THE RELATIONSHIP BETWEEN HUMAN COLOR PREFERENCE

AND HUMAN PERSONALITY TRAITS

———————

A Thesis

Presented to

the Faculty of the Department of Psychology

Emporia Kansas State College

———————

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

———————

by

Stephen DeWitt Smith

May 1976

Approved for the Major Department

Approved for the Graduate Council

Approved for the Major Department

Approved for the Graduate Council

PREFACE

It was the intent of this research to attempt to objectively study the possible relationship between human color preference and human personality traits. Human color preference was measured and recorded from administration of the four primary colors used in the Short-Form Lüscher Color Test (blue, green, red, and yellow); the personality traits (or scales) were measured by the Edwards Personal Preference Schedule.

ACKNOWLEDGMENTS

TABLE OF CONTENTS

Chapter   Page

LIST OF TABLES

Chapter 1

INTRODUCTION

Color, particularly color-preference, is a psychological

phenomenon, involving human perceptual reaction to color and expressed

emotions associated with specific colors. Since the color phenomenon

has become as entrenched in the history of man as intensely as the

anthropological history of man himself, early color research had tra-

ditionally studied color-meaning, and color-mood associations. Psycho-

logically, color effects had been studied according to the affective

moods the human being associated with specific colors. But with the

recently professional acceptance of personality inventories as accurate

measurement of the personality structure and personality traits, neces-

sity warrants some analysis of the possible relationship of color pref-

erence with personality traits. This is one step further than the tra-

ditional color-preference and color-mood analysis.

THEORETICAL FORMULATION

Concerning the earliest historical significance of color,

Lüscher[1] stated the following:

> In the beginning man's life was dictated by two factors
> beyond his control: night and day, darkness and light.
> Night brought about an environment in which action had to
> cease; day brought an environment in which action was pos-
> sible. Night brought passivity, quiescence, and a general

---

[1]Max Lüscher, The Lüscher Color Test (New York: Random House, 1969), pp. 11-12.

slowing down of metabolic and glandular activity; day brought with it the possibility of action, an increase in the metabolic rate, thus providing him with both energy and incentive. The colors associated with these two environments are the dark blue of the night sky and the bright yellow of daylight. Dark blue is therefore the color of quiet and passivity, bright yellow the color of hope and activity; these are "heteronomous" colors--colors which regulate from outside. To primitive man, activity was directed either towards conquest and acquisition or activity directed towards self-preservation. Attack and conquest activities are universally represented by the color red; self-preservation by its compliment, green. These colors-activities are described as "autonomous" or self-regulating.

Thus it is seen that color-meaning assumed a significant and meaningful influence upon the most basic and primitive of man's interaction with his physical environment. Subsequently, later development of psychological research of the color phenomenon revealed important data involving the association of color with affective moods.

Peretti[1] conducted a study in which two Shakespearian plays, Hamlet and As You Like It were used to elicit an emotional or mood tone. From either blue, yellow, or gray, each subject recorded only one color which reflected his feeling or mood after reading the excerpt. Both men and women recorded blue most frequently after reading the tragedy; yellow was recorded most frequently after readings of the comedy. The data suggested that colors are associated with mood-tones.

Another study of color association to mood-tones was headed by Schaie[2] in which each of eleven mood-tones were described by two or more adjectives as follows: exciting-stimulating; secure-comfortable;

---

[1]Peter Peretti, "Color-Mood Associations in Young Adults," Perceptual and Motor Skills, 1974, October, Vol. 39 (2), pp. 716-718.

[2]Warner Schaie, "Scaling the Association Between Colors and Mood-Tones," American Journal of Psychology, 1961 (74), pp. 266-273.

distressed-disturbed; tender-soothing; protective-defending; despondent-melancholy; calm-peaceful; serene-dignified; stately-cheerful-jovial; defiant-hostile; powerful-strong. Ten colors were used representing the principal hues to which associations were found: red, orange, yellow, green, blue, purple, white, black and gray. Exciting-stimulating were paired with yellow; secure-comfortable with blue; distressed-disturbed with black; tender-soothing with blue; protective-defending with red; despondent-melancholy with gray and black; calm-peaceful with blue; serene-dignified with purple; stately-cheerful and jovial with yellow; defiant-hostile with black; and powerful-strong were paired with black. The results of this study added to the empirical evidence of specific affective mood-tones being associated (paired) with specific colors.

More evidence was offered by Spiegel[1] when he studied the interplay among color-preferences, manifest-anxiety levels, and personality traits. Subjects were given the Manifest Anxiety Scale, the Spiegel Personality Inventory, and the Brentwood Color Test. The subjects were asked to report to the examiner the colors they liked the most and the least. Results showed that females preferred brighter colors, preferred violet, and disliked green more than the men. Anxiety level was negatively related to liking for blue. High anxiety males tended to dislike blue; low anxiety males tended to like blue. No such relationship existed for the females. Both sexes preferred the cool colors (males: blue and green; females: blue and violet) to the warm colors.

---

[1] Don Spiegel, "Manifest Anxiety, Color-Preferences, and Sensorizing Minimizing in College Men and Women," _Journal of Clinical Psychology_, 1971, July, Vol. 27 (3), pp. 318-321.

Another study involving color preferences as indices of personality traits was reported by Riffenburg[1] who obtained scores for Responsibility and Social Introversion from the Minnesota Multiphasic Personality Inventory scales. Nine color-combination plates were ordered by the subjects as to the three most liked and the three most disliked. It was concluded from the study that the color-combination plates were closely associated with personality. All plates were essential for the prediction of both Responsibility and Social Introversion.

Some empirical data not supporting correlations between color-preference and personality traits as measured in self-administration inventories came from the findings of Burdick[2] who critiqued the Color Pyramid Test. Subjects were administered the MMPI and the Color Pyramid Test; results indicated that there was no direct relationship between the choice of colors for one condition or the other.

Although the studies briefly discussed do expose some disagreement as to the validity of color-preference tests as correlated with self-administered personality-trait tests for the purpose of predicting, the data supported that some association between color-preference and personality traits exists. Significant development was exposed regarding color-personality indices from basic color-mood affiliation to this relationship stimulated further research penetrating the color-preference/personality trait theme.

------

[1]Geraldine Riffenburg, "Responses to Color-Combinations As Indices of Personality Traits," Journal of General Psychology, 1959, 61, pp. 317-322.

[2]Allen Burdick, "The Color Pyramid Test: A Critical Evaluation," Journal of Psychology, 1968, 70 (1) pp. 93-97.

THE PROBLEM

The previous evidence suggested that a basic, general affiliation between color and emotion exists. Since affectivity is but one extension of the larger personality, empirical groundwork was established for the study of the possible relationship between personality traits and color-preference. Several color-preference tests are available for objectively measuring color preference as are there numerous self-administration personality inventories.

The Lüscher (Short Form) Color Test measures color-preference, incorporating the use of four primary colors. The Edwards Personality Preference Schedule objectively measures fifteen specific personality traits. The empirical study of the possible relationship between the most preferred color of the four primary colors and the fifteen personality traits offers a stimulating research design from which the relationship of color-preference and personality traits was examined.

Statement of the Problem

Is there a significant difference between the fifteen personality traits, as measured by the Edwards Personal Preference Schedule, of college students who preferred a specific primary color, as used by the Short Form Lüscher Color Test, and those students who did not choose that same color as their most preferred color?

Statement of the Hypothesis

There is no significant difference between the fifteen personality traits, as measured by the Edwards Personal Preference Schedule, of college students who preferred a specific primary color, as used in

the Short Form Lüscher Color Test, and those students who did not choose that same color as their most preferred color.

Purpose of the Study

It was the purpose of this study to equate some objectively measured personality traits, using the Edwards Personal Preference Schedule, with color-preferences expressed towards the four primary colors of the Lüscher Color Test (Short Form). It was hoped that the results provided by this research may stimulate subsequent psychological research into color and personality since this study is of an exploratory nature. Such data may add to that research of color and personality undertaken by the disciplines of perceptual psychology and personality psychology.

Significance of the Study

This research represented an effort to establish an empirical relationship between color-preference and personality traits; if such developments occur, subsequent research may bear fruitful data concerning color in therapy in the successful treatment of specific mental illnesses. Since color is an omnipresent environmental influence, the addition to clinical knowledge of color-personality could stimulate improved clinical application. Additional knowledge involving the use and validity of color stimulation in projective tests such as the Rorschach, Draw-A-Person, and House-Tree-Person will be possible with more data involving color and personality.

DEFINITIONS OF TERMS

For this study of the relationship between human color prefer-
ence and human personality traits, specific terms are required for the
comprehension of this research.

Edwards Personal Preference Schedule

This is a forced choice personality inventory in which terms
are paired and the individual is asked to choose that member of each
pair that he believes is more descriptive of himself. There are 210
different pairs of statements in the E.P.P.S. and scores are provided
on fifteen scales which are: Achievement (Ach), Deference (Def),
Order (Ord), Exhibition (Exh), Autonomy (Aut), Affiliation (Aff),
Intraception (Int), Succorance (Suc) Dominance (Dom), Abasement (Aba),
Nurturance (Nur), Change (Chg), Endurance (End), Heterosexuality (Het),
and Aggression (Agg).[1]

Four Primary Colors of the Lüscher Color Test (Short Form)

These colors are: blue, yellow, red, and green. The colors
are printed on cardboard panels, 3" x 5". The colors are numbered as
follows: blue=1, green=2, red=3, and yellow=4.[2]

---

[1]Allen Edwards, The Measurement of Personality Traits by
Scales and Inventories (New York: Holt, Rinehart and Winston, Inc.,
1970), p. 60.

[2]Max Lüscher, The Lüscher Color Test (New York: Random House,
1969), pp. 51-95.

Color-Preference

This is the reaction of expressing which of the four color panels (of the Short Form Lüscher Color Test) the subject prefers the most.[1]

Personality Trait

A personality trait is, according to the E.P.S., any one of the fifteen personality scales in which a subject's score is ordered according to how he answers specific test-item pairs.[2]

Subjects

Subjects were any persons between the ages of 18 to 35 who attended Emporia Kansas State College either part-time or full-time in the fall of 1975.

Personality Inventory

A personality inventory is a questionnaire-type device to be answered by the individual about himself.[3] (The E.P.P.S.).

Color

Color is the dimension of visual sensation which is primarily related to the wave length of the stimulus. Colors are specified by names such as red, green, blue, and so forth.[4]

---

[1]Ibid., pp. 6-8.   [2]Edwards, loc. cit.

[3]James Chaplin, _Dictionary of Psychology_ (New York: Dell Publishing Co., Inc., 1968), p. 357.

[4]Ibid., pp. 222-223.

t-Test

The $\underline{t}$-test is the ratio of a statistic to its standard error. The statistical significance of $\underline{t}$ is dependent upon its size and the number of degrees of freedom, or the number of observations minus the number of independent restrictions on the sample. A common use of $\underline{t}$ is in the determination of the significance of differences between two means. The $\underline{t}$-test is then stated in terms of the probability, or $\underline{p}$ value, with which it may be expected that additional samples of data would yield by chance differences that are just as large as those obtained. For differences to be significantly greater than chance, $\underline{p}$ values of .05 are conventionally accepted as highly significant.[1]

Chi-Square (X^2)

The chi-square test is one of the more powerful non-parametric statistical tools that is used to analyze data. The value of chi-square is determined on the basis of the number of responses (observed frequencies) as compared to the number of expected responses (expected frequencies). The chi-square determines whether an obtained distribution differs significantly from the theoretical or expected distribution and thus may be attributable to the operation of factors other than chance.[2]

[1]Ibid., p. 515.

[2]N. M. Downie and R. W. Heath, Basic Statistical Methods, 4th Edition (New York: Harper and Row, Publishers, 1974), p. 188.

The Contingency Coefficient (c)

The contingency coefficient is an index of measurement that is used to determine the degree of relationship that exists between the independent and dependent variables. The magnitude of chi-square is a function used in the determination of the contingency coefficient. The measure employed is the degree to which one variable is found to be non-independent of the other variable more often than can be expected by chance.[1]

T Score

The T score is a standard score that has been normalized (the distributions of the T score have been made to conform to that of the normal curve). The T score has a mean of 50 and a standard deviation of 10.[2]

LIMITATIONS OF THE STUDY

As designed, this study presented several limitations. The subjects' ages, 18 to 35 for this study, definitely excluded all other persons of ages other than those of typical college age. This study included some possible differences in subject test approach and personality disposition due to immaturity or advanced age. The study also excluded those whose education was not up to college level; this restricted the majority of the population from test-sampling. The research design, however, was engaged to restrict from the subject pool those persons who suffered an incapacitating mental illness, color-vision

---

[1] Ibid., p. 194.   [2] Ibid., p. 66.

maladies, and persons classified as mentally retarded or deficient. No discrimination was made, except to test half females and half males, to compensate for possible sex influences. The uncontrolled variable of fear/anxiety brought to the testing session by the subject because of subject unfamiliarity with the test may have influenced some test results. Finally, even the most valid of personality inventories remains somewhat subjectively unstructured as to the personality scales interpreted; therefore, the E.P.P.S. assessment should be interpreted with some degree of flexibility.

Time Encompassed by the Investigation

Each testing session required approximately 80 minutes for administration. This included 75 minutes for the E.P.P.S.[1] and 5 minutes for the color preference query. Total data collection time encompassed approximately 70 hours of testing.

---

[1]Allen Edwards, Edwards Personal Preference Schedule Manual (New York: The Psychological Corporation, 1959), p. 6.

Chapter 2

REVIEW OF RELATED LITERATURE

It was the purpose of this research effort to investigate any
relationships that may exist between specific personality traits, as
measured by the Edwards Personal Preference Schedule, and color-
preferences, using the four primary colors of the Short Form Lüscher
Color Test. A predominance of psychological research has been
completed that has analyzed the color phenomenon; much personality
research has also been conducted to study the use of personality
inventories for assessing human personality traits.

Exposure of past research regarding color-preference and
personality-traits will help to provide a foundation from which this
study of these two phenomena may be approached. Firstly, color
research, historically, has included research, relevant to color-
preference, in the following subject areas: (1) Color and affective
mood associations; (2) Color-preference and related behaviors;
(3) Color in projective and color tests as a clue to personality;
(4) Color perception and personality traits. Personality traits and
personality inventory will be reviewed in the following two subject
areas: (1) Personality trait and color associations; and (2) Person-
ality trait measurement via personality inventory.

COLOR AND AFFECTIVE MOOD ASSOCIATIONS

Color-mood associations formed the foundation for the Lüscher

(Short Form) Color Test. Lüscher[1] reported that:

> The four basic colors used in the Short L.C.T. are: (1) blue,
> representing "Depth of Feeling" whose affective moods are tran-
> quility, contentment, tenderness, love and affection; (2) green,
> representing "Elasticity of Will" whose affective moods are per-
> sistence, self-assertion, obstinancy, and self-esteem; (3) red,
> representing "Force of Will" whose affective moods are desire,
> excitability, domination, and sexuality; and (4) yellow, repre-
> senting "Spontaneity" whose affective moods are variability,
> expectancy, originality, and exhiliaration. These are the
> "psychological primaries", the four "basic colors".

