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The aim of the study was to explore the possibility of relationships existing between the warmth and coolness of personal coloring, certain personality characteristics, and the choice of warmth or coolness in colors to be used for clothing.

A review of the literature dealing with color preferences indicated that one group of individuals generally preferred warm, bright and intense colors, while another group preferred cool, dull colors. Furthermore, leading authorities in clothing selection suggested that individuals with warm coloring should select warm colors for personal enhancement, while those with cool coloring should select cool colors. There were also reports from research which indicated that individuals who were more outgoing, forward, warm, sociable, and extroverted were found to select warm, bright colors, while others who were more calm, quiet, cool, passive, and introverted selected cool, dull colors. It was, therefore concluded that there might be an interaction between personal coloring, personality, and color preference.

In order to investigate these relationships a method was developed for the comparison of personal coloring to Munsell hues. These hues were divided into warm and cool tones of skin, eye, and hair

color as well as into blonde and brunette hair coloring classifications. One hundred young women who met the standards set for the four personal coloring classifications - warm blonde, cool blonde, warm brunette, and cool brunette - were selected from the student population at the University. They were presented with three color preference tests which were designed to force a choice between a warm and a cool color fan and between a warm and a cool tone of two groups of six colors - red, orange, yellow, green, blue, and purple. They were asked to select the colors which they would prefer to have for their own clothing.

The subjects were also presented with Cattell's 16 Personality Factor Test, from which the scores on factors A, C, F, and H were measured. These factors represented personality characteristics that were described as outgoing, forward, warm, emotional, happy-go-lucky, expressive, adventurous, active, and responsive versus reserved, cool, emotionally stable, calm, sober, serious, shy, and restrained. Some of these descriptive terms were found by other investigators to be associated with warm or cool colors.

The analysis of the data collected revealed that, for the subjects in this study, the warmth or coolness of personal coloring was, in some instances, related to the choice of warmth or coolness in colors to be used for clothing. The difference in preferences between subjects warm in coloring and cool in coloring was found to give highly significant F ratios. A high percentage of the subjects who were cool in coloring selected the fan of cool colors and also selected more cool tones than warm tones of the colors red, green, blue, and purple. Almost one-half of the subjects who were warm in coloring selected the fan of warm colors. On the other tests slightly over one-half of the choices made by the warm subjects

were for warm tones of the color; however, the warm tones of the cool colors were preferred less often than the cool tones. Hair coloring had little or no influence on the selection of warmth and coolness in colors although brunette subjects with warm coloring consistently selected a higher percentage of warmth in colors, with the exception of red, than did any other group.

It was found that the warmth or coolness of personal coloring was not related to the personality characteristics measured, nor were there any significant relationships between the warmth and coolness of personal coloring, personality, and color preference.

It was, therefore, concluded that for the subjects of this study the warmth and coolness of personal coloring was the only factor that had any relation to the preference for warmth and coolness in colors to be used for clothing.

THE RELATION OF SELECTED PHYSICAL AND PERSONALITY CHARACTERISTICS TO COLOR PREFERENCES FOR CLOTHING

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INTRODUCTION

The choice of color for clothing has been a topic of considerable interest among psychologists, sociologists, and teachers of clothing selection for many years. It is believed by these and other authorities that color influences the choice of clothing and gives clothing distinction and individuality as well as provides the individual with a medium through which he may express his personality. Since it is generally believed that man is often judged by what he wears, authorities have expressed a concern for the understanding of the specific factors that influence the choice of color in clothing. Bell Northrup, when attempting to identify the issues recognized that "a person's emotional as well as physical traits are sensed as a whole and her costume appraised for its interrelation of beauty and expressiveness. The whole issue is to bring together two things, costume and wearer and to make them one in effect" (50, p. 1).

For many years other authorities in the field of clothing selection have also recognized that certain aspects of physical coloring are influential in the selection of colors for clothing; however, few have been able to identify specific personality characteristics or the mutual influence of personal coloring and personality on the choice of colors for clothing. Therefore, it was the purpose of this study to investigate the relation of warmth or coolness of personal coloring to four personality characteristics and to preferences for warm and cool colors.

It was believed that the information from this study would contribute much toward the understanding of the importance of specific aspects of personal coloring and certain personality characteristics in the selection of colors for clothing. Such information

would be of value to those individuals teaching clothing selection, designing clothing, and buying merchandise, and would perhaps reinforce existing theories regarding the factors which influence color preferences in clothing.

REVIEW OF LITERATURE

A review of the literature dealing with color choices revealed a variety of opinions, ideas, and theories as to the factors which influence an individual's color preferences. There were many studies conducted which surveyed color preferences of individuals of different races, nationalities, of a wide range of ages, of both sexes, and from various educational backgrounds. These preference studies usually reported the rank order preferences of individual colors as well as preference for colors at different degrees of saturation and value levels.

In addition, a limited amount of research had investigated the "character" of colors and the relation of color preferences to certain biological factors and personality characteristics. However, there was little research that investigated the relation between color preferences, character of color, and individual differences.

The literature will be discussed in three main parts: (1) the general color preference studies, (2) the "character" of color, and (3) the relation of color preferences to individual differences.

General Color Preference Studies

Many of the studies investigated the individual's preference for specific hues; however, some studies investigated the preference for colors at different degrees of saturation and at various value levels.

The information from the color preference studies dealing with preferences for specific hues, as conducted by Jastrow (32), Lukiesch (42), Bradford (42), St. George (56), Garth (32), and Walton and Morrison (58), indicated that there was considerable preference for specific colors among persons regardless of nationality, race, age,

sex, or education. Eynseck, in a critical and experimental study of these and other color preference studies, concluded that:

> There is a certain amount of agreement between the colour preferences of people. This agreement is as high as that between intelligence tests; it is not restricted to Europeans, but also found among coloured races; and it is connected with a general factor of aesthetic appreciation discussed elsewhere (25, p. 394).

It appears that the agreement of many individuals was in the preference for the hues red and blue with less agreement in the preference for green, purple, yellow, and orange. This was true even when the studies investigated the individual's preferences for colors for clothing. However, Chandler reported that Cohn and Von Allesch denied the existence of any general order of preference for single hues. Cohn found that:

> Among ten hues, ranked by seven observers, every hue but orange was ranked first or second by some observer. He concluded that among hues of approximately equal saturations individual inclinations decides, except that perhaps yellow is disliked (14, p. 72).

Von Allesch found with a group of subjects who were of various ages, nationalities, and occupations that when colors were paired, preferences were similar to those of Cohn's subjects. He concluded that:

> (1) There is a sharp disagreement among the observers. (2) With all observers and in all parts of the series there are contradictions (one color is preferred to a second, the second to a third, but this third is again preferred to the first, etc). (3) The judgments must be influenced by variable factors not hitherto analyzed (14, p. 90).

