Vice President for Graduates for School Psychological Services at Oklahoma State University during 1973, and was elected Secretary for the Organization for 1974; member of the Dean's Honor Roll and President's Honor Roll; membership in professional organizations includes: National Association of School Psychologists, Oklahoma Psychological Association, American Psychological Association--Division 16, Phi Delta Kappa, Oklahoma Education Association, and National Association for Children with Learning Disabilities.