Concerning color and mood, Birren[2] suggested that:

> Reactions to color were impulsive and emotional. With
> maturity, color preferences were generally ranked blue, red,
> green, regardless of race or nationality. Blue or black indi-
> cated self-control and the repression of emotion. Red revealed
> uninhibited expression; yellow represented dependence and
> infantile traits. Green represented simple and uncomplicated
> natures. Emotionally, the red end of the spectrum is exciting,
> the blue end subduing. Red symbolizes manic tendencies; yellow
> is allied with feeblemindedness. Green is desired by psycho-
> neurotics and psychotics. Blue is to be associated with
> schizophrenia; brown represents obstinacy.

These rather "unempirical" findings have been presented as

such, without statistical support, as testimony to provide the reader

with rather explicit, straightforward exposure to two early color-mood

philosophies. Some important empirical findings were promoted by

Crane[3] who investigated color scales and emotionally. The subjects

---

[1]Max Lüscher, The Lüscher Color Test (New York: Random House, 1969), pp. 19-26.

[2]Faber Birren, "Color Preference As a Clue to Personality," Art Psychotherapy, 1973, April, Vol. 1 (1), pp. 13-16.

[3]Rebecca Crane, "Color Scales in Responses to Emotionally Laden Situations," Journal of Consulting Psychology, 1962, 26 (6), pp. 515-519.

were asked to compare two silhouttes of men, identical except for color,
and to select the one which most closely fits an emotionally laden
situation. Each figure was painted on a separate card; there were a
total of six figures: red, yellow, blue, green, orange and violet. On
all of the color scales related to these questions, yellow and orange
had the highest values, while violet had the lowest. The scale posi-
tions were almost entirely reversed for the unpleasant questions. The
light colors, in terms of brightness, are evidently important for posi-
tive emotions while the reverse is true for negative emotional experi-
ence. The kind of emotional experience portrayed is an important
factor in determining scale positions of the colors. Thus was
portrayed a definite relation between color scales and emotion producing
stimuli. This study reinforced the possibility of a supported correla-
tion between color stimuli and mood.

Further research effort to empirically link color with mood was
detailed in a study by Odbert[1] in which verbal associations of color
and mood were studied. Ten short phrases from orchestral recordings
were selected to represent a fair range of moods. On a second hearing
of the musical selections the subjects indicated the dominant mood by
checking one of eight groups of descriptive adjectives: (1) "spiritual
to serious"; (2) "pathetic to dark"; (3) "dreamy to plaintive"; (4)
"lyrical to soothing"; (5) "humorous to graceful"; (6) "merry to
bright"; (7) "exhilirated to restless"; and (8) "vigorous to exalting".
Subjects were then asked to verbalize a color to represent the mood

---

[1]H. S. Odbert, "Studies In Synesthetic Thinking: II. Verbal
Associations of Color and Mood," _Journal of General Psychology_, 1942,
26, pp. 153-173.

they choose for a specific musical selection. These colors were then grouped with the selection moods the colors represented. Group VIII is "tender" and blue; Group V is "leisurely" and green; Group I is "gay" and yellow; Group III is "exciting" and orange; Group VI is both "exciting" and "vigorous" and red; and Group II is "vigorous" and "solemn" and "sad" and is purple.

Wright[1] conducted a study in which judgements of color were expressed on an Osgood Semantic Differential by circling one of seven positions between pairs of polar adjectives. Six clusters of adjective-pairs could be identified on the basis of five components: (1) happiness; (2) forceful-strength; (3) warmth; (4) elegance, and (5) calming-strength.

The results of Wright's study showed: (1) the lighter or the more saturated is a color, the more "happiness" it connotates; (2) saturation is the color perception which contributes the most to the connotation of "showiness"; (3) it is upon color darkness that "forcefulness" most depends--the darker the color, the more it connotates "forcefulness"; (4) greater "redness" is the hue change which corresponds with greater "warmth"--the more saturated a color is, the more it connotates "warmth"; (5) greater saturation and greater "blueness" correspond with a greater connotation of "elegance"; (6) the darker or more blue is a color, the more it connotates a kind of "calming-strength".

---

[1]Benjamin Wright, "The Meaning of Color," Journal of General Psychology, 1962, 67, pp. 89-99.

Wexner[1] prepared a study that provided further empirical support for the association of color and moods. Eleven moods were chosen: exciting, secure, distressed, tender, protective, despondent, calm, dignified, cheerful, defiant, and powerful. Four judges presented subjects eight colors: yellow, orange, red, purple, brown, blue, black and green. The subjects were to select the color that best represented the word groups. No significant differences in sex differences of mood tone and color choice were found. It was demonstrated that some colors are more often associated with a given mood tone than others. Red was more often associated with "exciting"; blue with "secure"; orange with "distressed"; blue with "tender"; purple with "dignified"; yellow with "cheerful"; and black with "powerful".

A similar study by Murray[2] concerning color and mood tones finalizes those research efforts designed to expose statistically significant correlations/associations between color and moods. Subjects were asked to select one color from: yellow, orange, red, purple, brown, blue, black, and green, that they felt best represented the feeling described by the word groups (taken from a list of eleven mood tones). The word groups were: exciting, secure, distressed, tender, protective, despondent, calm, dignified, cheerful, defiant and powerful.

---

[1]Lois Wexner, "The Degree To Which Colors (Hues) Are Associated with Mood-Tones," Journal of Applied Psychology, 1954, Vol. 38, pp. 432-435.

[2]David Murray, "Colors and Mood Tones," Journal of Applied Psychology, 1957, Vol. 41, pp. 279-283.

In Murray's study, blue and green were consistently related to "secure, tender, and calm" and consistently unrelated to "defiant". Red and black were most consistently related to mood tones by all groups. Red associated as "exciting, cheerful, defiant, and powerful" and not related to "secure, tender, and calm." Black was associated with "distressed, despondent, and defiant" and consistently not associated with "tender, calm, and cheerful". Brown was associated with "protective"; purple was associated with "dignified"; yellow was associated with "cheerful", and orange was not consistently related. Factually, the study concluded that socio-economic level was a more highly significant influence to consider, other than level of mental health or geographic region locale of the subject, regarding color-mood associations. Since the relevant research has been presented, regarding the basal importance of color and moods, and the evidence suggested some statistical correlation between color and mood, the next research investigations studied were those involving color preferences as possible clues to personality traits.

COLOR PREFERENCE AND RELATED BEHAVIORS

Granger[1] investigated the more physical natures of color (hues) as a factor in the process of preferences. Granger largely excluded the more psychological dynamics of color in the study, but the study's results are relevant to an understanding of color preference and personality. Sixty sets of colors were selected to represent the entire

---

[1]C. Granger, "An Experimental Study of Color Preferences," Journal of General Psychology, 1955, Vol. 52, pp. 3-20.

color solid with respect to the three principals of color: hue, value, and chroma. Within each set the colors were ranked in order of preference by fifty subjects (twenty-five men and twenty-five women) of normal color vision. Granger's findings showed that there were no marked statistical differences between the sexes as to color preference. He also found that wave length was a fundamental factor in determining color preference and that hues of shorter wave lengths were preferred over those of longer wave lengths. Also, the blues and greens were preferred to the yellows, oranges, and reds.

A parallel research study conducted by Eysenck[1] produced results emphasizing the physical dynamics of the color stimulant regarding saturation vs unsaturation but without suggestions of associated personality traits. The colors used were: blue, red, green, violet, orange, yellow--all fully saturated. Subjects were asked to rank the colors in order of preference. These rankings were then correlated and the resulting table of correlations factor analyzed.

Eysenck found that there is more agreement between the orders of preference for colors given by the subjects than there is between the results of tests of intelligence. The rankings of the fifteen men and the fifteen women agree in placing blue, red, green and violet above the two other colors; but they reverse the position of yellow, which is preferred by the women and orange, which is preferred by the men.

Color preference is connected with some general factor of aesthetic appreciation. The results from this research provided data

---

[1]H. Eysenck, "A Critical and Experimental Study of Color Preferences," _American Journal of Psychology_, 1941, Vol. 54, pp. 385-394.

suggesting the universality of color preference agreement among the various races, negating some possible ethnocentric influences that could affect color preferences. A major part of this research was sensitive to the possible influence of race (the subjects in this research were equally numbered with no preference or standardization for race).

COLOR IN PROJECTIVE AND COLOR TESTS AS A CLUE TO PERSONALITY

The next research presented will be that research involving an analysis of the role of color stimuli in established projective and color tests such as the Lüscher Color Test, House-Tree-Person, and the Minnesota Multiphasic Personality Inventory. These tests will be discussed from the perspective of color as a personality clue and the discussion of study results will provide further orientation to the proposed correlation of color and personality.

The Lüscher Color Test (Short Form) provided some analysis of personality indices dependent upon specific color preference schemes (although the test used little empirical support for its claims) as Lüscher[1] delineated five personality functions from the color preference orders: "(1) the (+) functions--Desired Objectives; (2) the (x) functions--exposing the Existing Situation; (3) the (=) functions-- exposing the Characteristics Under Restraint; (4) the (-) functions-- exposing the Rejected or Suppressed Characteristics; and (5) the (+-) functions--exposing the Actual Problem."

---

[1]Max Lüscher, The Lüscher Color Test (New York: Random House, 1969), p. 96.

French[1] researched/critiqued the Lüscher Color Test (Short Form) as to the proposed validity of the test. This study should provide a more complete and meaningful understanding of the Lüscher Color Test. Subjects were presented the primary and auxiliary color patches of the Lüscher (Short Form) Color Test: grey, blue, green, red, yellow, violet, brown, and black. This initial presentation order was held constant. As each color patch was presented, subjects were asked to record the name of the color and then their immediate reactions to the color on each of the mood adjective rating scales: Tense, Happy, Doubtful, Fearful, Worried, Jittery, and Joyful. After the Lüscher Color Test was given, the subjects were administered the Illinois Personality and Ability Testing (IPAT) Anxiety Scale.

The seven adjective-moods were grouped into the five adjectives which reflected "negative" feeling states and the two which reflected "positive" feeling states. The male mood ratings of the eight colors were higher than the female ratings. The data from the mood adjectives suggested that: (1) there is some merit in Lüscher's theorizing regarding people's reactions to colors, and (2) these results do point to the possible value of color choosing as a form of psychological assessment. French suggested that the following research was needed: (1) more research concerning the Lüscher Color Test, and (2) further work investigating the effects of colors on people and differences in color preferences in varying situations.

---

[1]Cheryl French, "The Lüscher Color Test: An Investigation of Validity and Underlying Assumptions," Journal of Projective Techniques and Personality Assessment, 1971, 35 (3), pp. 351-365.

Yudin[1] researched color as a personality clue in the Thematic

Apperception Test to further this review of the relationship between

color tests and personality. Five cards from the standard set of the

Murray TAT cards (1,2,3BM,4, and 13MF) hand painted by an artist were

photographed on 35mm color film and slides made from the film. Slides

were also obtained of the corresponding set of original black and white

cards. Thirty of the students in each subgroup were shown the chromatic

slides and thirty the achromatic slides. The students were instructed

to make up a story about each slide according to standard TAT procedure.

For the outcome ratings the achromatic and chromatic presentations of

cards 1, 3BM, and 13MF were discriminated at less than the .05 level.

Stories told to the colored cards were longer than those told to the

black and white cards. Yudin's study found that color, as a variable,

does exert at least a subtle effect on fantasy production. These

results suggest further support for the rationale that color stimuli

provoke emotional-associations to whatever design that color represents

(whether the design be characters in a study, color patches, or

ambiguous color designs).

Colon[2] researched the reactions to color as indices of specific

Minnesota Multiphasic Personality Inventory-measured "trait" groups,

the results of which were highly germane to the molar concept of color

stimuli and personality. Subjects were placed in an inhibited, an

---

[1]Lee Yudin, "Color and Its Relation to Personality: The TAT," _Journal of Projective Techniques and Personality Assessment_, 1965, 29 (3), pp. 479-487.

[2]Fernando Colon, "A Study of Response to Achromatic and Chromatic Stimuli," _Journal of Consulting Psychology_, 1965, 29 (6), pp. 571-576.

impulsive, and a normal group. Stimuli were four colors: red, green, white, and black. Each subject gave eleven consecutive one-word responses, separated by ten second intervals, which came to the subject's mind as he looked at the four stimuli.

There was no evidence that the normal, inhibitive and impulsive groups will respond differently to the chromatic and achromatic stimuli; the normal group always took the longest to respond, whether achromatic or chromatic stimuli, followed by the inhibited and the impulsive group. The color red required the longest response time. The conclusions found above failed to register any significant differences among the color reactions of the various personality groups.

Marzolf[1] researched color as personality clues in House-Tree-Person drawings, the results of which are vital to the investigated functions of color in personality. Two samples of college students were administered the H-T-P on two occasions; on the first occasion, both samples made drawings in pencil. From four to six weeks later, those in Sample A (achromatic) made a second drawing in pencil. After a similar interval, those in Sample C (chromatic) made the second drawing with crayons. The Sixteen PF was used as a measure of personality, given on the same day that the first achromatic drawing was made.

The initial drawings of the two samples differed very little. There was no evidence of any relationship between consistency and any personality trait measured by the Sixteen PF. Of the 73 characteristics, only 23 showed reliable differences in incidence in achromatic

---

[1]Stanley Marzolf, "Color in H-T-P Drawings By College Men and Women," Journal of Clinical Psychology, 1971, Oct., Vol. 27 (4), pp. 504-509.

and chromatic second drawings of either men or women. The only marked conclusions from this study reflected some tendency for significant differences in drawings to occur in the chromatic drawings of either sex; no empirical correlation between these differences and Sixteen PF personality traits was supported.

A subsequent study by Marzolf[1] was conducted which researched personality traits and color choices for House-Tree-Person drawings. Subjects drew the H-T-P in color a few weeks after they had produced an achromatic one and had taken the Sixteen PF, Form C (Sixteen PF), which includes a seventeenth experimental factor, motivational distortion, designed to measure the subjects' candor. Eight crayons: black, blue, brown, green, orange, purple, red and yellow were used. The characteristic that occurred most frequently was red in the house drawing.

There were eleven different characteristics involved in sixteen correlations, all of which were low. Men who used purple in the person drawing were more likely to be sober rather than happy-go-lucky or shy rather than venturesome. Men who used orange in the person drawing were more assertive or more experimenting. Men who used one color for the person were inclined to be forthright while those who used six or more were likely to be shrewd. Women who used six or more colors for the house were inclined to be happy-go-lucky and those who did so for the person were defensive or self-sufficient. Men who drew a brown, black, and green tree were more likely to be toughminded and those who used orange in the tree to be experimenting.