Since there was lack of agreement among these authorities as to the general preference for specific colors, they and other authorities also investigated the individual's preference for colors which appeared either warm or cool and for colors which were at

different degrees of saturation and value levels.

St. George (56), McInnes (43), and Bjerstedt (9) were the authorities who investigated individual preferences for warm or cool colors. St. George studied 500 college students and concluded that "certain colors, because of a native "pull", were more commonly preferred; i.e., cool, recessive hues were more favored than warm, aggressive ones" (56, p. 716). This preference for cool tones was supported by a recent study conducted by McInnes who investigated the preferences for bright cool, dull cool, dull warm, and bright warm groups of colors. She found that within a group of 115 subjects who were between the ages of 18 and 50 years, 67 percent selected bright cool colors as their first choice for colors for clothing (43, p. 184).

Bjerstedt, on the other hand, found that age might be an influencing factor in the preference for warm or cool colors. Among the 603 individuals representing a wide range in ages, he found that "...more warm color patterns were preferred among the younger ones, more cool among the older ones" (9, p. 132).

Birren, who reported much of the recent information on color preferences, drew the following conclusion: "Human beings fall into two groups - those who prefer clear, distinct hues, usually warm in tone, and those who favor cooler hues and tones of less saturation" (4, p. 186).

The influence of the saturation of a color on color preferences was investigated by several authorities. Cohn compared saturated colors with the colors obtained by a mixture of black or white and found that "in general, the saturated colors were preferred" (14, p. 72). Similar results were reported by Bradford (43), Minor (14), Luckiesh (43), Walton and Morrison (58), Hunt (35), and Bjerstedt (8). Bjerstedt was the only investigator to find that age was an

influencing factor on preferences. He found that:

> The older children preferred, to a greater degree than the younger children, patterns poor in color for the ones intense in color.... color intensity attracted primarily the younger ones (8, p. 96-106).

However, all of these investigators, with the exception of Bjerstedt, found that the preference for saturated colors varied considerably depending upon the hue. Chandler reported that in Minor's study the effect of saturation was investigated through the use of gelatine plates and a lantern. He provided the subjects with three degrees of saturation - high, medium, and low - for each of the hues. Minor concluded that:

> It appears that on the average, full saturations were rated above the medium, and the medium above the low. However, it was rare that a single observer judged the three saturations of a single hue in this order. Full and medium saturations seesawed back and forth in the judgments of nearly all observers, and the low saturation was often preferred to one or both of the higher saturations (14, p. 76).

When Luckiesh presented 15 subjects with colored papers he found that the subjects preferred highly saturated blues and reds to lower saturations and that, in general, colors of lowest saturation were least preferred (42, p. 262). Hunt, on the other hand, when investigating children's preferences found that:

> ....the unsaturated levels of violet and orange were chosen in preference to the saturated levels more frequently than were the unsaturated levels of any other form of color (35, p. 35).

These findings by Luckiesh and Hunt were somewhat opposite of those presented by Walton and Morrison who found that college students preferred the less saturated level of red and the fully saturated level of the other colors (58, p. 294).

When Birren (4, p. 186), Luckiesch (42, p. 72), and Eynseck (25) studied the results from many investigations they each concluded

that there appeared to be two groups of individuals, those that preferred fully saturated colors, and those that preferred less saturated colors. When Eynseck attempted to isolate the "bipolar" factor which contributed to this division, he found what he called a "K" factor to be present. He said: "...it differentiates as we have seen those who like modern art, bright sunny photographs...; from those who like old masters, cloudy foreboding photographs" (26, p. 394). He believed the "K" factor to represent "brightness". Some authorities indicated that "brightness" was synonymous with value; however, it is believed that in his study "brightness" may have been more related to the degree of saturation, since Eynseck did not at any time discuss the influence of the darkness or lightness of a color.

Several other authorities have considered the value of the color to influence color preferences. In the investigation of the effect of this property of color on color preference, Luckiesh found that "the colors of medium value were in general preferred to the lighter colors, in a ratio of ten to two among the men and of seven to five among the women..." (43, p. 72). On the other hand, an analysis of the results of Washburn's study, as presented by Chandler (14, p. 72), showed that generally the subjects preferred tints over shades or normal levels. These conclusions were in partial agreement with the findings presented by Hunt (35) and Pearson (52).

Hunt considered that a brightness factor greatly influenced the color preferences of children when intensity was held relatively constant. It is believed that Hunt's use of the term "brightness" is synonymous with value. She says:

> "The variation among brightness level was highly significant. The lighter levels were most preferred, followed closely by the standard levels. The darker levels were considerably less favored. Brightness preferences tended to vary with the

> color. Although the darker levels of all six colors were least preferred, the standard levels of red, orange, yellow, and green were slightly more preferred than the lighter levels; whereas, the lighter levels of blue and violet were overwhelmingly preferred to the standard levels.
>
> Brightness preferences tended to vary with sex but not age. The lighter levels were more popular with the girls than with the boys; the darker levels were more popular with the boys than with the girls (35, p. 35).

Pearson, who conducted a study in which she investigated the color preferences for clothing of a group of high school students, found that they preferred lighter levels of blue and red to medium and darker levels (52, p. 801).

From all of the research reviewed concerning the preferences for specific colors, it appeared that the hue, the degree of saturation, and the value level each had a unique effect on the individual's choice for color. With respect to hue, red and blue were most often preferred. It appeared that slightly more individuals preferred cool colors instead of warm colors. When given a choice between saturated or unsaturated colors, the specific hue often influenced the choice. However, individuals seemed to fall into two groups, those preferring saturated colors and those preferring unsaturated colors. There was a slight suggestion that those who preferred cool colors also preferred unsaturated colors and those who preferred bright, intense colors also preferred warm colors. As to value, the medium to light values were generally preferred by females, and the medium to dark values were preferred by males.

Character of Color

Another important part of the color literature had to do with the "character" of color. The "character" generally referred to the expressions and meanings associated with specific colors as

well as related groups of colors. Bullough was one of the first to investigate this aspect of color which he described as:

> The appearance in a color or the expression by a color of what, in the case of a human being would be called his character or mood or temperament (14, p. 95).

Kouwer (37, p. 1) more generally described the "character" as the impression made by the color on the individual, and for this reason he believed that the "character" aspect of color greatly influenced color preferences. Both Bullough and Kouwer agreed that there was a definite distinction between the "character" expressed by red and blue. Bullough said that:

> The main division is between colors containing red, which are affectionate and frank and colors containing blue, which are reserved and distant, though not necessarily repellent; the red type is active, and the blue type is contemplative, reposeful, spacious. Similarly, warmth is translated into 'affectionate openness and sympathy' (14, p. 102).