_____

[1]Stanley Marzolf, "Personality Traits and Color Choices for H-T-P Drawings," Journal of Clinical Psychology, 1973, April, Vol. 29 (2), pp. 240-245.

The results from this study implicate the direct, empirical association between color use (according to the House-Tree-Person Test) and corresponding personality traits (according to the Sixteen PF). It was attributed to the other studies whose emphasis was color use as a personality clue, whether that color use was pure (the Color Pyramid Test) or correlated in association with a valid personality inventory (the Sixteen PF), that empirical evidence exists linking color use (color preference) to correlated personality traits. The subsequent study review section, Color Perception, cites one research study. This study involves some inferred psychophysiological dynamics of the color phenomenon, responsible for color-preferences/or associated personality factors.

COLOR PERCEPTION AND PERSONALITY TRAITS

Fine[1] investigated color discrimination with extroversion/ introversion tendencies. Subjects were soldiers selected by extreme scores on both dimensions of extroversion-introversion and field-dependence/independence. The Maudsley Personality Inventory and the Gottschaldt Hidden Shapes Test were given to 170 men. Four criterion categories were tested: (1) field-dependence, extrovert; (2) field-dependence, introvert; (3) field-independence, extrovert; and (4) field-independence, introvert.

No differences were found in Fine's study between criterion groups with respect to time to complete the tasks. The results for

---

[1]Bernard Fine, "Field Dependence-Independence as 'Sensitivity' of the Nervous Systems: Supportive Evidence With Color Discrimination," <u>Perceptual and Motor Skills</u>, 1973, Aug., Vol. 37 (1) pp. 287-295.

color discrimination clearly supported the hypothesis that those who have more "sensitive" nervous systems are classified as field-independent; and those whose nervous systems are "less sensitive" are those classified as field-dependent. There was a substantial difference between the color discrimination abilities of the two personality groups. No correlation was found to exist between extroversion-introversion and color discrimination.

PERSONALITY TRAITS AND COLOR ASSOCIATIONS

This literature review cites those studies emphasizing the empirical interplay of color and personality traits, an emphasis vital to the rationale of this research. Three studies were exposed which reflect data critically related to the purpose of this research: to substantiate a statistical relationship between color preference and personality traits. The completion of discussion of these studies concludes the review of research investigating color phenomenon and personality traits, with the final reviews focused upon personality trait measurement and the Edwards Personal Preference Schedule Test.

Choungourian[1] researched color-preferences and introversion/extroversion. Subjects were administered the E Scale (Introversion-Extroversion) of the Maudsley Personality Inventory which showed no significant differences between the sexes. Those who obtained scores of 0-12 were classified introverts, 20-28 normals, and 36-48 extroverts.

---

[1]Assador Choungourian, "Introversion, Extroversion and Color Preferences," <u>Journal of Projective Techniques and Personality Assessment</u>, 1967, 31 (4), pp. 92-94.

The color-preference stimuli were eight Ostwald hues: red, orange, yellow, yellow-green, sea-green, blue-green, blue, and purple. To make the warm-cool color distinction, red, orange, yellow, and yellow-green were considered "warm"; and green, blue-green, blue, and purple were considered "cool".

Purple was never preferred significantly while there were more significant preferences for green, blue-green, and blue. Only the warm-cool preferences of the extrovert males did not differ from chance, while all the other male and female groups tended to prefer cool colors to the warm. There was found a tendency for extroverts to prefer more than introverts colors that are warm, and that males in all the groups tended to prefer more colors that are warm than females. One crucial conclusion was that differences in the cultural background of the sub-jects may provide different learned color associations which could affect their preferences.

Another study by Choungourian[1] paralleled the former study which investigated color-preference and personality factors. Subjects were eighty extrovertive and eighty neurotic undergraduate students; the comparison group was 160 students who were undifferentiated as to scores on the Maudsley Personality Inventory (MPI). Color preference stimuli were 10 x 10 cm. colored cards of: red, orange, yellow, yellow-green, sea-green, blue-green, blue, and purple.

None of the eight color preferences of extroverts and neurotics differs significantly from that of an undifferentiated group; the

---

[1]Assador Choungourian, "Extroversion, Neuroticism, and Color Preferences," <u>Perceptual and Motor Skills</u>, 1972 (June), Vol. 34 (3), pp. 724-726.

preferences for red, yellow-green, and purple do differ significantly

between the extroverts and neurotics. Neurotics significantly prefer

red and purple more than extroverts, while extroverts significantly

prefer yellow-green more than neurotics.

PERSONALITY TRAIT MEASUREMENT VIA PERSONALITY INVENTORY

The final section includes a review of those studies regarding

personality trait measurement tests, and, particularly, a critique of

the Edwards Personal Preference Schedule, that evaluation tool respon-

sible for much of the necessary data from this research. The initial

exposure included an introduction to the Edwards Personal Preference

Schedule, as depicted by its author Allen Edwards.[1] In the E.P.P.S. the

210 items are paired on the basis of their SDSV's (Social Desirability

Scale Values). For each pair of statements, the subject is asked to

choose that member of the pair that he believes is the more descriptive

of himself. The interclass correlations between the SDSV's of the

statements is 0.85.

Edwards[2] continued to initiate critical evaluation of the

E.P.P.S.:

> If a personality item has an extremely high SDSV, the subject
> may be aware that by responding "true" to the item, he is saying
> socially desirable about himself; and if he answers "false" to the
> item, he is denying that a socially desirable statement describes
> him. He may also be aware that a "true" response to an item with
> extremely low SDSV will be regarded as indicating that he is
> saying something socially undesirable about himself; and that a

[1]Allen Edwards, The Measurement of Personality Traits by Scales
and Inventories (New York: Holt, Rinehart and Winston, Inc., 1970),
pp. 202-216.

[2]Ibid., p. 216.

"false" response will be regarded as a denial of a socially undesirable characteristic.

An excellent critique of the statistical validity of the E.P.P.S. was provided by Levonian[1] from which convincing data offers an alternate framework from which to understand the E.P.P.S. as it was intended to be used in this research. Each of the fifteen scales was factor analyzed independently of the other scales. While most of the intercorrelations are +, the average correlation was less than .08, not significant. The low values of the correlations in general and particularly for the identical consistency items should be noted.

Instead of finding large factors which are readily identifiable along the lines of the major variables scored in the test, one finds a large number of narrow factors, the majority of which seems to be based upon shared common statements. E.P.P.S. failure stems from: (1) using the same item statement in several different items; (2) scoring the same item on two scales; and (3) using the forced-choice item form with equated social desirability of the item statements.

Edwards[2] defended the statistical validity and empirical integrity of his personality inventory with two studies whose results distinctly reinforced the ability of a personality inventory to objectively measure Social Desirability tendencies and scales. Scores on 58 Minnesota Multiphasic Personality Inventory scales were available. P (K), the mean probability of a keyed response, was found. P (SD),

---

[1] E. Levonian, "A Statistical Evaluation of the E.P.P.S.," Journal of Applied Psychology, 1959, Vol. 43, pp. 355-359.

[2] Allen Edwards, "The Relationship Between Social Desirability and Internal Consistency of Personality Scales," Journal of Applied Psychology, 1963, Vol. 47 (4), pp. 255-259.

proportion of items keyed for socially desirable responses, was

obtained. The correlation between P (K) and P (SD) was .83, suggesting

that the mean probability of a keyed response to items in a personality

scale is a function of the social desirability keying of the items.

Edwards'[1] second study closely paralleled the former one and

provides further support for the validity of the Edwards Personal Pref-

erence Schedule for measuring social desirability. A total of 140 per-

sonality trait items based upon Murray's discussion of needs were written

and edited. The items were arranged in ten sets of fourteen each. Each

set consisted of one item relating to each of the needs. The items were

presented to subjects with instructions to judge the degree of social

desirability of the behavior indicated by each item in terms of how the

behavior would be regarded in others. The probability of endorsement

was a linear function of the scaled desirability of the item. If a pat-

tern of behavior was prevalent among members of a group, it was judged

as desirable; if it was uncommon, it was judged as undesirable. The

subject taking the inventory was trying to give a good impression of

himself. Misrepresentation of subjects on social-desirability person-

ality items could have been alleviated by pairing items indicative of

different traits in terms of their social desirability scale values.

If the subject was forced to choose between the two items, his choice

obviously could not be upon the basis of the greater social desirability

of one of the items.

---

[1]Allen Edwards, "The Relationship Between the Judged Desira-
bility of a Trait and the Probability that the Trait will be Endorsed,"
Journal of Applied Psychology, 1953, 37 (2), pp. 90-93.

The results of these defenses by Edwards to establish a formidable foundation upon which to promote his E.P.P.S. seemed sufficient to similarly promote the use of the Edwards Personal Preference Schedule in this research study. This research must depend upon a valid assessment tool of personality traits.

In review of this research review concerning color preference and associated personality traits, six areas of emphasis were analyzed: (1) Color and affective mood associations; (2) Color preference and related behaviors; (3) Color in projective and color tests as a clue to personality; (4) Color perception and personality traits; (5) Personality-traits and color associations; and (6) Personality trait measurement via personality inventory. The empirical evidence seemed to suggest the following: (1) that there is a relationship, empirically supported, that exists between specific colors and associated affective moods; (2) that color as a vital stimulant in projective and color tests was a necessary clue for identifying specific personality traits; (3) that statistically exposed color associations and personality traits exist; and (4) that specific personality traits may be objectively measured via personality inventories (namely, the Edwards Personal Preference Schedule). The problem investigated in this research was stated: that there may exist a significant, statistical relationship between human color preference and specific human personality traits (as measured by the Edwards Personal Preference Schedule). Past research exposed no overt relationship, empirically supported, to exist between color preference and associated personality traits, a relationship this research analyzed.

Chapter 3

METHODS AND PROCEDURES

This research study was designed to examine data possibly
relating color preference, using the four primary colors from the Short
Form Lüscher Color Test, to personality traits, as measured by the
Edwards Personal Preference Schedule (1959 edition). The procedure for
collecting the personality trait data was to use the self-administration
method of a personality inventory; color preference data was that color
reported by each subject from the four colors as his favorite. This
personality testing method incorporates the testing philosophy that
those testing situations which attract the least amount of examiner
intervention offer an environment most conducive to objective, non-
distracted, non-influenced assessment. The Edwards Personal Preference
Schedule conforms to that testing philosophy. Those examiner related
influences targeted for minimization include examiner personality
influences, examinee personality influences (reaction to the test),
and potential examiner feedback influences (approval, disapproval,
encouragement, discouragement). This chapter includes: population and
sampling, materials and instrumentation, design of the study, data
collection, and data analysis.

POPULATION AND SAMPLING

The subjects administered the color preference test and the
Edwards Personal Preference Schedule were selected randomly from the

Emporia Kansas State College Campus Telephone Directory 1975-76.[1] The

selection of subjects, limited only to students attending Emporia

Kansas State College in the fall of 1975, was accomplished by selecting

from a table of random numbers[2] a two-digit number, less than or equal

to the number 28 (since the Directory pages numbered one to twenty-

eight). This number was recorded and the next consecutively selected

number, less than or equal to 28, was recorded; this procedure was

repeated until 100 two-digit numbers had been selected randomly and

recorded vertically.

Next, a three-digit number was selected from the table, less

than or equal to the number 222 (since there were 222 students listed

per Directory page). This number, vertical student name placement on

a Directory page, was recorded opposite the first selected two-digit

Directory page number. The next consecutively selected number, less

than or equal to 222, was recorded; this process was repeated until 100

three-digit numbers had been randomly selected and recorded vertically

and paired to the previously selected two-digit numbers. Each of the

100 students was then selected by referencing his two-digit number

(directory page) and three-digit number (vertical placement on a Direc-

tory page). Initially, it was insured that fifty females and fifty

males had been randomly selected. The name and phone number of each

---

[1]E.K.S.C. Campus Telephone Directory 1975-76, Emporia State
Press, Fall 1975, pp. 1-28.

[2]N. M. Downie and R. W. Heath, Basic Statistical Methods, 4th
Edition (New York: Harper and Row, Publishers, 1974), pp. 316-317.

selected student was recorded for further contact purposes for the
testing.

Each of the fifty students of each sex was notified by phone
and simply asked if he or she would volunteer to participate in a
research effort to satisfy thesis requirements for a master's degree in
psychology. This phone notification was continued until twenty-five
students of each sex had volunteered to take the two tests at an agreed
upon test time. The names and phone numbers of the other students
selected but not called were retained if the subject quotas (25 of each
sex) could not be obtained (test time conflicts, other commitments,
withdrawals, and "no-shows"). This researcher then gave to each noti-
field subject his name and phone number, a brief explanation of the
objectives of the research design, and he told each subject that he
had been randomly selected. Initial confirmation was established that
each subject was between the ages of 18 to 35, and was currently
attending Emporia Kansas State College the fall semester before any
test explanations were offered.

MATERIALS AND INSTRUMENTATION

The two tests administered to obtain the required data were the
Edwards Personal Preference Schedule (1959 edition) and the four primary
colors of the Lüscher Color Test (Short Form). The E.P.P.S. is a forced
choice personality inventory in which items are paired and the indi-
vidual is asked to choose that member of each pair that he believes is
more descriptive of himself. There are 210 different pairs of state-
ments in the E.P.P.S. and scores are provided on fifteen scales which
are: Achievement (Ach), Deference (Def), Order (Ord), Exhibition (Exh),

Autonomy (Aut), Affiliation (Aff), Intraception (Int), Succorance (Suc),

Dominance (Dom), Abasement (Aba), Nurturance (Nur), Change (Chg),

Endurance (End), Heterosexuality (Het), and Aggression (Agg).[1] The

four primary colors of the Lüscher Color Test (Short Form) are: blue,

yellow, red, and green. The colors are printed on cardboard panels,

3" x 5". The colors are numbered as follows: blue=1, green=2, red=3,

and yellow=4.[2]

<center>DESIGN OF THE STUDY</center>

This study of the relationship between human color preference

and human personality traits is a correlational study, not a truly

experimental one. This study satisfies the following distinctions a

correlational study has from an experimental study: (1) relations

between two or more phenomena that have been observed have been meas-

ured; (2) the time sequence has no particular relevance; (3) causation

is not implied; (4) prediction is possible if the correlation is high

and reliable; and (5) conditions are not directly controllable.[3]

<center>DATA COLLECTION</center>

All fifty subjects were tested at a convenient time in an

isolated study room on the fourth floor of William Allen White Library.

A sign depicting "Testing--Please Do Not Disturb" was taped on the

---

[1]Allen Edwards, The Measurement of Personality Traits by Scales
and Inventories (New York: Holt, Rinehart, & Winston, Inc., 1970), p. 60.

[2]Max Lüscher, The Lüscher Color Test (New York: Random House,
1969), pp. 51-95.

[3]Robert Plutchik, Foundations of Experimental Research (New
York: Harper and Row, 1974), pp. 28-30.

testing room door to discourage distracting disturbances. No names were recorded in reference to any tests administered or any test results recorded.

Each subject was told that his preference for colors would be recorded. Each subject was told to express which of the following four color panels he prefers the most: blue, red, yellow, or green. The expressed color preference was recorded by the examiner at this time. During administration of the four colors, the examiner sat behind the subject and to his right.

After completion of the color preference query, the subject was asked to answer some questions about himself in which he was told there were no right or wrong answers. He was told to read the direction sheet of the E.P.P.S., that he might take as long as he desired, that he might change any answer if he erased the circled letter completely, and that he was to choose the answer which most accurately described himself. Every statement (225 of them) was to be responded to. The Edwards Personal Preference Schedule is a forced choice personality inventory. The examiner left the testing room until notified by the subject that he had answered all of the 225 statements, recorded by either circling an "A" or a "B" on a hand-scored answer sheet for each statement.

Completion of the E.P.P.S. terminated the testing session; all subjects' queries as to "Am I nuts or not?" "Am I normal," or "How do I compare to others?" were answered by the examiner with, "This test does not tell about abnormal behavior; it merely identifies some of your personality traits." No subject was told about any interpretations of his E.P.P.S. or color preference results. All test results remained

in the strictest confidence of the examiner and no discussion of test results between subjects or between subjects and the examiner occurred.

DATA ANALYSIS

Having collected from each of the fifty subjects his color preference choice and one Edwards Personal Preference Schedule answer sheet, form 70-282 AS[1], each color preference choice was recorded in table format (see Appendices A and B), a format that cross-references color choices with E.P.S. raw score test results according to assigned numbers. Each subject's raw score for each personality trait was then converted to a T score by use of Edwards' "T Scores for College Students on the E.P.P.S."[2] Each color preference choice was again recorded in table format (see Appendices C and D), a format that cross references color choices with E.P.P.S. T scores according to assigned numbers. Each subject was assigned a number, #1 to #50, to provide identification for these cross-referencing purposes. The subjects' E.P.P.S. T scores and the subjects' favorite color choices were the necessary data for determining the possible relationship between color preference and personality traits.

The following procedure was executed to score and interpret the E.P.P.S. Each subject's Edwards Personal Preference Schedule answer sheet, numbered #1 to #225 with either answer "A" or "B" encircled with

---

[1] Allen Edwards, Edwards Personal Preference Schedule Manual (New York: The Psychological Corporation, 1959), p. 11.

[2] Ibid., p. 14.

a #2 lead pencil, was hand scored according to the E.P.P.S. Manual

scoring procedures.[1] These procedures included:

Step 1. The template (form #66-322K) was placed over the
answer sheet so that the items printed above the three wide slots
appeared within these slots. Through the three narrow slits run-
ning diagonally across the template, lines were drawn on the
answer sheet (a red colored pencil was used). These lines went
through items 1, 7, 13, 19, 25; 101, 107, 113, 119, 125; 201,
207, 213, 219, and 225. The items crossed out were not to be
counted in obtaining the scores for the personality variables.

Through the three wider openings in the template was traced
the outline of the openings on the answer sheet. These lines
encompassed items 151, 157, 163, 169, 175; 26, 32, 38, 44, 50;
51, 57, 63, 69, and 75. The responses to these items were
included in the raw scores for the personality variables.

Step 2. The number of A's encircled in the first row of
answers on the answer sheet was counted and this number was
recorded at the end of the row in the column labeled "r". The
number of A's encircled in each successive row was counted and
recorded at the end of that row in column "r". In obtaining
these raw scores, any encircled A's in any item that had been
marked out by the diagonal lines drawn in Step 1 were not
counted.

Step 3. The B's encircled in the first column were counted
and this count was recorded in the first (top) row of column "c"
at the right of the answer sheet. The B's encircled in each
successive column were counted and recorded in the successive
rows of column "c". In obtaining these column scores, encircled
B's in any of the items that had been marked out by the diagonal
lines drawn in Step 1 were not counted.

Step 4. When Step 3 had been completed there were 15 numbers
recorded in column "r" and 15 in column "c". The two numbers in
each row of columns "r" and "c" were added and the sums were
recorded in column "s" directly at the right. The numbers
recorded in column "s" were the total raw scores for the 15 per-
sonality variables. The numbers in column "s" were added; this
sum must have equalled 210. If it was not equal to 210, then an
error had been made in the scoring.

In considering interpretation of the E.P.P.S. raw score totals,

each of the fifteen personality variables in the E.P.P.S. was paired

---

[1]Allen Edwards, Edwards Personal Preference Schedule Manual
(New York: The Psychological Corporation, 1959), pp. 7-8.

twice with each of the other variables. If, in each of the comparisons, the subject had chosen the statement for a given variable as being more characteristic of himself than the statements for the other variables, his score on this particular variable would be 28. This was the maximum score that could be obtained for any given personality variable. The two statements comprising each item in the E.P.P.S. were comparable with respect to their social desirability scale values. The higher the score on a particular variable, the more often the subject had chosen the statements for this variable as being descriptive of himself in preference to the statements for the other variables. And the lower the score on a particular variable, the less often the subject had chosen the statements for this variable as being descriptive of himself in preference to the statements for the other variables.

Having followed the procedure for scoring each E.P.P.S. test, the raw score and T score of each subject, referenced by the number assigned him #1 to #50, were recorded for each of the fifteen personality traits measured. Each personality trait raw score and T score was recorded in table format under the following headings for the fifteen measured traits: "Ach" for achievement, "Def" for deference, "Ord" for order, "Exh" for exhibition, "Aut" for autonomy, "Aff" for affiliation, "Int" for Intraception, "Suc" for succorance, "Dom" for dominance, "Aba" for abasement, "Nur" for nurturance; "Chg" for change, "End" for endurance, "Het" for heterosexuality, and "Agg" for aggression. Each subject's most preferred color choice (selected from the blue, green, yellow, or red color panels) was also recorded (see Appendices A, B, C, and D).

The E.P.S. personality trait scores of subjects who had preferred one color were compared with the personality trait scores of subjects who had not chosen that color as their favorite. For example, the scores of those subjects who chose red as their favorite color were compared with the scores of those subjects who did not choose red as their most preferred color.

If the n, or number of cases to be compared, for either "choosers" or "non-choosers" group was unequal (example: the scores of five "red choosers" were compared to the trait scores of forty-five "non-red choosers") then a table of random numbers[1] was used to reduce the larger n to the exact number of cases of the smaller n (from an n of forty-five "red choosers" would be randomly selected a smaller n of five "red choosers" whose trait scores would then be compared). If a previously drawn subject number was selected more than once in the table of random numbers, that number was ignored and the selection process was continued until all different subject numbers had been selected. This process was used to minimize the influence of "unequal-n's" upon the t-test calculations. The t-test was calculated for all personality trait "equal-n" and "unequal-n" score comparisons.

The t-test was used to determine if any significant differences existed between the personality trait scores (15 scores) of those who chose a specific color as opposed to those who did not choose that color as their favorite. The t-test was computed for every personality trait variable for each of the four primary color comparison groups:

---

[1] N. M. Downie and R. W. Heath, Basic Statistical Methods, 4th Edition (New York: Harper and Row, Publishers, 1974), pp. 316-317.

(1) blue choosers/non-blue choosers; (2) green choosers/non-green choosers; (3) yellow choosers/non-yellow choosers; and (4) red choosers/non-red choosers.

A t-table was consulted to determine whether the differences in T score trait totals were significant at the .05 level. This is the Distribution of t Probability Table.[1] Rejection of the null hypothesis was warranted, if for that specific personality trait for the specific color choice/non-choice analyzed, the t-value is larger than that value posted in the table at the .05 level of significance (chances being that 95 times out of 100 that the obtained differences were not just due to sampling error) at the computed degrees of freedom level.

The t-statistic incorporates the following formulas and required statistics[2]:

$$\overline{X} = \frac{\Sigma Xi}{N_X} \qquad \overline{Y} = \frac{\Sigma Yi}{N_Y} \qquad v = N_X + N_Y - 2$$

$$s_X = \frac{\Sigma (Xi - X)^2}{N_X - 1} \qquad s_Y = \frac{\Sigma (Yi - Y)^2}{N_Y - 1}$$

$$t = \frac{\overline{X} - \overline{Y}}{\sqrt{(\frac{1}{N_X} + \frac{1}{N_Y}) \quad \frac{\Sigma (Xi - X)^2 + \Sigma (Yi - Y)^2}{N_X + N_Y - 2}}}$$

---

[1]N. M. Downie and R. W. Heath, <u>Basic Statistical Methods, 4th Edition</u> (New York: Harper and Row, Publishers, 1974), p. 298.

[2]Monroe Calculator Manual, <u>The t-Statistic</u>, #3011N. 1970, p. 1.

where: $\overline{X}$ = mean of X values

$\overline{Y}$ = mean of Y values

s_X = standard deviation of X values

s_Y = standard deviation of Y values

N_X = number of X values

N_Y = number of Y values

$\underline{t}$ = $\underline{t}$-statistic

v = number of degrees of freedom

Example: for subjects who chose red: the mean and standard deviation were calculated for each of the fifteen personality traits. For subjects who did not choose red, the same calculations were computed. The $\underline{t}$-test was then calculated for every personality trait score data between the "choosers/non-choosers" groups of both "equal-n's" and "unequal-n's" to determine if any significant differences existed between the two groups. A total of 60 $\underline{t}$-tests were computed (15 traits x 4 color groups) for each of the "equal-n" and "unequal-n" groups of "chooser/non-chooser" comparisons.

The chi-square test was calculated as an additional statistical analysis of the E.P.P.S. personality trait scores for all four color groups for all "equal-n" and "unequal-n" choosers/non-choosers. The chi-square test is one of the more powerful non-parametric statistical tools that is used to analyze data. The value of chi-square is determined on the basis of the number of responses (observed frequencies) as compared to the number of expected responses (expected frequencies).

The formula used for calculating the value of chi-square is:

$$\chi^2 = \Sigma \frac{(O_f - E_f)^2}{E_f}$$

where, Σ = summation operator,

O_f = observed frequencies, and

E_f = expected frequencies.

The observed frequencies (O_f) are simply based upon the total number of respondents in each category. The expected frequencies (E_f) for each cell are calculated on the basis of the row sums times the column sums divided by the total number of respondents (N), or

E_f = (row sum) (column sum)/N.

In testing the null hypothesis, the value obtained for chi-square is tested against a chi-square table.[1] In reading from a chi-square table, the degrees of freedom must be considered. The degrees of freedom are calculated by taking the number of rows minus one times the number of columns minus one, or, df = (r-1) (c-1).[2] The O_f figure, observed frequencies, for this analysis was that number of subjects whose T score (based upon their raw score for a specific personality trait) was equal to or greater than a T score of 60 as opposed to that number of subjects whose raw score fell at a T score of less than 60 (O_f), regardless of whether these subjects were "color choosers" or "non-color choosers". The T score of 60 demarcation represents a statistical separation the Edwards' test endorses between "average" and "high" descriptions.[3] Each subject's raw score for a specific

---

[1] N. M. Downie and R. W. Heath, <u>Basic Statistical Methods, 4th Edition</u> (New York: Harper and Row, Publishers, 1974), p. 299.

[2] Ibid., p. 164.

[3] Allen Edwards, <u>Edwards Personal Preference Schedule Manual</u> (New York: The Psychological Corporation, 1959), p. 15.

personality trait was converted to a T score based upon the Edwards'

"T Scores for College Students on the E.P.S.".[1]

For this study the .05 level of significance was selected to test the null hypothesis. This may be interpreted as dependent upon whether the statistic (sample fact) fell within the established critical region or not. In general, if the obtained value of chi-square is greater than or equal to the tabled value of chi-square at the .05 level of significance, chances will be that ninety-five times out of one hundred the large obtained value of chi-square was not just due to sampling error. Based on this criterion, the obtained value of chi-square being significantly larger than expected, rejection of the null hypothesis was warranted.

The contingency coefficient was also calculated for each chi-square. The contingency coefficient is an index of measurement that is used to determine the degree of relationship that exists between the independent and dependent variables. The magnitude of chi-square is a function used in the determination of the contingency coefficient. The contingency coefficient formula is:

$$C = \sqrt{\frac{\chi^2}{N + \chi^2}}$$

where, χ^2 = obtained value of chi-square, and,

N = total number of respondents to each individual item.

For interpretation of the meaning of the contingency coefficient values, the comparison is analogous to obtaining a Pearson Product-Moment

---

[1]Ibid., p. 14.

Coefficient of Correlation (r). Like Pearson's r, the degree of

relationship between the independent and dependent variables can be

obtained.[1]

_____

[1]N. M. Downie and R. W. Heath, Basic Statistical Methods, 4th Edition (New York: Harper and Row, Publishers, 1974), p. 194.

Chapter 4

ANALYSIS OF DATA

This chapter includes the presentation of the statistical
analysis of the subjects' responses to the Edwards Personal Preference
Schedule and the color preferences to the four primary color panels
taken from the Short Form Lüscher Color Test: blue, green, red, and
yellow. The t-test, chi-square test, and contingency coefficient were
used to analyze the test score responses. Chi-square and t-test summary
tables are presented in this section, one summary table for all t-test
and chi-square calculations (discussed in Data Analysis--Chapter 3)
for "unequal-n's" and "equal-n's" of each of the four color groups.

STATISTICAL ANALYSIS

This section includes the statistically analyzed responses to
the E.P.S. test and the color preference query made by the fifty sub-
jects. The t-test was selected to determine if significant differences
occurred on E.P.P.S. personality trait scores between those students who
chose a specific color as their most preferred color and those students
who did not choose that same specific color as their most preferred
color. Color preferences were offered to the four primary color panels
of the Lüscher Color Test (Short Form): blue, yellow, red, and green.
The formula and computation of the t-test have been discussed in the
Data Analysis section of Chapter 3 (p. 40). A t-table was used to
determine whether the differences in E.P.P.S. raw score trait totals

were significant at the .05 level of significance, according to the
number of degrees of freedom utilized. The chi-square and contingency
coefficient were also computed for all comparisons.

Included in this section are the t-test and chi-square values
calculated to test the null hypothesis. The null hypothesis was: that
there was no significant difference between the fifteen personality
traits, as measured by the E.P.P.S., of college students who preferred
a specific primary color, as used in the Short Form Lüscher Color Test,
and those students who did not choose that same color as their most
preferred color.

The data analysis in this study was divided into two sections:
(1) t-test and chi-square personality trait score calculations for
randomized "equal-n's", and (2) t-test and chi-square personality
trait score calculations for "unequal-n's". In order, for each color
group compared, are a t-test result table, first, and second, a chi-
square result table. There is a summary table for each of the t-test
and chi-square test results for each of the four colors. The sixteen
following tables (see Tables 1-16) present personality trait score
differences between "choosers/non-choosers" of a color. It should be
noted that it remains in the researcher's favor that significant dif-
ferences in the personality trait scores could have been found due to
chance because of the large number of t-tests computed.