Kouwer, on the other hand, indicated the main division of colors occurred as the result of an impression of "warmth" and "coolness". He describes "warmth" as:

> Warmth, among other things means a certain intimacy, an inner, deep contact with the environment. Everything warm has something live and dynamic. Sharp outlines become vague, they 'melt together' (37, p. 47).

He also said:

> Cold on the contrary 'freezes', and draws sharp outlines within which everything halts. The relation with the environment gets chilly, the intimacy is broken; we withdraw as much as possible within ourselves (14, p. 47).

It appeared that the divisions proposed by Kouwer and those by Bullough were closely related. Other research has substantiated this conclusion since the same or similar meanings and expressions

were associated with colors that were divided into warm (colors containing red) and cool groups (colors containing blue).

Stafansecua-Goanga (14, p. 196), Lewinski (49, p. 159), and Ross (55, p. 127) found that when reds and blues were projected, reds were rated warmer than blues. Tatibana (60, p. 236), Newhall (48, p. 198), and Kimura (60, p. 336) also found that reds were consistently described as warmer than blues when their subjects described surface colors.

In tests where subjects were asked to associate words with specific colors, Tatibana, Rogers (60, p. 236), Bjerstedt (8, p. 96-106), Kouwer (37, p. 102), and Wright and Rainwater (61, p. 96) found that red was associated with "warmth". Kouwer (37, p. 48) and Newhall also found that red was considered to be the "warmest" hue. It was Wright and Rainwater who found that: "'warmth' is the first connotate to have much linear dependence on hue. The greater redness is the hue change which corresponds with greater 'warmth'" (61, p. 96).

Tatibana, Rogers, and Kouwer (37, p. 112) also found that orange was associated with "warmth"; however, Kouwer was the only investigator who found yellow to be associated with "warmth". As for a group of warm colors, Bullough concluded that "red, orange, and yellow seem warm" (14, p. 100).

Those colors often associated with the word "cold" were blue, green, and purple. Newhall, Tatibana, Rogers, and Bjerstedt found that blue and green were considered by their subjects to be "cool". On the other hand, all of the subjects in Kouwer's study did not associate "cold" with blue. Thirteen percent of these subjects called it "warm" and only 11 percent "cold" (37, p. 141). Kouwer believed that blue was often associated with the repression of emotional reactions and with the lack of warm intimacy and for

these reasons blue was called "cold". There was no information as to the quality of blue that was presented to the subjects. Bullough (14, p. 100) said that green was variable when referring to coolness; however, Newhall found yellow-green to be cool, and Bjerstedt found violet to be "cold".

When considering the properties of saturation and value and their effect on the warm and cool connotations there appeared to be some disagreement among authorities. However, Wright and Rainwater, after extensive research and a review of the other studies, concluded that "... in addition to the effect of redness, the darker or the more saturated a color, the more it connotes 'warmth'" (61, p. 96). They also said that greater color lightness corresponds with less "warmth" regardless of hue. These conclusions were generally in agreement with the other more recent studies conducted by Ross (55, p. 127) and Osgood (51, p. 300).

A somewhat different interpretation of the phenomena of "warm" and "cool" colors was suggested in some of the non-technical literature. "Warmth" and "coolness" was not necessarily considered to be characteristic of pure hues. Arnheim said:

> The two terms seem to acquire their characteristic meaning when they refer to the deviation of a given color in the direction of another color. A bluish yellow or red tends to look cold, and so does a yellowish red or blue. On the contrary, a reddish yellow or blue seems warm (2, p. 276).

Albers, in his recent book Color Interaction, supported Arnheim in part when he said: "... there are also warm blues and cool reds possible within their own hues" (1, p. 63).

Often associated with the "warmth" and "coolness" of a color were other psychological connotations related to stimulation, activity, or strength which added to the overall character of the color. Bullough (14, p. 100) found red active, while the subjects

in Kouwer's (37, p. 104) study considered that vital and dynamic powers were inherent aspects. Murray and Deabler (46, p. 279) and Wexner (59, p. 432) found that when subjects were asked to make an association between a list of words and specific colors, red was associated with exciting, whereas the subjects in Bjerstedt's (8, p. 97) color polarity test associated the following terms with red: active, exciting, positive, and strong. Stefanescu-Goanga (14, p. 96) found the warm colors to evoke the feeling of excitement.

For specific "cool" colors, Bullough indicated that blue was reposeful, whereas Kouwer and Stefanescu-Goanga found blue was more quiet and peaceful. Murray and Deabler, Wexner, and Bjerstedt reported that blue was related to the word "calm". Bjerstedt also found green to be associated with calmness and blue with passiveness. As for the cool group of colors - blue, green, and indigo - Stefanescu-Goanga found that these colors evoked a soothing feeling.

Saturation and value also seemed to affect the connotations of activity, passivity and forcefulness. Von Allesch stated that "terms indicating 'activity' were rarely applied to the least saturated colors" (14, p. 109); while Ross (55, p. 127) and Osgood (51, p. 300) found that the light values corresponded with greater "passivity". Wright and Rainwater found that the more saturated as well as the darker the color the more it denoted "forcefulness" (61, p. 96).

Kouwer even made further conclusions about the emotional and social character of several colors based on the responses given by subjects.

Red

> ....all contact with red lies entirely in the emotional sphere, reason is replaced by the irrationality of action and the dynamics of the moment. Red carries away, it overwhelms and involves everything in its passionateness. Every distance is bridged in direct contact; it is impossible to keep red at a distance or

to rationalize it (37, p. 133).

Finally the social character of red should be mentioned. The "warmth" of red also applies to human contact; it indicates emotional ties, coziness, sympathy (37, p. 107).

Yellow and Orange

All effect of yellow lies at the surface, in its exteriority. Unlike that of red, yellow's innermost part is unconcerned with its outward radiance ... yellow has no emotional depth (37, p. 110).

In the closely related color, orange, the emphasis is more on the glamour and radiance and less on the unimpeachable interiority (37, p. 134).

Blue

Blue demands nothing from its observer...blue is the color of distance...makes it a symbol of all that is far away, in time - past or future; in space, in thoughts, in fantasy, in emotionality, etc. (37, p. 115).

Thus blue forms quite a strong contrast with concreteness, with everyday reality (37, p. 118).