Table 1

Means, Standard Deviations, and t-Values From the Comparison of E.P.P.S.
Scores for Equal Numbers of "Blue Choosers/Non-Blue Choosers"
on All 15 E.P.P.S. Personality Traits (n=23)

Personality trait		Mean score	Standard deviation	t-value	df	p - Level of significance
Ach	Blue =	50.522	10.206			
	Non-Blue =	51.217	12.240	0.209	44.000	NS*
Def	Blue =	53.391	10.731			
	Non-Blue =	51.478	11.476	0.583	44.000	NS
Ord	Blue =	60.434	11.707			
	Non-Blue =	55.695	14.778	1.205	44.000	NS
Exh	Blue =	51.695	9.426			
	Non-Blue =	47.260	10.673	1.493	44.000	NS
Aut	Blue =	53.826	9.684			
	Non-Blue =	49.956	7.522	1.513	44.000	NS
Aff	Blue =	48.782	10.383			
	Non-Blue =	49.391	10.590	0.196	44.000	NS
Int	Blue =	48.391	5.694			
	Non-Blue =	49.652	12.687	0.434	44.000	NS
Suc	Blue =	51.565	10.040			
	Non-Blue =	54.826	11.788	1.009	44.000	NS
Dom	Blue =	43.173	8.663			
	Non-Blue =	41.826	10.200	0.482	44.000	NS
Aba	Blue =	47.397	7.924			
	Non-Blue =	53.434	7.721	2.619	44.000	p < .05**
Nur	Blue =	48.913	10.090			
	Non-Blue =	51.304	12.740	0.705	44.000	NS
Chg	Blue =	48.391	13.220			
	Non-Blue =	48.304	9.197	0.025	44.000	NS
End	Blue =	53.869	9.478			
	Non-Blue =	51.260	10.050	0.905	44.000	NS
Het	Blue =	45.956	12.334			
	Non-Blue =	47.347	13.367	0.366	44.000	NS
Agg	Blue =	48.826	8.183			
	Non-Blue =	50.173	9.916	0.502	44.000	NS

*NS--Non-significant

**A t-value greater than or equal to 2.017 was needed to reject
the null hypothesis at the .05 level of significance. Since the t-
value of 2.619 was greater than 2.017, rejection of the null hypothesis
was warranted.

Table 2

Chi-Square and Contingency Coefficient Values From the Comparison of
E.P.P.S. Scores for Equal Numbers of "Blue Choosers/Non-Blue
Choosers" on All 15 Personality Traits (n=23)

Personality trait	Chi-square value	df	p - Level of significance	C-value contingency coefficient
Ach	0.168	1	NS*	0.057
Def	0.511	1	NS	0.100
Ord	0.353	1	NS	0.083
Exh	0.168	1	NS	0.057
Aut	1.243	1	NS	0.155
Aff	1.095	1	NS	0.146
Int	4.212	1	$p < .05$**	0.278
Suc	2.044	1	NS	0.198
Dom	0.000	1	NS	0.000
Aba	6.768	1	$p < .01$**	0.345
Nur	2.044	1	NS	0.198
Chg	2.421	1	NS	0.214
End	0.000	1	NS	0.000
Het	0.138	1	NS	0.052
Agg	1.243	1	NS	0.155

*NS--Non-significant

**A chi-square value greater than or equal to 3.841 was
needed to reject the null hypothesis at the .05 level of significance.
Since the chi-square values of 4.212 and 6.768 were greater than
3.841, rejection of the null hypothesis was warranted.

Table 3

Means, Standard Deviations, and t-Values From the Comparison of E.P.P.S.
Scores for Equal Numbers of "Green Choosers/Non-Green Choosers"
on All 15 E.P.P.S. Personality Traits (n=9)

Personality trait		Mean score	Standard deviation	t-value	df	p - Level of significance
Ach	Green =	44.777	11.638			
	Non-Green =	50.666	10.965	1.104	16.000	NS*
Def	Green =	57.777	10.929			
	Non-Green =	51.333	11.979	1.192	16.000	NS
Ord	Green =	52.222	13.358			
	Non-Green =	56.888	11.151	0.804	16.000	NS
Exh	Green =	45.111	12.574			
	Non-Green =	48.222	11.311	0.551	16.000	NS
Aut	Green =	45.555	7.316			
	Non-Green =	55.333	5.338	3.238	16.000	p < .01**
Aff	Green =	52.777	8.842			
	Non-Green =	47.222	11.519	1.147	16.000	NS
Int	Green =	55.555	10.137			
	Non-Green =	48.666	11.124	1.373	16.000	NS
Suc	Green =	56.555	11.780			
	Non-Green =	50.000	12.338	1.152	16.000	NS
Dom	Green =	39.222	9.523			
	Non-Green =	44.000	7.648	1.173	16.000	NS
Aba	Green =	52.222	9.038			
	Non-Green =	52.111	10.385	0.024	16.000	NS
Nur	Green =	55.222	10.449			
	Non-Green =	43.444	13.191	2.099	16.000	NS
Chg	Green =	49.888	4.196			
	Non-Green =	47.777	11.893	0.502	16.000	NS
End	Green =	52.000	10.747			
	Non-Green =	49.222	9.066	0.592	16.000	NS
Het	Green =	44.555	15.346			
	Non-Green =	61.444	15.191	0.957	16.000	NS
Agg	Green =	50.444	9.180			
	Non-Green =	50.000	11.045	0.092	16.000	NS

*NS--Non-significant

**A t-value greater than or equal to 2.120 was needed to reject
the null hypothesis at the .05 level of significance. Since the t-
value of 3.238 was greater than 2.120, rejection of the null hypothesis
was warranted.

Table 4

Chi-Square and Contingency Coefficient Values From the Comparison of
E.P.S. Scores for Equal Numbers of "Green Choosers/Non-Green
Choosers" on All 15 E.P.P.S. Personality Traits (n=9)

Personality trait	Chi-square value	df	p - Level of significance	C-value contingency coefficient
Ach	1.058	1	NS*	0.143
Def	0.276	1	NS	0.074
Ord	0.276	1	NS	0.074
Exh	0.000	1	NS	0.000
Aut	2.250	1	NS	0.207
Aff	2.250	1	NS	0.207
Int	0.276	1	NS	0.074
Suc	0.276	1	NS	0.074
Dom	0.000	1	NS	0.000
Aba	0.000	1	NS	0.000
Nur	3.600	1	NS	0.259
Chg	1.058	1	NS	0.143
End	1.285	1	NS	0.158
Het	0.276	1	NS	0.074
Agg	0.000	1	NS	0.000

*NS--Non-significant.

Table 5

Means, Standard Deviations, and t-Values From the Comparison of E.P.P.S.
Scores for Equal Numbers of "Red Choosers/Non-Red Choosers"
on All 15 E.P.P.S. Personality Traits (n=10)

Personality trait		Mean score	Standard deviation	t-value	df	p - Level of significance
Ach	Red =	54.700	11.195			
	Non-Red =	51.700	7.588	0.703	18.000	NS*
Def	Red =	47.900	11.560			
	Non-Red =	54.900	10.846	1.396	18.000	NS
Ord	Red =	56.300	17.352			
	Non-Red =	57.600	17.447	0.167	18.000	NS
Exh	Red =	50.300	10.349			
	Non-Red =	46.100	9.468	0.946	18.000	NS
Aut	Red =	53.900	5.915			
	Non-Red =	46.500	10.135	1.994	18.000	NS
Aff	Red =	45.900	11.327			
	Non-Red =	46.900	12.041	0.191	18.000	NS
Int	Red =	44.800	10.042			
	Non-Red =	49.900	8.504	1.225	18.000	NS
Suc	Red =	55.500	13.116			
	Non-Red =	51.800	11.083	0.681	18.000	NS
Dom	Red =	43.400	8.656			
	Non-Red =	38.500	9.264	1.222	18.000	NS
Aba	Red =	54.300	6.360			
	Non-Red =	46.300	6.583	2.763	18.000	p < .05**
Nur	Red =	49.200	13.595			
	Non-Red =	48.000	12.083	0.208	18.000	NS
Chg	Red =	50.200	10.141			
	Non-Red =	54.700	9.933	1.002	18.000	NS
End	Red =	49.300	10.750			
	Non-Red =	51.000	9.865	0.368	18.000	NS
Het	Red =	45.000	10.593			
	Non-Red =	42.400	16.072	0.427	18.000	NS
Agg	Red =	53.900	8.517			
	Non-Red =	45.500	7.382	2.356	18.000	p < .05**

*NS--Non-significant

**A t-value greater than or equal to 2.101 was needed to reject
the null hypothesis at the .05 level of significance. Since the t-
values of 2.763 and 2.356 were greater than 2.101, rejection of the
null hypothesis was warranted.

Table 6

Chi-Square and Contingency Coefficient Values From the Comparison of
E.P.S. Scores for Equal Numbers of "Red Choosers/Non-Red
Choosers" on All 15 E.P.P.S. Personality Traits (n=10)

Personality trait	Chi-square value	df	p - Level of significance	C-value contingency coefficient
Ach	0.392	1	NS*	0.088
Def	0.266	1	NS	0.072
Ord	0.000	1	NS	0.000
Exh	0.392	1	NS	0.088
Aut	0.000	1	NS	0.000
Aff	0.000	1	NS	0.000
Int	0.392	1	NS	0.088
Suc	0.000	1	NS	0.000
Dom	0.000	1	NS	0.000
Aba	3.529	1	NS	0.256
Nur	1.250	1	NS	0.156
Chg	0.000	1	NS	0.000
End	1.250	1	NS	0.156
Het	0.000	1	NS	0.000
Agg	5.000	1	$p < .05$**	0.301

*NS--Non-significant

**A chi-square value greater than or equal to 3.841 was
needed to reject the null hypothesis at the .05 level of significance.
Since the chi-square value of 5.000 was greater than 3.841, rejection
of the null hypothesis was warranted.

Table 7

Means, Standard Deviations, and t-Values From the Comparison of E.P.P.S.
Scores for Equal Numbers of "Yellow Choosers/Non-Yellow Choosers"
on All 15 E.P.P.S. Personality Traits (n=4)

Personality trait		Mean score	Standard deviation	t-value	df	p - Level of significance
Ach	Yellow =	57.000	12.328			
	Non-Yellow =	57.750	10.436	0.092	6.000	NS*
Def	Yellow =	46.250	6.946			
	Non-Yellow =	60.500	8.962	2.513	6.000	p < .05**
Ord	Yellow =	62.000	11.489			
	Non-Yellow =	53.000	19.949	0.781	6.000	NS
Exh	Yellow =	44.500	6.137			
	Non-Yellow =	53.250	9.810	1.512	6.000	NS
Aut	Yellow =	50.000	7.571			
	Non-Yellow =	49.250	10.307	0.117	6.000	NS
Aff	Yellow =	50.500	5.066			
	Non-Yellow =	53.500	9.712	0.547	6.000	NS
Int	Yellow =	48.500	20.469			
	Non-Yellow =	49.750	9.604	0.110	6.000	NS
Suc	Yellow =	49.250	8.995			
	Non-Yellow =	49.250	9.178	0.000	6.000	NS
Dom	Yellow =	43.750	16.214			
	Non-Yellow =	45.250	8.015	0.165	6.000	NS
Aba	Yellow =	54.000	9.521			
	Non-Yellow =	38.750	6.601	2.632	6.000	p < .05**
Nur	Yellow =	47.750	17.576			
	Non-Yellow =	49.000	11.445	0.166	6.000	NS
Chg	Yellow =	40.500	12.662			
	Non-Yellow =	51.250	8.057	1.432	6.000	NS
End	Yellow =	54.500	7.593			
	Non-Yellow =	59.750	15.217	0.617	6.000	NS
Het	Yellow =	59.500	10.344			
	Non-Yellow =	52.000	14.899	0.826	6.000	NS
Agg	Yellow =	40.250	10.045			
	Non-Yellow =	48.000	7.071	1.261	6.000	NS

*NS--Non-significant

**A t-value greater than or equal to 2.447 was needed to reject
the null hypothesis at the .05 level of significance. Since the t-
values of 2.513 and 2.632 were greater than 2.447, rejection of the null
hypothesis was warranted.

Table 8

Chi-square and Contingency Coefficient Values From the Comparison of
E.P.S. Scores for Equal Numbers of "Yellow Choosers/Non-Yellow
Choosers" on All 15 E.P.S. Personality Traits (n=4)

Personality trait	Chi-square value	df	p - Level of significance	C-value contingency coefficient
Ach	0.000	1	NS*	0.000
Def	2.666	1	NS	0.224
Ord	2.000	1	NS	0.196
Exh	1.142	1	NS	0.149
Aut	0.000	1	NS	0.000
Aff	1.142	1	NS	0.149
Int	0.533	1	NS	0.102
Suc	1.142	1	NS	0.149
Dom	0.000	1	NS	0.000
Aba	2.666	1	NS	0.224
Nur	0.000	1	NS	0.000
Chg	1.142	1	NS	0.149
End	0.000	1	NS	0.000
Het	0.533	1	NS	0.102
Agg	0.000	1	NS	0.000

*NS--Non-significant

Table 9

Means, Standard Deviations, and t-Values From the Comparison of E.P.P.S.
Scores for Unequal Numbers of "Blue Choosers/Non-Blue Choosers" on
All 15 E.P.P.S. Personality Traits (n Blue=27; n Non-Blue=23)

Personality trait		Mean score	Standard deviation	t-value	df	p - Level of significance
Ach	Blue =	51.407	9.644			
	Non-Blue =	51.217	12.239	0.061	48.000	NS*
Def	Blue =	53.037	11.366			
	Non-Blue =	51.478	11.476	0.481	48.000	NS
Ord	Blue =	59.111	11.653			
	Non-Blue =	55.695	14.778	0.913	48.000	NS
Exh	Blue =	51.629	9.515			
	Non-Blue =	47.260	10.673	1.529	48.000	NS
Aut	Blue =	52.703	9.610			
	Non-Blue =	49.956	7.522	1.110	48.000	NS
Aff	Blue =	49.296	10.957			
	Non-Blue =	49.391	10.590	0.031	48.000	NS
Int	Blue =	47.555	5.879			
	Non-Blue =	49.652	12.687	0.768	48.000	NS
Suc	Blue =	52.407	9.993			
	Non-Blue =	54.826	11.788	0.785	48.000	NS
Dom	Blue =	42.370	8.705			
	Non-Blue =	42.695	11.752	0.112	48.000	NS
Aba	Blue =	46.185	8.227			
	Non-Blue =	53.434	7.721	3.193	48.000	p <.01**
Nur	Blue =	48.592	9.888			
	Non-Blue =	51.304	12.945	0.838	48.000	NS
Chg	Blue =	48.592	12.363			
	Non-Blue =	48.304	9.197	0.092	48.000	NS
End	Blue =	53.851	8.925			
	Non-Blue =	51.260	10.050	0.965	48.000	NS
Het	Blue =	47.333	12.670			
	Non-Blue =	47.347	13.367	0.003	48.000	NS
Agg	Blue =	48.814	8.983			
	Non-Blue =	50.173	9.916	0.508	48.000	NS

*NS--Non-significant

**A t-value greater than or equal to 2.013 was needed to reject
the null hypothesis at the .05 level of significance. Since the t-
value of 3.193 was greater than 2.013, rejection of the null hypothesis
was warranted.

Table 10

Chi-square and Contingency Coefficient Values From the Comparison of
E.P.S. Scores for Unequal Numbers of "Blue Choosers/Non-Blue
Choosers" on All 15 E.P.S. Personality Traits
(n Blue = 27; n Non-Blue = 23)

Personality trait	Chi-square value	df	p - Level of significance	C-value contingency coefficient
Ach	0.032	1	NS*	0.025
Def	1.019	1	NS	0.141
Ord	0.143	1	NS	0.053
Exh	0.277	1	NS	0.074
Aut	0.708	1	NS	0.118
Aff	0.438	1	NS	0.093
Int	5.168	1	$p < .05$**	0.306
Suc	0.966	1	NS	0.137
Dom	0.000	1	NS	0.000
Aba	8.127	1	$p < .01$**	0.373
Nur	2.898	1	NS	0.234
Chg	1.690	1	NS	0.180
End	0.000	1	NS	0.000
Het	0.144	1	NS	0.053
Agg	1.877	1	NS	0.190

*NS--Non-significant

**A chi-square value greater than or equal to 3.841 was needed
to reject the null hypothesis at the .05 level of significance. Since
the chi-square values of 5.168 and 8.127 were greater than 3.841,
rejection of the null hypothesis was warranted.

Table 11

Means, Standard Deviations, and t-Values From the Comparison of E.P.P.S.
Scores for Unequal Numbers of "Green Choosers/Non-Green Choosers" on
All 15 E.P.P.S. Personality Traits (n Green=9; n Non-Green=41)

Personality trait		Mean score	Standard deviation	t-value	df	p - Level of significance
Ach	Green =	44.777	11.638			
	Non-Green =	52.804	10.166	2.091	48.000	p < .05**
Def	Green =	57.777	10.929			
	Non-Green =	51.365	11.423	1.535	48.00	NS*
Ord	Green =	52.222	13.358			
	Non-Green =	58.707	12.983	1.350	48.000	NS
Exh	Green =	45.111	12.574			
	Non-Green =	50.609	9.499	1.482	48.000	NS
Aut	Green =	45.555	7.316			
	Non-Green =	52.731	8.561	2.329	48.000	p < .05**
Aff	Green =	52.777	8.842			
	Non-Green =	48.585	10.552	1.107	48.000	NS
Int	Green =	55.555	10.137			
	Non-Green =	46.975	8.844	2.569	48.000	p < .05**
Suc	Green =	56.555	11.780			
	Non-Green =	52.853	11.130	0.894	48.000	NS
Dom	Green =	39.222	9.523			
	Non-Green =	42.268	9.362	0.881	48.000	NS
Aba	Green =	52.222	9.038			
	Non-Green =	48.926	8.646	1.027	48.000	NS
Nur	Green =	55.222	10.449			
	Non-Green =	48.658	11.334	1.593	48.000	NS
Chg	Green =	49.888	4.196			
	Non-Green =	48.195	11.897	0.418	48.000	NS
End	Green =	52.000	10.747			
	Non-Green =	52.804	9.529	0.224	48.000	NS
Het	Green =	44.555	15.346			
	Non-Green =	47.951	12.385	0.713	48.000	NS
Agg	Green =	50.444	9.180			
	Non-Green =	49.219	8.830	0.374	48.000	NS

*NS--Non-significant

**A t-value greater than or equal to 2.013 was needed to reject
the null hypothesis at the .05 level of significance. Since the t-
values of 2.091, 2.329, and 2.569 were greater than 2.013, rejection of
the null hypothesis was warranted.

Table 12

Chi-square and Contingency Coefficient Values From the Comparison of
E.P.S. Scores for Unequal Numbers of "Green Choosers/Non-Green
Choosers" on All 15 E.P.S. Personality Traits
(n Green = 9; n Non-Green = 41)

Personality trait	Chi-square value	df	p - Level of significance	C-value contingency coefficient
Ach	1.786	1	NS*	0.185
Def	0.081	1	NS	0.040
Ord	1.762	1	NS	0.184
Exh	0.195	1	NS	0.062
Aut	2.409	1	NS	0.214
Aff	3.016	1	NS	0.238
Int	3.407	1	NS	0.252
Suc	0.524	1	NS	0.101
Dom	0.000	1	NS	0.000
Aba	1.748	1	NS	0.183
Nur	1.219	1	NS	0.154
Chg	2.090	1	NS	0.200
End	0.306	1	NS	0.077
Het	0.033	1	NS	0.025
Agg	0.132	1	NS	0.051

*NS--Non-significant.

Table 13

Means, Standard Deviations, and _t_-Values From the Comparison of E.P.P.S.
Scores for Unequal Numbers of "Red Choosers/Non-Red Choosers" on
All 15 E.P.P.S. Personality Traits (n Red=10; n Non-Red=40)

Personality trait		Mean score	Standard deviation	t-value	df	p - Level of significance
Ach	Red =	54.700	11.195			
	Non-Red =	50.475	10.674	1.109	48.000	NS*
Def	Red =	47.900	11.560			
	Non-Red =	53.425	11.139	1.392	48.000	NS
Ord	Red =	56.300	17.352			
	Non-Red =	57.850	12.143	0.330	48.000	NS
Exh	Red =	50.300	10.349			
	Non-Red =	49.450	10.288	0.233	48.000	NS
Aut	Red =	53.900	5.915			
	Non-Red =	50.825	9.267	0.995	48.000	NS
Aff	Red =	45.900	11.327			
	Non-Red =	50.200	10.008	1.184	48.000	NS
Int	Red =	44.800	10.042			
	Non-Red =	49.450	9.356	1.386	48.000	NS
Suc	Red =	55.500	13.116			
	Non-Red =	53.025	10.289	0.643	48.000	NS
Dom	Red =	43.400	8.514			
	Non-Red =	41.300	9.961	0.611	48.000	NS
Aba	Red =	54.300	6.360			
	Non-Red =	48.325	8.879	1.996	48.000	NS
Nur	Red =	49.200	13.595			
	Non-Red =	50.000	10.933	0.197	48.000	NS
Chg	Red =	45.200	17.306			
	Non-Red =	48.125	11.101	0.661	48.000	NS
End	Red =	49.300	10.750			
	Non-Red =	53.500	9.309	1.237	48.000	NS
Het	Red =	45.000	10.593			
	Non-Red =	47.925	13.422	0.639	48.000	NS
Agg	Red =	53.900	8.517			
	Non-Red =	48.325	8.627	1.832	48.000	NS

*NS--Non-significant

Table 14

Chi-square and Contingency Coefficient Values From the Comparison of
E.P.P.S. Scores for Unequal Numbers of "Red Choosers/Non-Red
Choosers" on All 15 E.P.P.S. Personality Traits
(n Red = 10; n Non-Red = 40

Personality trait	Chi-square value	df	p - Level of significance	C-value contingency coefficient
Ach	0.373	1	NS*	0.086
Def	0.109	1	NS	0.046
Ord	0.022	1	NS	0.020
Exh	0.148	1	NS	0.054
Aut	0.033	1	NS	0.025
Aff	1.086	1	NS	0.145
Int	0.166	1	NS	0.057
Suc	0.246	1	NS	0.069
Dom	0.000	1	NS	0.000
Aba	0.781	1	NS	0.124
Nur	0.781	1	NS	0.124
Chg	0.148	1	NS	0.054
End	1.663	1	NS	0.179
Het	0.781	1	NS	0.124
Agg	4.098	1	$p < .05$**	0.275

*NS-non-significant
**A chi-square value greater than or equal to 3.841 was needed
to reject the null hypothesis at the .05 level of significance. Since
the chi-square value of 4.098 was greater than 3.841, rejecting of the
null hypothesis was warranted.

Table 15

Means, Standard Deviations, and t-Values From the Comparison of E.P.P.S.
Scores for Unequal Numbers of "Yellow Choosers/Non-Yellow Choosers" on
All 15 E.P.P.S. Personality Traits (n Yellow=4; n Non-Yellow=46)

Personality trait		Mean score	Standard deviation	t-value	df	p - Level of significance
Ach	Yellow =	57.000	12.328			
	Non-Yellow =	50.826	10.665	1.099	48.000	NS*
Def	Yellow =	46.250	6.946			
	Non-Yellow =	53.282	11.869	1.160	48.000	NS
Ord	Yellow =	62.000	11.489			
	Non-Yellow =	57.152	13.331	0.703	48.000	NS
Exh	Yellow =	44.500	6.137			
	Non-Yellow =	50.065	10.403	1.047	48.000	NS
Aut	Yellow =	50.000	7.571			
	Non-Yellow =	51.565	8.893	0.340	48.000	NS
Aff	Yellow =	50.500	5.066			
	Non-Yellow =	49.239	10.673	0.232	48.000	NS
Int	Yellow =	48.500	20.469			
	Non-Yellow =	48.521	8.975	0.004	48.000	NS
Suc	Yellow =	49.250	8.995			
	Non-Yellow =	54.326	10.625	0.924	48.000	NS
Dom	Yellow =	43.750	16.214			
	Non-Yellow =	40.847	8.704	0.595	48.000	NS
Aba	Yellow =	54.000	9.521			
	Non-Yellow =	49.130	8.647	1.073	48.000	NS
Nur	Yellow =	47.750	17.576			
	Non-Yellow =	50.021	10.939	0.380	48.000	NS
Chg	Yellow =	40.500	12.662			
	Non-Yellow =	49.021	10.961	1.476	48.000	NS
End	Yellow =	54.500	7.593			
	Non-Yellow =	52.500	9.858	0.394	48.000	NS
Het	Yellow =	59.500	10.344			
	Non-Yellow =	46.282	12.597	2.033	48.000	p < .05**
Agg	Yellow =	40.250	10.045			
	Non-Yellow =	50.239	8.345	2.264	48.000	p < .05**

*NS--Non-significant

**A t-value greater than or equal to 2.013 was needed to reject
the null hypothesis at the .05 level of significance. Since the t-
values of 2.033 and 2.264 were greater than 2.013, rejection of the
null hypothesis was warranted.

Table 16

Chi-square and Contingency Coefficient Values From the Comparison of
E.P.S. Scores for Unequal Numbers of "Yellow Choosers/Non-Yellow
Choosers" on All 15 E.P.S. Personality Traits
(n Yellow = 4; n Non-Yellow = 46)

Personality trait	Chi-square value	df	p - Level of significance	C-value contingency coefficient
Ach	0.436	1	NS*	0.092
Def	1.690	1	NS	0.180
Ord	1.943	1	NS	0.193
Exh	0.828	1	NS	0.127
Aut	0.144	1	NS	0.053
Aff	0.378	1	NS	0.086
Int	4.680	1	$p < .05$**	0.292
Suc	0.002	1	NS	0.006
Dom	0.000	1	NS	0.000
Aba	3.016	1	NS	0.238
Nur	0.067	1	NS	0.036
Chg	0.707	1	NS	0.118
End	1.301	1	NS	0.159
Het	2.445	1	NS	0.215
Agg	0.954	1	NS	0.136

*NS--Non-significant

**A chi-square value greater than or equal to 3.841 was
needed to reject the null hypothesis at the .05 level of significance.
Since the chi-square value of 4.680 was greater than 3.841, rejection
of the null hypothesis was warranted.

The null hypothesis for this study is that there is no significant difference between the fifteen personality traits, as measured by the Edwards Personal Preference Schedule, of college students who preferred a specific primary color, as used in the Short Form Lüscher Color Test, and those students who did not choose that same color as their most preferred color. The fifteen personality trait raw scores for each subject were converted to T scores and compared. A favorite color was selected from the following four colors: blue, green, red, and yellow. The t-tests and chi-squares were computed for unequal numbers of subjects and for randomized equal numbers of subjects. All statistical comparisons were computed by divisions of the four colors selected from.

"Equal-n" comparisons, in which the t-test was computed, depicted a rejection of the null hypothesis for six personality traits in their respective color divisions. All six t-tests were significant at less than the .05 level of significance. The six traits were: (1) Abasement T score comparisons between "blue choosers and non-blue choosers"; (2) Autonomy T score comparisons between "green choosers and non-green choosers"; (3) Abasement T score comparisons between "red choosers and non-red choosers"; (4) Aggression T score comparisons between "red choosers and non-red choosers"; (5) Deference T score comparisons between "yellow choosers and non-yellow choosers"; and (6) Abasement T score comparisons between "yellow choosers and non-yellow choosers".

The chi-square test was used as a second statistical tool to use for detecting significant differences between personality trait score frequencies of the students in the four color divisions. For

"equal-n" comparisons chi-squares were significant at less than the .05 level of significance for three personality traits in their respective color divisions. The three traits were: (1) Intraception score frequency comparisons between "blue choosers and non-blue choosers"; (2) Abasement score frequency comparisons between "blue choosers and non-blue choosers"; and (3) Aggression score frequency comparisons between "red choosers and non-red choosers". There were no significant chi-square values for "green choosers/non-green choosers" comparisons or for "yellow choosers/non-yellow choosers" comparisons.

"Unequal-n" comparisons, in which the t-test was computed, depicted a rejection of the null hypothesis for six personality traits in their respective color divisions. All six t-tests were significant at less than the .05 level of significance. The six traits were: (1) Abasement T score comparisons between "blue choosers and non-blue choosers"; (2) Achievement T score comparisons between "green choosers and non-green choosers"; (3) Autonomy T score comparisons between "green choosers and non-green choosers"; (4) Intraception T score comparisons between "green choosers and non-green choosers"; (5) Heterosexuality T score comparisons between "yellow choosers and non-yellow choosers"; and (6) Aggression T score comparisons between "yellow choosers and non-yellow choosers".

For "unequal-n" trait score frequency comparisons, chi-squares were significant at less than the .05 level of significance for four personality traits in their respective color divisions. The four traits were: (1) Intraception score frequency comparisons between "blue choosers and non-blue choosers"; (2) Abasement score frequency comparisons between "blue choosers and non-blue choosers"; (3) Aggression score

frequency comparisons between "red choosers and non-red choosers"; and (4) Intraception score frequency comparisons between "yellow choosers and non-yellow choosers". There were no significant chi-square values for "green choosers/non-green choosers" comparisons and there were not any significant t-test values for "red choosers/non-red choosers" comparisons.