Blue is the will to be good, the conscience, the responsibility or - in a less elevated sense, the desire to adhere to rules, tradition, convention and culture. This repression of emotional intensity, this lack of warm intimacy, is the reason why blue is called a cold color (37, p. 120).

Green

The naturalness of green lies in this tensionless interaction, this elementary process of well-beloved give and take. The above explains why green should also be the color of repose; it is calm, well-balanced, harmonious, stable, soft, beneficial (37, p. 124).

Purple

Purple has contrasting emotional values...resembles yellow and green in their negative interpretation... purple is unreliable, disharmonious, dubious, repulsive (37, p. 128).

The results of research into color dimensions and texts of popular sources have shown that the term "warm" was most often associated with the fully saturated hues of red, orange and yellow, while blue was generally thought to be "cool". However, the degree of saturation had some effect on the meanings described. When colors were not pure in hue, it was the presence of red that was related to the feeling of warmth; also, the darker the color, the more it appeared to be warm. It was the color blue that most contributed the feeling of "coolness"; however, green and purple were sometimes considered to be cool. Also, the lightness of the value appeared to be related to feelings of coolness.

Warm colors of full saturation and medium to dark values generally expressed feelings of activity and excitement, while the cool colors, especially of light value and of little saturation, were felt to be more calm and passive. Dark colors, regardless of hue, appeared to be more forceful.

There was also some indication that the groups of warm and cool colors might each express different social and emotional meanings and that these, as well as the other meanings associated with warm and cool colors might be related to some personality characteristics.

Individual Differences

In the color preference studies, as well as those investigating the "character" of color there was some indication that individual differences might account for preferences for specific kinds of colors. Some of the authorities (14, 25, 37, 55) suggested that these differences were biologically oriented, while others (18, 19, 25, 43) believed that psychological differences accounted for the variation in preferences.

Only two investigators, Bullough (14, p. 102) and Chandler (14),

discussed the nature of the biological factors. They concluded that these factors were related to the inherent capacity of the body to react to stimulation.

Chandler (14, p.2) and Eynseck (26, p.266) agreed that perception was a part of the aesthetic process, thus an individual could receive or reject stimulation when selecting colors. This theory was supported by Kretch and Crutchfield (38, p.4) who contended that during the process of the perception of colors man's brain and nervous system were affected. Birren (4) reported that results of recent research conducted by Gerard indicated that colors cause physical reactions of a stimulating nature and that the reactions were different for red and for blue. Gerard found when subjecting individuals to colored lights that "..red consistently produced more pronounced effects (activity and stimulation) than blue, both when first introduced and after a period of time" (4, p.177). It appeared that the results of Gerard's study seemed to support the earlier proposal made by Bullough (14, p.99) that stimulation was related to "warmth" and soothing to "coolness" for red is most often associated with "warmth" and blue with "coolness".

The physical coloring of the individual was thought to influence color preferences, at least by authorities who were concerned with the selection of colors for clothing. Morton (47), Chambers (13), Graves (31), McJimsey (44), and Hillhouse and Mansfield (34) each suggested specific colors that would enhance warm and cool coloring types. The basis for these types was primarily the color of the skin; however, the colors of the hair and eyes were also influential. There was often a division made within these types between blondes and brunettes.

A review of the literature revealed only two studies that investigated the relationship between personal coloring and color

preferences. According to the observations reported of Jaensch's (4, p. 186) study, subjects with blonde complexions had a preference for cool colors while those of brunette complexions preferred warm colors.

This finding is supported, at least in part, by a more recent study conducted by McInnes who found that "...of the respondents who preferred warm colors over one-half were classified as brunettes and another one-fourth were brownettes" (43, p. 185). McInnes also found that cool colors rather than warm were generally preferred irrespective of personal coloring (43, p. 185). Compton (19), on the other hand, found in her study that there was no relation between personal coloring and color preference. However, she did find that differences in personality had some effect on color preferences.

For a number of years other authorities (9, 26, 37, 50) have contended that the personality of an individual influenced color preferences but few were able to specify the personality factors that were the most influential. Kower said that:

> ...a person's color preference depends on the value of the colors in his project d'etre. The most preferred colors refer to points of possible development of the personality (37, p. 144).

Personality has been defined by Cattell, an eminent psychologist, as "that which is concerned with and deduced from all the behavior relations between the organism and its environment. It is concerned with all the behavior of the individual, both overt and under the skin" (12, p. 2). In his total concept of the personality he discussed the importance of the innate psycho-physical disposition of the individual since this aspect often influences the way an individual reacts to a particular object. Cattell defined several factors which were described with some of the same terms that were used

in expressing the "character" of warm and cool colors. These were: warm, sociable vs. aloof, cool, stiff (factor A); emotionally stable, calm, or ego strength vs. dissatisfied emotionally (factor C); enthusiastic, happy-go-lucky vs. glum, sober, serious (factor F; adventurous, active vs. shy, cold, timid (factor H).

In the literature reviewed it was found that none of these specific personality factors had been investigated in relation to color preferences. However, there were several authorities who had conducted color preference studies where personality factors somewhat similar to Cattell's were investigated. Also the relation of extraversion and introversion to color preference has been tested. Cattell (12) believed that factors A, F, and H were a part of these personality types.

Jaensch and Bjerstedt investigated the relation of the preferences for warm and cool colors to personality characteristics which were described in terms often associated with warm and cool colors. Jaensch in his early study found that there were two types of subjects.

> One type displays greater sensitivity for red and less for green, while the other type displays the opposite tendencies.
>
> Persons of the "warm" color vision type are in close relation with their perceived surroundings (outwardly integrated) and meet the external world with warm feelings; individuals with "cold" color vision type are closed off from their perceived surroundings (inwardly integrated) and meet the external world with cold emotions (49, p. 201).

Bjerstedt said that the results from his recent study indicated that:

> ...Individuals preferring warm color patterns tended to have greater ease in activation, for intense, shorter reaction times and quicker temper of tapping. In addition they tended to

> display a high degree of immediate stimulus receptivity (9, p. 33).

When Bjerstedt assigned specific task accomplishments to the subjects he found that subjects preferring warm colors tended toward stimulus openness or receptivity, while subjects preferring cool colors tended toward stimulus reworking and selectivity (9, p. 33). The results from both of these studies were in agreement with the theoretical conclusions made by Rickers-Ovsiankina (4, p. 186) with regard to warm-color and cool-color dominate subjects. Also, the personality characteristics investigated appeared to be related to the factors that make up the extroverted and introverted personality. In the literature there was strong indication that extroversion and introversion influenced color preferences.

Eynseck (26, p. 268) and Lopez (4, p. 14) specifically measured the relation of extraversion-introversion to color preferences, while McInnes, Alshuler and Hatewick checked color preferences in relation to other personality characteristics related to extraversion and introversion. All of these authorities except Lopez supported the popular belief that extroverts prefer warm, bright colors, while introverts prefer cool, dull colors. Lopez found no difference in color preference between extroverts and introverts. However, she used subjects other than those who scored high or low on the Bernreuter Inventory.

McInnes found that:

> .... Warm-color oriented subjects who chose bright colors were more active and gregarious than those who preferred cool and dull tones (43, p. 185).

In the study conducted by Alschuler and Hatewick, as reported by Kouwer, the results showed a relationship of personality characteristics to the color preferences of young children. They found that red was used pronouncedly by children who were emotional and

uninhibited. Children choosing yellow were extrovert, egocentric, and emotionally dependent on grown-ups. The frequent users of blue and green exhibited self-control, adaption to the milieu and repression of emotional tensions (37, p. 145).

The study seemed to indicate a relationship between extroversion-introversion, egocentrism, and emotional expression to color preference. Apparently this type of relationship has not been investigated by any other authorities. However, Compton considered sociability to be an influencing factor on color preferences. High sociability scores were thought to represent a personality which was outgoing, forward and confident, while low scores indicated a personality which was conventional, slow, simple, stereotyped in thinking, restricted in outlook and interest.

In her first study Compton found that "... students preferring tints scored lower in sociability than those in the saturated and shade preference groups" (19, p. 70). As a result she concluded that "... these color choices would appear to be an outward expression of an inner personality trait" (20, p. 193). In her second study she found that "... students preferring deep shades and saturated colors scored higher on sociability than those preferring tints" (20, p. 193).

It appeared from these studies conducted by Compton that there might be a relation between more specific aspects of personality and color preference and meanings commonly associated with colors. In fact, the findings might support the previous hypothesis proposed by Bjerstedt (9, p. 32) that individuals who were outgoing, forward and active would select colors with qualities that expressed activity and forcefulness.

The above studies which were concerned with the relation of individual differences to color preferences showed that (1) people

reacted physically to colors. Warm colors caused an activation or stimulation within the body, while cool colors had a more soothing, calming effect. (2) Personal coloring at times influenced the choice of colors, particularly in the case of the brunettes who preferred more warm colors than other personal coloring types. (3) Certain personality types were associated with the preference for warm or for cool colors. Individuals who were active, gregarious, forward, outgoing and extroverted selected warm colors while those who were more inwardly directed, who exercise emotional restraint, and who were introverted selected cool colors.

From the review of the literature it is apparent that (1) there are warm and cool colors; (2) some of the physical and psychological reactions that people have towards colors were related to the color's warmth or coolness; (3) color preferences were related to the warmth and coolness of colors; (4) the individual's coloring was suggested as the basis for the selection of colors for personal enhancement; and (5) the personality characteristics that were related to the preferences for warm and cool colors were often described in the same terms as warm and cool colors.

When all of the factors found to influence color preferences are considered there is support to the belief that the warmth and coolness of personal coloring should be related to the preference for warm or cool colors and to personality characteristics described, in part, as being warm and cool.

STATEMENT OF THE PROBLEM AND HYPOTHESES

Statement of the Problem

The study was designed to determine the relationship of the warmth and coolness of personal coloring to certain personality characteristics and to the preference for warm and cool colors. Subjects were selected who represented four personal coloring types - warm blonde, cool blonde, warm brunette, and cool brunette.

Three tests were designed to determine color preferences. The first test demanded a response for a warm or a cool color fan, while the other two tests asked for the subject's choice of a warm or a cool tone for the colors red, orange, yellow, green, blue, and purple. The personality characteristics measured were: (1) factor A - reserved versus outgoing; (2) factor C - affected by feelings versus emotional stability; (3) factor F - sober versus happy-go-lucky; (4) factor H - shy, restrained versus venturesome.

Since the study of clothing selection was thought to influence color preferences, subjects were asked to indicate if they had or had not taken such a course.

Hypotheses

1. Subjects with warm coloring will select the fan of warm colors and warm tones of the six colors red, orange, yellow, green, blue, and purple.

2. Subjects with warm coloring will have personalities described as outgoing, happy-go-lucky, and venturesome and will be less stable emotionally.

3. Subjects of warm coloring who are outgoing, happy-go-lucky, venturesome and less stable emotionally will prefer the fan

of warm colors and the warm tones of all of the colors.

4. Subjects with cool coloring will select the fan of cool colors and cool tones of the colors red, orange, yellow, green, blue, and purple.

5. Subjects with cool coloring will have personalities described as reserved, sober, and shy and will be emotionally stable.

6. Subjects with cool coloring who are reserved, sober, shy and emotionally stable will select fans of cool colors and cool tones of all of the colors.

7. Hair color will make no difference in the response toward color or the scoring on any of the personality factors.

PROCEDURE

The following discussion describes the development of the methods and instruments used in the analysis of the subjects as well as the selection of subjects, and testing conditions and procedures.

Analysis of Personal Coloring

Since there were no prescribed instruments or techniques suggested for the analysis or classification of personal coloring into warm and cool categories, Mrs. Frances Quinn, Extension Clothing Specialist for the University of California Agricultural Extension Service, suggested the use of the Munsell Skin and Hair Color Charts, Munsell Soil Color Charts and Book of Color. Mrs. Quinn was working on a project at the time to determine the adequacy of the Munsell hues in the measurement of personal coloring. The warm and cool hues that were similar to skin, hair, and eye color were selected from these charts, and in the case of hair color, the same hues were grouped into brunette and blonde categories. Those hues selected for the two groups of skin colors were:

Warm		Cool	
2.5 YR 7-8/4	10 YR 7-9/2-4	2.5 R 8-7/2-6	10 R 9-8/1-3
5 YR 9-7/1-4	2.5 Y 7-8/2-4	5 R 9-7/2-4	2.5 YR 8-7/2
7.5 YR 7-8/2-4		7.5 R 8-7/2-4	

It was believed that the hue 10 R 8/3 was somewhat neutral as to warmth and coolness. This hue often matched the skin color of the cool brunettes and the cool blondes. These subjects qualified for the cool group only if they had additional cool red tone in the pigmentation of the cheek area.