Chapter 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

In this chapter, the results of this study are discussed. The interpretations derived from the results produced by this research concerning the possible relationship between color preference and personality traits are presented. The recommendations presented are discussed with the intention of promoting suggested improvements in subsequent research similar in design and purpose to this study.

SUMMARY

This study was designed to examine the relationship of color preference to personality traits. To obtain knowledge of each subject's personality traits, a questionnaire-type personality inventory was used: the Edwards Personal Preference Schedule. This forced choice personality inventory includes 210 different pairs of statements from which scores are provided for fifteen personality scales. To assess each subject's most preferred color, the four primary color panels of the Lüscher Color Test (Short Form) were administered and the subject's favorite color was then recorded. The four primary colors are blue, green, red, and yellow. Both the E.P.P.S. personality inventory and the four primary color panels were administered to fifty randomly selected college students who were attending Emporia Kansas State College in the fall semester of 1975.

The color preference and personality trait score responses were analyzed to determine if there were any significant differences between the personality trait scores of students who preferred one of the four primary colors and the personality trait scores of students who did not prefer that same primary color. The primary statistical tool used to analyze the data was the t-test. The t-test was utilized primarily to determine if there were any significant differences between the personality trait scores of "color choosers" as compared to the personality trait scores of "non-color choosers". The chi-square test was then used as a second statistical tool to support or deny previously detected significant relationships between color preference and personality traits. In addition, the contingency coefficient was computed to reflect the degree of the exposed relationships. All t-test and chi-square computations were made for equal numbers of "choosers/non-choosers", using a table of random numbers, and for unequal numbers of "choosers/non-choosers".

CONCLUSIONS

The interpretations made from the results of the personality trait score comparisons computed for "equal-n's" and "unequal-n's" are discussed in the following dichotomous manner: (1) discussion of all t-tests significant at less than the .05 level of significance that were supported by the chi-square test; and (2) discussion of all t-tests significant at less than the .05 level of significance that were not supported by the chi-square test. First, the "equal-n" personality trait score comparisons are analyzed.

Of all personality trait score comparisons that were computed for "equal-n's" of color "choosers/non-choosers", only six t-tests were significant at less than the .05 level of significance. Of these six significant t-tests, only two were also supported by chi-squares that were significant at less than the .05 level of significance. A total of sixty t-tests and sixty chi-squares was computed for "equal-n" comparisons; this data, generally, suggests that only a very limited number of significant relationships were shown to exist between color preferences and personality traits.

The two "equal-n" significant t-tests for which a chi-square test was also significant were of trait score comparisons made for abasement and aggression. "Non-blue choosers" scored significantly higher on the trait abasement than "blue-choosers"; but this does not parallel the mood representation equated with blue as reported by Lüscher (see p. 13). Lüscher reported that blue reflected "depth of feeling" while the remaining non-blue primary colors, green-red-yellow, all represented "strengths of will". Abasement, according to the E.P.P.S., means to feel guilty when one does something wrong, to feel the need for punishment for wrong doing, or to feel inferior to others in most respects.[1] It does not follow logically that the non-blue choosers ("strength of will") would score higher on the personality trait abasement than the blue-choosers. This conflict could have been caused by the age and educational influences of subjects chosen for testing for this study: college students. The second significant

---

[1]Allen Edwards, The Edwards Personal Preference Schedule Manual, Revised (New York: The Psychological Corporation, 1959), p. 11.

_t_-test that was supported by a significant chi-square at less than the .05 level of significance was for those score comparisons computed for the personality trait aggression. Aggression, according to the E.P.P.S., means to criticize others publicly, to get revenge for insults, or to become angry.[1] Red-choosers scored significantly higher on the trait aggression than non-red choosers. This relationship parallels the affective association promoted by Lüscher (see p. 13) who related red to "domination". It may be concluded that the Lüscher affective associations to the primary color red were supported by this study, but not for the color blue. The Lüscher "primaries" were used as the color preference hues in this study.

According to Murray's results (see p. 17), blue was associated with the moods "secure and calm"; on the E.P.P.S. blue choosers scored significantly lower on abasement (a tendency towards guilt feelings) than non-blue choosers. These results compliment each other. Murray's study also associated red with the moods "defiance and aggression," identical with the E.P.P.S. results. Choungourian's study (see p. 26) revealed that extroverts preferred "warm" colors while introverts preferred "cool colors slightly more; this study suggested that blue choosers (a "cool" color) were less related to abasement (an introvertive characteristic) than non-blue choosers. Some conflict was exposed here. This study showed that red-choosers (a "warm" color) were more highly related to the trait aggression (an extrovertive characteristic) than non-red choosers. This paralleled Choungourian's results.

---

[1]Ibid.

The absence of a significant chi-square test in support of a significant t-test casts doubts upon the meaning of the significance of that t-test; i.e., that t-test may have therefore been attributed to chance alone due to the large number of t-tests computed. Concerning t-tests that were significant but not also supported by significant chi-squares, the following relationships were exposed: (1) green choosers scored significantly lower on autonomy (to feel free to do what one wants or to do things that are unconventional[1]) than non-green choosers; (2) red choosers and yellow choosers scored significantly higher on abasement (to feel the need for punishment for wrong doing[2]) than non-red choosers and non-yellow choosers respectively; and (3) yellow choosers scored significantly lower on deference (to praise others or to accept the leadership of others[3]) than non-yellow choosers. Lüscher (see p. 13) associated red with the mood "force of will"; it does not follow logically that "force of will" high scorers would also score higher on the E.P.P.S. trait abasement, not necessarily a characteristic of "force of will". Yellow represented "exhilaration" to Lüscher; the trait score comparisons for yellow on abasement supported Lüscher. Green represented "assertion and persistence" to Lüscher; yet green choosers scored lower on autonomy than non-green choosers. A conflict resided in yellow, representing "expectancy" to Lüscher, as yellow choosers scored lower on deference than non-yellow choosers. These E.P.P.S. relationships were not supported by the chi-square test. The function of such chi-square support is to grant validity to the statistical significance of the t-test. It would be

---

[1]Ibid.   [2]Ibid.   [3]Ibid.

concluded that Lüscher's color-mood associations for the colors red, blue, green, and yellow were supported moreso than refuted by the data from this study with the E.P.P.S. Some of the inconsistencies were most likely due to sampling differences and research design.

Murray (see p. 16) associated green with the moods "secure and calm"; this association was supported by the E.P.P.S. results (green choosers scored lower on autonomy than non-green choosers). And Choungourian's results (see p. 26) were largely supported as green (a "cool" color) was less related to autonomy (an extrovertive characteristic) than non-green colors; and deference (an introvertive characteristic) was less related to yellow (warm color) than to the non-yellow colors. But yellow was then more highly related to abasement (an introvertive characteristic) than the non-yellow colors. Again, there are inconsistencies in the color preference/personality trait relationships as exposed by this study and those relationships promoted by other researchers. Basic differences in sampling, research design, and statistics employed could be the cause for such conflicts. Generally, though, this study's results do support some conclusions promoted by the three researchers discussed: Lüscher, Murray, and Choungourian.

"Unequal-n" E.P.P.S. personality trait score comparisons elicited one significant t-test for which there was also a significant chi-square, both significant at less than the .05 level of significance. There were five significant t-tests which were not supported by a significant chi-square. These six significant t-tests were extracted from a total of sixty t-tests and sixty chi-squares computed for "unequal-n" data. The data may imply that very limited relationships were shown to exist between color preference and personality traits.

The personality trait abasement was scored on significantly lower by blue choosers than non-blue choosers. Abasement means to feel the need for punishment for wrong doing or to feel inferior to others in most respects.[1] Lüscher (see p. 13) associated blue with the moods "security and calm"; this study showed just the opposite to occur. This conflict could have been attributed to the influences of the subjects' ages and education, the subjects being college students. Murray (see p. 16) associated blue to "secure"; this is opposite the tendency shown for blue choosers by this study. Choungourian's efforts (see p. 26) to prove that extroverts prefer "warm" colors and introverts prefer "cool" colors were somewhat supported by the E.P.P.S. results for blue/abasement, blue being a "cool" color and abasement being a rather "introvertive characteristic". It would be concluded that the relationship between blue preference and the trait abasement, supported by other research, was not suggested by this study. This conflict could have been attributed to sampling, statistical procedures, and/or research design.

The absence of a significant chi-square test in support of a significant t-test casts doubt upon the meaning of the significance of that t-test; i.e., that t-test may have therefore been attributed to chance alone due to the large number of t-tests computed. The following five color preference/personality trait relationships elicited a significant t-test (significant at less than the .05 level) for which there were no supporting chi-square tests: (1) green choosers scored

---

[1]Edwards, loc. cit.

significantly lower on achievement (to be successful or to accomplish something of great significance[1]) and scored lower on (2) autonomy (to feel free to do what one wants[2]) than non-green choosers; (3) green choosers scored significantly higher on intraception (to analyze one's motives, feelings and to observe others[3]) than non-green choosers; (4) yellow choosers scored significantly higher on heterosexuality (to engage in social activities with the opposite sex or to be in love with members of the opposite sex[4]) than non-yellow choosers; and (5) yellow choosers scored significantly lower on aggression (to get revenge for insults or to become angry[5]) than non-yellow choosers. None of these relationships were supported by the chi-square test.

Lüscher (see p. 13) associated green with "persistence" and this study associates green with the act of analyzing the motives of others; there is some similarity here. A major conflict resides from the fact that this study associates achievement to the non-green colors while Lüscher associated green with "persistence and self-esteem". The non-green colors were associated with autonomy in this study, but Lüscher related green to "persistence and self-assertion". There is some conflict here. Also, Lüscher associated red with "sexuality" but this study "relates" yellow to heterosexuality. Red, to Lüscher, represented "dominance" and this research related all colors but yellow to aggression, which would include red. Basically, the two studies correspond on some color preference/personality trait relationships; but more

---

[1]Ibid.   [2]Ibid.   [3]Ibid.

[4]Ibid.   [5]Ibid.

opposing conflicts exist for the "unequal-n" associations than for the "equal-n" associations.

Murray's results (see p. 16) that associated green to "calm" were somewhat supported by this study's relationship of non-green colors to achievement (not necessarily a calming process) and to autonomy (change may be implied here). This study's relation of green to intraception (a "calming-cool" analysis of others motives) seemed to parallel this general analogy. Murray's yellow was associated with "cheerful" and yellow, in this study, was rarely associated with aggression.

Choungourian's study (see p. 26) that associated extroversion with a preference for "warm" colors and introversion with a preference for "cool" colors was largely supported by this research as the following associations were made: non-blue ("warm") with abasement (introvertive) (some conflict here), non-green ("warm") with achievement (extrovertive), non-green ("warm") with autonomy (extrovertive), green ("cool") with intraception (introvertive), yellow ("warm") with heterosexuality (extrovertive), and non-yellow ("cool") with aggression (extrovertive) (some conflict here). There are some conflicts here but an overview reflects strong support for Choungourian's suggestions. The majority of relationships exposed in this study seemed to support, generally speaking, the associations made between color preference/personality traits by similar research by Lüscher, Murray, and Choungourian.

Inconsistencies occurred between the personality trait score comparisons for t-tests that were significant at less than the .05 level of significance for "equal-n" data and those trait score

comparisons for t-tests significant for the "unequal-n" data. "Equal-n"

significant t-tests included: the trait abasement for the color blue,

aggression for red, autonomy for green, abasement for red and yellow,

and the trait deference for the color yellow. "Unequal-n" significant

t-tests included: the trait abasement for the color blue, achievement

for green, autonomy for green, intraception for green, heterosexuality

for yellow, and the trait aggression for the color yellow. Only two of

the twelve significant t-test color/personality trait relationships

were exposed by both "equal-n" and "unequal-n" data.

The inconsistencies between the "equal-n" and "unequal-n" color

preference/personality trait relationships revealed by this study could

have been attributed to the sacrifice of large numbers of subjects when

the "equal-n" comparisons were computed. Chi-square reinforcements of

significant t-tests varied considerably due to, most probably, the

small number of subjects tested (50). The subjects randomly selected

for "equal-n" comparisons could have had either predominantly high or

predominantly low personality trait scores. It was explained previously

that differences between the color preference/personality trait findings

of this study and other studies were probably due to differences in

research design, statistical methods used, and sample of subjects that

was tested, although the majority of the limited number of color/trait

associations proven to exist, tended to support each other among the

different studies.

RECOMMENDATIONS

It is recommended to other researchers and students of

psychology that the following suggestions be considered:

(1) That any subsequent studies similar in design and purpose to this study be executed with a much larger number of subjects than fifty (as used in this study). This might insure that sufficient numbers of color "choosers" and "non-choosers" would be secured for a more valid and reliable statistical analysis.

(2) That subsequent research similar to this study incorporate the administration of all eight Lüscher Color Test colors, primary plus auxiliary, not only the four primary colors (as this study did). This procedure would enhance any subsequent comparisons of study data with the "color-mood" associations described by the Lüscher Color Test (Short Form).

(3) That the subject pool not only be increased in absolute number, but that the subjects be selected from a more inclusive domain than just college students. This might include students in grade school through the professional graduate schools. It is recommended that subjects from all major socio-economic levels be tested, and that subjects of all ages be tested. Such expansion should debilitate some of the inhibiting effects of a too severely restricted sample size and representation of the general United States population.

(4) That subsequent similar studies test subjects who were extracted from a broader geographical area than the urban-college community area used in this study. This could compensate for and expose possible color preference/personality trait differences due to rural/ urban influences.

(5) That a subsequent study be conducted to examine possible sex differences in color preferences. Much of the data from this study could be used as a comparison guideline for such a study.

(6) That this study be replicated at five-year intervals, using these subjects or others used in a similar initial study, to expose possible differences in both color preferences and personality traits due to the process of aging.

(7) That this study be replicated to examine the specific significant relationships between color preference and personality traits discerned in this study. This recommendation is suggested to offer further supportive evidence (or lack of it) that the significant relationships found in this study were not due to chance alone.

BIBLIOGRAPHY

BIBLIOGRAPHY

Birren, Faber. "Color Preference As a Clue to Personality," Art Psychotherapy, April, 1973, Vol. 1 (1), pp. 13-16.

Burdick, J. Allen. "The Color Pyramid Test: A Critical Evaluation," Journal of Psychology, 1968, 70 (1), pp. 93-97.

Chaplin, James. Dictionary of Psychology. New York: Dell Publishing Co., Inc., 1968. P. 357.

Choungourian, Assador. "Introversion, Extroversion, and Color Preferences," Journal of Projective Techniques and Personality Assessment, 1967, 31 (4), pp. 92-94.

_____. "Extroversion, Neuroticism, and Color Preferences," Perceptual and Motor Skills, 1972 (June), Vol. 34 (3), pp. 724-726.