Those hues selected for the two groups of hair colors for the

brunettes and blondes were:

Warm Brunettes	Cool Brunettes	
2.5 YR	5 R	5 YR
3-2/2-4	3-2/1-2	3-2/1-2
5 YR	7.5 R	7.5 YR
3-2/2-4	2/1-2	3-2/1-2
7.5 YR	10 R	10 YR
3/2-4	3-2/1-3	3-2/1-2
10 YR	2.5 YR	
3/3-4	3-2/1-2	

Warm Blondes	Cool Blondes
5 YR	10 YR
6-5/4-5	8-5/2-3
7.5 YR	2.5 Y
6-5/4-5	9-6/2-4
10 YR	5 Y
8-5/4-6	8-6/1-4

In the analysis of the hair color both warm and cool brunettes had hair that matched the hues 5 YR 2-3/1-2 and 10 YR 2/3. It was the presence of highlights matching to the hues 5 or 7.5 YR at chroma levels /3 and /4 that qualified brunettes for the warm category.

Those hues selected for the two groups of eye colors were:

Warm 2.5 YR, 5 YR through 5 Y

Cool 5 GY, 10 GY through 10 B

After the above categories were defined a group of six subjects was examined by the investigator and two clothing selection teachers for the purpose of checking the adequacy of the selected colors. The approach appeared to be satisfactory; however, extensive refinement was made and a second pretest conducted. This time nine subjects were analyzed. The results from these two pretests indicated that there was high agreement between judges in the classification of subjects into the warm and cool categories; however, each judge did not necessarily indicate the same hue as matching the subject's skin or hair color. Since there was this agreement it was felt that the

investigator was sufficiently reliable in determining the warmth and coolness of personal coloring. It has been suggested by Verriest (57) that a difference in age influences the way a color appears to the eye, thus, this may account for the selection of different hues by each of the judges.

The following procedure for the analysis of personal coloring was used: (1) A Munsell hue was compared to the skin color on the forehead by placing the hue close to the skin and also at a distance of about one foot. The color quality of the cheek area was considered also, since it was in this area that there was often the presence of red pigmentation. (2) A Munsell hue was compared to the general effect of the hair color at about four inches away from the crown of the head. (3) A Munsell hue was compared to the eye color at about six inches away from the subject.

Color Preference Tests

Three color preference tests were developed using the same colors in three versions - color fans, strips of color mounted in warm and cool pairs, and pages of colors mounted in warm and cool pairs. The purpose of the color fans was to get a general response from the subject as to preference for warmth or coolness, while the tests made of pairs of strips and pages were designed to produce a more specific preference response for either warm or cool tones of six different hues.

The color fans were made from strips of color taken from the Nickerson Color Wheel and ranged in value from three through eight.

Warm Fan			Cool Fan			
5 GY	2.5 Y	10 R	2.5 G	5 BG	7.5 B	10 BP
2.5 GY	10 YR	7.5 R	5 G	7.5 BG	10 B	2.5 P
10 Y	7.5 YR	5 R	7.5 G	10 BG	2.5 BP	5 P
7.5 Y	5 YR	2.5 R	10 G	2.5 B	5 BP	7.5 P
5 Y	2.5 YR		2.5 BG	5 B	7.5 BP	10 P

Since the hues 2.5 RP, 5 RP, 7.5 RP, 10 RP, 10 GY, and 7.5 GY were believed to be somewhat questionable as to their warmth and coolness, they were omitted from either of the fans.

The second color preference test was designed with warm and cool tones of six hues, values from three through eight, selected from the Nickerson Color Wheel. The strips used were:

Warm Tones	Cool Tones
7.5 R	2.5 R
2.5 YR	7.5 YR
2.5 Y	7.5 Y
2.5 G	2.5 BG
5 B	2.5 PB
7.5 P	2.5 P

For the hues red, orange, yellow, and purple, each strip was selected equidistant from the major hue (5). Since the blue hue designated as number 5 appeared to contain a visible amount of green, a more pure blue (10 B) was selected as the major hue, while the green, 7.5 G was considered to be more pure in hue than 5. For the pair of blues, 5 B and 2.5 PB were chosen, while for green hues 2.5 G and 2.5 BG were selected. It was believed that these pairs represented the same degree of variation of warmth and coolness from the major hue as was found between the other pairs.

In an effort to determine the effectiveness of the two tests, they were presented to a group of ten graduate students. These students indicated that they could see a difference of warmth and coolness between the two fans and between the strips in the pairs. Their answers indicated that there was a relationship between their preferences for warmth and coolness in the color fans and for the warmth and coolness in the individual hues. Therefore, the instruments were believed to be effective.

During a second pretest, the third color preference test was

added. This test was designed with pages selected from the 1929 Munsell Book of Color and corresponded in number to those strips of color used in Test Two. It was believed that the pages gave a more complete picture of the variation of value and intensity within each hue, therefore, they might be more representative of the colors often found in clothing. However, it was also recognized that because of these variations, there might be less of an impact of warmth and coolness between the paired pages.

Each color fan and each pair of hues were mounted on single stands covered with gray paper matching Munsell value six. Each fan, as well as each strip and page, was randomly labeled "A" or "B", and the pairs of strips and pages were numbered from one through six. The subjects were asked to indicate their preference for a color by placing "A" or "B" after the proper number on their answer sheet. (See Appendix E)

Personality Test

Cattell's 16 Personality Factor Test was selected for this study, primarily because certain personality factors were described in phrases similar to those used in describing the "character" of warm and cool colors. Some of the factors also appeared to be related to the personality characteristics measured by other authorities in relation to warm and cool color preferences. Also, in this test, specific personality factors could be measured independently or as a group. According to the review by Adcock in The Fifth Mental Measurements Yearbook (10, p. 196-7) the test is considered to be reasonably reliable and valid. The split-half reliabilities ranged from .71 to .93 with ten coefficients being above .90°.

Form A of the test was used and personality factors A, C, F, and H were selected to be measured. Since Cattell (11) indicated that factors A, F, and H were quite related to each other and each

was a part of a larger introversion and extroversion factor, it was decided that, in addition to measuring these factors independently, a cluster measurement would also be made.

The following outline of each of the factors was given by Cattell (11, p. 11-15):

Factor A

High Score		Low Score
Cyclothymia, A+ (Warm, Sociable)	vs.	Schizothymia, A- (Aloof, Stiff)

This factor has been found to load most highly the following traits:

Good Natured, Easy Going	vs.	Aggressive, Grasping, Critical
Ready to Cooperate	vs.	Obstructive
Attentive to People	vs.	Cool, Aloof
Soft Hearted, Kindly, Trustful	vs.	Hard, Precise, Suspicious
Adaptable	vs.	Rigid
Warm Hearted	vs.	Cold

Factor C

High Score		Low Score
Emotional Stability or Ego Strength, C+ (Mature, Calm)	vs.	Dissatisfied Emotionality, C- Emotional, Immature, Unstable)

This factor loads:

Emotionally Mature	vs.	Lacking in Frustration Tolerance
Emotionally Stable	vs.	Changeable (in attitudes)
Calm, Phlegmatic	vs.	Showing General Emotionality
Realistic about Life	vs.	Evasive (on awkward issues and in facing personal decisions)
Absence of Neurotic Fatigue	vs.	Neurotically Fatigued
Placid	vs.	Worrying

Factor F

High Score		Low Score
Surgency, F+ (Enthusiastic, Happy-Go-Lucky)	vs.	Desurgency, F- (Glum, Sober, Serious)
Talkative	vs.	Silent, Introspective
Cheerful	vs.	Depressed
Serene, Happy-go-lucky	vs.	Concerned, Brooding
Frank, Expressive	vs.	Incommunicative, Smug
Quick and Alert	vs.	Languid, Slow

Factor H

High Score		Low Score
Parmia, H+ (Adventurous, "Thick-skinned")	vs.	Threctia, H- (Shy, Timid)
Adventurous, Likes Meeting People	vs.	Shy, Withdrawn
Active, Overt Interest in Opposite Sex	vs.	Retiring in Face of Opposite Sex
Responsive, Genial	vs.	Aloof, Cold, Self-Contained
Friendly	vs.	Apt to be Embittered
Impulsive and Frivolous	vs.	Restrained, Conscientious
Emotional and Artistic Interests	vs.	Restricted Interests
Carefree, Does not see Danger Signals	vs.	Careful, Considerate, Quick to see Dangers

The personality test of each subject was scored with the answer sheet provided with the test and the "raw scores" for each factor were converted into standard ten-point scores (stens) by the use of the 16 Personality Factor Test Norm Tables, Form A for College Women.

Those subjects who scored one through four on a personality factor were classified as low scorers, while those who scored seven

through ten were classified as high scorers. For the subject's score on the cluster of factors A, F, and H, those who scored one through four on all of the factors or scored one through four on two factors but five on one factor were considered as low scorers. Those subjects who scored seven through ten on all of the factors or scored seven through ten on two factors but only six on one factor were considered as high scorers in this same cluster.

This scoring procedure was adapted from the procedure suggested for determining extroversion-introversion scores by Cattell in Table 14 in the Handbook for the 16 Personality Factor Questionnaire (14, p. 47).

Selection of Subjects

The investigator observed young women in classrooms, dormitories, and other living groups on the Oregon State University campus during the late fall and early winter terms in an attempt to find individuals whose coloring was one of the four types being analyzed - warm brunette, cool brunette, warm blonde, or cool blonde. Among those observed, it appeared there would be little difficulty in finding young women to fit the warm brunette and cool blonde coloring types but to find young women of the cool brunette type appeared to be somewhat more difficult. Very few warm blondes with brown eyes were observed; therefore, it seemed necessary to consider young women who were warm in coloring except for eye color. Thus, young women with blue-green and green eyes were considered to be acceptable in the warm blonde category.

From those observed, a group of 142 women with natural hair coloring and untanned skin were asked to participate in the study. They were informed that a study was being conducted during the first six weeks of winter term to determine whether there was a relation between personal coloring, certain personality

characteristics and color preferences for clothing. From this group, 25 subjects for each of the four personal coloring groups were selected as being most representative of a specific type.

Testing Conditions and Procedure

The research was conducted in a large room during the afternoon and evening. Two of the walls in the room were a neutral gray, often broken up by natural wood paneling and blackboards, and the other two walls were predominately windows shaded by white venetian blinds. These blinds were closed at all times to prevent any outside light from coming into the room. The ceiling lights provided about two-foot candles of light which was not enough for the analyzing of personal coloring. Therefore, a more specific area was set up for this purpose. A backdrop about seven feet in height and covered with white sheeting was placed approximately three feet from the shaded windows.

The subject was seated in front of the backdrop and faced toward the center of the room. Three floor lamps which burned General Electric Soft-White bulbs of 250 watts were placed on either side and to the front of the subject in a triangular pattern so as to project fifty-foot candle of light on and around the subject. This type of lighting was suggested by Reis Leming, Lighting Specialist and District Sales Manager for the Pacific Power and Light Company in Corvallis, Oregon.

A large grey collar was placed around the subject's neck to cover any color that might reflect onto her face. The observer recorded the Munsell hue numbers corresponding to the subject's skin, hair, and eye color on the subject's answer sheet. The subject was then given the following directions:

> You will see there are three color preference tests.
> For the Color Fans, please select "A" or "B",

depending on the fan which you would most prefer to have for the colors in your own clothing. For the colors in Group X (paired strips), again select "A" or "B" for each of the six colors, depending on the one you would most prefer to have for the colors in your own clothing. Do the same for Group Y (pages). Record your answers in the proper place on your answer sheet and answer all of the other questions on the bottom of the page. This is the Personality Test. Please read the directions on the front page carefully and record your answers on the answer sheet.

FINDINGS AND DISCUSSION

The findings of the study will be discussed in the following order: description of the subjects, results of the color preference tests, personal coloring in relation to personality characteristics, and personal coloring in relation to personality characteristics and to color preference.

Description of the Subjects

The subjects who contributed the data for the study were college women, ranging in age from 18 to 23 with the exception of one who was 29. They were enrolled in the schools of Home Economics, Business and Technology, Science, Humanities, and Education, and were members of a wide variety of living groups. Each subject was selected because she represented one of the four personal coloring classifications - warm blonde, cool blonde, warm brunette, and cool brunette.

Results of the Color Preference Tests

One of the purposes of the study was to determine whether there was an existing relationship between the warmth and coolness of personal coloring and hair color and preference for warmth or coolness in colors to be used for clothing. The tests used to determine the subjects preferences were warm and cool color fans, strips and pages of warm and cool tones of colors.

The subjects' choices on each of the tests were tallied and percentages figured. The results from the preferences recorded for the strips and pages indicated that very little difference in choice occurred between the two measurements. An F test indicated that the difference in color choices between the two tests was not significant. Also, the coefficient of variation was 0.952. Since the choices

were similar the scores for the two tests were combined; thus, the group referred to as "all colors" represents the choices for red, orange, yellow, green, blue, and purple from both strips and pages. The following discussion reports the preferences for (1) warm or cool color fan, (2) warm or cool tones for all colors, (3) warm or cool tones of the warm colors red, orange, and yellow, and (4) warm or cool tones of the cool colors green, blue, and purple. The data was recorded and reported as preference for warmth only, since there were only the two choices - warm and cool. Preferences for coolness would be the reciprocal of that for warmth.