Colon, Fernando. "A Study of Response to Achromatic and Chromatic Stimuli," Journal of Consulting Psychology, 1965, 29 (6), pp. 571-576.

Crane, Rebecca. "Color Scales In Responses to Emotionally Laden Situations," Journal of Consulting Psychology, 1962, 26 (6), pp. 515-519.

Downie, N. M. and R. W. Heath. Basic Statistical Methods, 4th Edition. New York: Harper and Row, Publishers, 1974. P. 298.

Edwards, Allen L. "The Relationship Between the Judged Desirability of a Trait and the Probability That the Trait Will be Endorsed," Journal of Applied Psychology, 1953, 37 (2), pp. 90-93.

_____. Edwards Personal Preference Schedule Manual. New York: The Psychological Corporation, 1959. P. 6.

_____. "The Relationship Between Social Desirability and Internal Consistency of Personality Scales," Journal of Applied Psychology, 1963, Vol. 47 (4), pp. 255-259.

_____. The Measurement of Personality Traits by Scales and Inventories. New York: Holt, Rinehart, and Winston, Inc., 1970.

Emporia Kansas State College Campus Telephone Directory 1975-76. College Press, Fall, 1975, pp. 1s-28s.

Eysenck, H. J. "A Critical and Experimental Study of Color Preferences," American Journal of Psychology, 1941, Vol. 54, pp. 385-394.

Fine, Bernard J. "Field-Dependence-Independence as 'Sensitivity' of the Nervous System: Supportive Evidence With Color Discrimination," Perceptual and Motor Skills, 1973, Aug. Vol. 37 (1), pp. 287-295.

French, Cheryl. "The Lüscher Color Test: An Investigation of Validity and Underlying Assumptions," Journal of Projective Techniques and Personality Assessment, 1971, 35 (3), pp. 361-365.

Granger, G. W. "An Experimental Study of Color Preferences," Journal of General Psychology, 1955, Vol. 52, pp. 3-20.

Levonian, E. "A Statistical Evaluation of the E.P.P.S.," Journal of Applied Psychology, 1959, Vol. 43, pp. 355-359.

Lüscher, Max. The Lüscher Color Test. New York: Random House, 1969.

Marzolf, Stanley S. "Color in H-T-P Drawings by College Men and Women," Journal of Clinical Psychology, 1971, Oct., Vol. 27 (4), pp. 504-509.

_____. "Personality Traits and Color Choices for H-T-P Drawings," Journal of Clinical Psychology, 1973, April, Vol. 29 (2), pp. 240-245.

Monroe Calculator Manual. The T-Statistic, #2011N, 1970, p. 1.

Murray, David. "Colors and Mood Tones," Journal of Applied Psychology, 1957, Vol. 41, pp. 279-283.

Odbert, H. S. "Studies in Synesthetic Thinking: II. Verbal Associations of Color and Mood," Journal of General Psychology, 1942, 26, pp. 153-173.

Peretti, Peter O. "Color-Mood Associations In Young Adults," Perceptual and Motor Skills, 1974, Oct., Vol. 39 (2), pp. 715-718.

Plutchik, Robert. Foundations of Experimental Research. New York: Harper and Row, 1974.

Riffenburg, Geraldine H. "Responses to Color-Combinations as Indices of Personality Traits," Journal of General Psychology, 1959, 61, pp. 317-322.

Schaie, Warner. "Scaling the Association Between Colors and Mood Tones," American Journal of Psychology, 1961, 74, pp. 266-273.

Spiegel, Don. "Manifest Anxiety, Color Preferences, and Sensorizing Minimizing in College Men and Women," Journal of Clinical Psychology, 1971, July, Vol. 27 (3), pp. 318-321.

Wexner, Lois. "The Degree to Which Colors (Hues) Are Associated with Mood-Tones," Journal of Applied Psychology, 1954, Vol. 38, pp. 432-435.

Wright, Benjamin. "The Meaning of Color," <u>Journal of General Psychology</u>, 1962, 67, pp. 89-99.

Yudin, Lee. "Color and Its Relation to Personality: the TAT," <u>Journal of Projective Techniques and Personality Assessment</u>, 1965, 29 (3), pp. 479-487.

APPENDICES

Recorded E.P.S.S. Raw Scores and Color Preferences (Subjects #1 thru #25)

Assigned Subject #	Sex	Most Preferred Color Choice	The 15 E.P.P.S. Personality Traits														
			Ach	Def	Ord	Exh	Aut	Aff	Int	Suc	Dom	Aba	Nur	Chg	End	Het	Agg
			Raw Scores														
1	M	Green	17	11	5	22	11	17	17	16	18	7	16	16	8	15	14
2	M	Red	17	16	20	17	15	15	14	7	7	17	14	18	13	17	3
3	M	Red	16	11	8	12	13	16	17	16	16	11	21	19	9	15	10
4	M	Green	16	14	13	8	15	18	15	20	18	12	13	16	14	9	9
5	M	Red	15	5	7	19	17	17	9	13	14	14	9	22	16	17	16
6	M	Blue	19	12	9	14	16	14	17	11	18	6	9	20	13	19	13
7	M	Blue	12	13	8	14	22	14	19	13	10	10	16	23	11	18	7
8	M	Blue	11	9	11	12	17	14	15	21	14	14	17	13	13	15	14
9	M	Blue	18	11	12	20	15	16	14	14	18	9	14	16	12	10	11
10	M	Blue	18	11	10	22	12	18	14	10	19	8	13	19	13	12	11
11	M	Green	12	9	9	17	10	13	23	11	12	18	19	13	9	23	12
12	M	Green	7	21	13	14	6	13	11	24	16	17	15	13	17	5	18
13	F	Green	17	13	8	9	15	23	21	7	8	18	23	14	13	12	9
14	M	Blue	22	13	23	14	20	5	19	8	7	14	9	8	22	12	14
15	M	Yellow	12	13	16	14	12	17	25	8	5	17	24	11	18	18	0
16	M	Blue	21	7	15	14	22	15	17	4	12	11	13	15	11	23	10
17	M	Blue	14	17	23	16	8	15	12	15	9	21	11	8	16	17	8
18	M	Blue	19	22	21	12	12	14	10	13	21	6	15	7	23	3	12
19	M	Red	12	8	3	16	13	18	19	13	17	12	17	20	8	24	10
20	M	Blue	17	12	17	16	15	19	13	12	15	8	17	14	9	10	16
21	F	Green	14	14	19	11	11	22	15	13	3	22	15	18	21	7	5
22	F	Red	11	12	13	13	14	17	9	13	14	18	26	22	6	7	15
23	F	Red	16	10	6	16	14	18	23	15	17	11	11	12	10	15	16
24	F	Red	17	11	23	10	18	9	10	19	6	17	14	15	14	14	13
25	F	Blue	20	18	17	13	13	15	15	15	14	7	19	8	19	3	14

Recorded E.P.P.S. Raw Scores and Color Preferences (Subjects #26 thru #50)

Assigned Subject #	Sex	Most Preferred Color Choice	The 15 E.P.P.S. Personality Traits														
			Ach	Def	Ord	Exh	Aut	Aff	Int	Suc	Dom	Aba	Nur	Chg	End	Het	Agg
									Raw Scores								
26	F	Blue	15	13	14	11	9	18	17	14	12	13	20	9	16	14	15
27	F	Yellow	22	11	21	9	12	15	4	18	17	12	16	5	12	26	10
28	M	Blue	10	15	9	18	14	13	15	14	14	14	17	12	12	18	15
29	M	Blue	12	10	8	10	19	23	11	17	18	3	19	16	12	24	8
30	F	Blue	13	14	18	20	17	10	12	10	15	8	5	25	11	28	4
31	F	Green	13	15	11	9	11	12	26	15	4	13	12	18	18	26	7
32	F	Red	21	6	8	12	17	16	13	14	14	20	11	16	12	15	15
33	F	Blue	12	19	22	11	12	18	17	12	8	13	19	14	20	3	10
34	M	Green	13	20	20	12	12	16	20	11	8	13	17	16	19	5	8
35	F	Blue	11	14	12	17	12	11	15	6	8	13	11	21	23	19	17
36	F	Blue	13	15	11	15	14	19	16	16	7	17	16	6	7	24	14
37	F	Yellow	16	11	9	14	10	19	14	12	8	22	13	20	11	22	9
38	F	Blue	13	9	9	17	14	15	23	9	8	17	23	18	12	13	10
39	M	Green	5	13	3	11	15	19	26	12	14	8	26	19	4	20	15
40	F	Blue	8	9	8	10	13	18	17	11	7	16	19	22	21	19.	12
41	F	Blue	9	17	13	14	9	21	17	21	9	12	16	23	7	15	7
42	F	Blue	17	10	15	8	14	21	20	12	15	19	14	10	14	12	9
43	F	Blue	10	4	10	17	10	24	18	21	3	13	21	14	16	20	9
44	F	Yellow	17	8	16	12	17	17	23	9	18	14	7	13	19	15	5
45	F	Blue	16	17	12	17	6	20	14	10	14	14	9	24	16	13	8
46	F	Blue	16	10	16	17	16	18	11	12	14	10	14	14	14	12	16
47	M	Blue	25	18	23	19	15	2	15	4	14	8	4	20	23	8	12
48	M	Red	27	18	22	20	13	3	16	3	11	16	4	11	26	7	13
49	F	Red	12	13	20	9	16	16	12	27	10	21	21	10	9	2	12
50	F	Blue	11	10	17	15	25	21	16	19	4	15	14	26	9	5	3

Recorded E.P.P.S. T-Scores[1] and Color Preferences (Subjects #1 thru #25)

Assigned subject #	Sex	Most preferred color choice	The 15 E.P.P.S. Personality Traits														
			Ach	Def	Ord	Exh	Aut	Aff	Int	Suc	Dom	Aba	Nur	Chg	End	Het	Agg
									T-Scores								
1	M	Green	53	49	38	72	42	55	52	61	51	39	54	51	41	45	53
2	M	Red	53	63	73	57	51	50	46	42	29	60	50	55	51	49	29
3	M	Red	51	49	45	43	47	52	52	61	47	47	64	57	43	45	44
4	M	Green	51	58	56	32	51	57	48	70	51	50	48	51	53	34	42
5	M	Red	48	33	43	63	56	55	36	55	43	54	40	64	56	49	57
6	M	Blue	58	52	47	49	54	48	52	51	51	37	40	59	51	52	50
7	M	Blue	41	55	45	49	67	48	56	55	35	45	54	66	47	51	37
8	M	Blue	39	44	52	43	56	48	48	72	43	54	56	45	51	45	53
9	M	Blue	56	49	54	66	51	52	46	57	51	43	50	51	49	36	46
10	M	Blue	56	49	49	72	45	57	46	48	53	41	48	57	51	40	46
11	M	Green	41	44	47	57	40	45	63	51	39	62	60	45	43	60	48
12	M	Green	29	77	56	49	31	45	40	78	47	60	52	45	58	27	61
13	F	Green	59	52	45	36	56	64	58	38	37	56	65	43	51	46	47
14	M	Blue	65	55	80	49	63	27	56	44	29	54	40	34	68	40	53
15	M	Yellow	41	55	63	49	45	55	67	44	24	60	71	40	60	51	22
16	M	Blue	63	38	61	49	67	50	52	36	39	47	48	49	47	60	44
17	M	Blue	46	66	80	55	36	50	42	59	33	68	44	34	56	49	40
18	M	Blue	58	80	75	43	45	48	38	55	57	37	52	32	70	23	48
19	M	Red	41	41	33	55	47	57	56	55	49	50	56	59	41	62	44
20	M	Blue	53	52	66	55	51	59	44	53	45	41	56	47	43	36	57
21	F	Green	52	54	70	41	47	61	45	51	26	64	47	52	66	36	38
22	F	Red	45	49	56	46	54	49	32	51	50	56	72	60	37	36	60
23	F	Red	57	44	40	55	54	51	62	56	56	42	38	39	45	51	62
24	F	Red	59	46	79	38	63	29	34	65	32	54	45	45	53	49	55
25	F	Blue	67	65	65	46	52	44	45	56	50	34	56	31	62	29	57

[1]Allen Edwards, Edwards Personal Preference Schedule Manual (New York: The Psychological Corporation, 1959), p. 14.

Recorded E.P.S.S. T-Scores[1] and Color Preferences (Subjects #26 thru #50)

Assigned subject #	Sex	Most preferred color choice	The 15 E.P.P.S. Personality Traits														
			Ach	Def	Ord	Exh	Aut	Aff	Int	Suc	Dom	Aba	Nur	Chg	End	Het	Agg
			T-Scores														
26	F	Blue	55	52	59	41	42	51	49	53	45	46	58	33	56	49	60
27	F	Yellow	71	46	75	36	49	44	22	62	56	44	49	25	49	72	49
28	M	Blue	36	57	47	60	54	39	45	53	50	48	51	39	49	57	60
29	M	Blue	41	44	45	38	65	64	37	60	58	26	56	48	49	68	44
30	F	Blue	50	54	68	66	61	32	39	44	52	36	34	66	47	75	36
31	F	Green	50	57	52	36	47	37	68	56	28	46	40	52	60	72	42
32	F	Red	69	33	45	44	61	47	41	53	50	63	42	49	39	55	60
33	F	Blue	47	68	77	41	49	51	49	49	37	46	56	43	64	29	49
34	M	Green	44	74	73	43	45	52	57	51	31	52	56	51	62	27	40
35	F	Blue	45	54	54	57	49	34	45	35	37	49	38	68	70	59	64
36	F	Blue	50	57	52	52	54	54	47	58	34	54	49	27	39	68	57
37	F	Yellow	57	46	47	49	45	54	43	49	37	64	42	56	47	64	47
38	F	Blue	50	41	47	57	54	44	62	42	37	54	65	52	49	48	49
39	M	Green	24	55	33	40	51	59	69	53	43	41	75	57	34	54	55
40	F	Blue	38	41	45	38	52	51	49	47	34	52	56	60	66	39	53
41	F	Blue	40	62	56	49	42	59	49	69	39	44	49	62	39	51	42
42	F	Blue	59	44	61	33	54	59	56	49	52	58	45	35	53	46	47
43	F	Blue	43	27	49	57	45	66	51	69	26	46	60	43	56	61	47
44	F	Yellow	59	38	63	44	61	49	62	42	58	48	29	41	62	51	38
45	F	Blue	57	62	54	57	36	56	43	44	50	48	33	64	56	48	44
46	F	Blue	57	44	63	57	59	51	37	49	50	40	45	43	53	46	62
47	M	Blue	73	69	80	63	51	20	48	36	43	41	29	59	70	32	48
48	M	Red	77	69	77	66	47	22	50	34	37	58	29	40	75	31	50
49	F	Red	47	52	72	36	59	47	39	83	41	62	60	35	43	27	53
50	F	Blue	45	44	65	52	79	59	47	65	28	50	45	68	43	33	34

[1]Edwards, op. cit., p. 14.