Preference for the Warm or Cool Color Fan

Frequency counts of the 100 subjects' preferences revealed that the fan of cool colors was preferred to the fan of warm colors; however, the F test showed there was a marked difference in preferences between warm subjects and cool subjects regardless of hair coloring (see Table 1). The preference of the cool fans by the cool subjects showed the most distinct relationship, while the choice of warm fans by warm subjects was less positive since over one-half of the preferences were for the cool fans rather than the warm fans.

Table 1. Preference for the Warm Color Fan by Warm and Cool Subjects

	Number	Number Preferring Warm Fan	Percentage	F ratio
Warm Subjects	50	23	46	11.60**
Cool Subjects	50	8	16	

**Significant at .01 level of confidence

The results presented in Table 2 show the preference for the warm fan by the four personal coloring groups and by the blondes

and brunettes.

Table 2. Preference for the Warm Color Fan by Warm Blondes and Brunettes and Cool Blondes and Brunettes

	Number	Number Preferring Warm Fan	Percentage	F ratio
Warm Blondes	25	10	40	
Cool Blondes	25	2	8	.05
Warm Brunettes	25	13	52	
Cool Brunettes	25	6	24	
Total	100	31	31	
Blondes	50	12	24	2.53[a]
Brunettes	50	19	38	
Total	100	31	31	

[a]Indicates a direction only

An analysis of the preferences for either the warm or cool fans by each of the four personal coloring groups revealed that the preferences were too varied to show any significant relationships; however, the results indicated that more of the warm brunettes preferred the warm fans than warm blondes, and that more of the cool blondes preferred the cool fans than cool brunettes. The difference in preferences between blondes and brunettes was found not to be significant at the five percent level of confidence; however, the F ratio was interpreted to mean that the choice of the cool fan by blondes did not occur by chance alone.

Preferences for Warm or Cool Tones of All Colors

When the subjects were given an opportunity to select warm and cool tones of two groups of six colors the frequency count

revealed that the subjects had a slight preference for cool tones over warm tones. Out of 1200 possible choices, 626 were recorded for the cool tones. However, the F test revealed that a significant difference in preferences occurred between the warm and cool subjects. It is shown in Table 3 that warm subjects preferred more warm tones of the colors while the cool subjects preferred more cool tones.

Table 3. Preferences for Warm Tones of All Colors by Warm and Cool Subjects

	Number	Number of Warm Tones Preferred	Percentages	F ratio
Warm Subjects	50	312	52	4.69*
Cool Subjects	50	263	43.38	

*Significant at .05 level of confidence

Table 4 reports the preferences for warm tones of all of the colors for each of the four personal coloring groups as well as for the blondes and brunettes. There was quite a variation in the choice within each of the groups; hence, no significant F ratios were found. However, there was considerable difference in the preferences recorded for the cool blondes and for the warm brunettes. This preference pattern was also found in the choices for the warm color fan. Therefore, the results give some indication that these two groups represented the extremes in preferences for warmth and coolness in color as well as support the hypotheses that warm subjects would prefer warm tones of all colors and that cool subjects would prefer cool tones of all colors.

Table 4. Preferences for Warm Tones of All Colors by Warm Blondes and Brunettes and Cool Blondes and Brunettes

	Number	Number of Warm Tones Preferred	Percentage	F ratio
Warm Blondes	25	150	50	
Cool Blondes	25	130	43.33	
Warm Brunettes	25	162	54	.16
Cool Brunettes	25	133	44.33	
Total	100	575	47.92	
Blondes	50	280	46.66	
Brunettes	50	295	49.17	.44
Total	100	575	47.92	

In the analysis of the preferences of warm tones for each of the colors there was also some indication that there might be considerable difference in the preferences for tones of the warm colors than of the cool colors; thus an investigation was made to determine where the differences occurred.

Preferences for Warm Tones of Warm Colors

When the preferences for warm or cool tones of the warm colors were counted and studied it was found that the subjects preferred slightly more warm tones than cool tones, and that there was more difference in the preference for warm and cool tones between blondes and brunettes than between warm subjects and cool subjects. In both cases the differences were minimal. However, when checking the frequency counts for the individual warm colors it was found that the number of warm tones preferred was considerably less for red than for orange or yellow. Out of a possible 200

choices, 75 warm responses were recorded for red, 135 for orange, and 141 for yellow (see Appendices D 1-4). Since red was found by other investigators to be one of the most preferred colors and orange and yellow the least preferred, chi square analyses were made of the frequency of choices of warm and cool tones of red (see Table 5).

Table 5. Preferences for Warm Tones of Red by All Subjects

	Number	Number of Warm Tones Preferred	Percentage	X^2
Warm Subjects	50	48	48	9.40**
Cool Subjects	50	27	27	
Total	100	75	37.5	
Warm Blondes	25	25	50	3.30
Cool Blondes	25	15	30	
Warm Brunettes	25	23	46	5.04*
Cool Brunettes	25	12	24	
Total	100	75	37.5	
Blondes	50	40	40	.444
Brunettes	50	35	35	
Total	100	75	37.5	

**Significant at the .01 level of confidence
*Significant at the .05 level of confidence

The results showed that cool tones of red were preferred to warm tones by all subjects. There was also a significant difference in preferences between the warm subjects and the cool subjects as well as between warm brunettes and cool brunettes. The cool subjects selected more cool tones than warm tones while the warm subjects selected almost an equal number of warm and cool tones.

Preferences for Warm Tones of the Cool Colors

The tally of all the subjects' preferences for warm tones of the cool colors revealed that they preferred the cool colors - green, blue, and purple - to be cool in tone. However, there was much variation in preferences between the different groups of subjects. The results in Table 6 show that out of 300 possible choices the warm subjects preferred more warm tones than did the cool subjects. The F ratio indicated that the difference between the two groups was significant at the one percent level of confidence.

Table 6. Preferences for Warm Tones of Cool Colors by Warm and Cool Subjects

	Number	Number of Warm Tones Preferred	Percentage	F ratio
Warm Subjects	50	135	45	9.12**
Cool Subjects	50	89	29.66	

**Significant at the .01 level of confidence

There was some difference in the preference for warm and cool tones of colors between the four personal coloring groups (see Appendix A-2). It appeared that the difference in preferences was due to the warmth and coolness of personal coloring rather than hair color.

Since it was believed that education in clothing selection might influence the choice of warm or cool colors for clothing, a comparison of the preferences was made between the subjects who had and had not taken clothing selection. According to the F test there was no significant difference in color preferences between the warm or cool subjects who had or had not taken clothing selection (see Appendix A-3).

In summary, the results from the color preference test

showed that subjects, when selecting colors that could be used for clothing, generally preferred cool fans to warm fans and cool tones of colors to warm tones. McInnes (43, p. 185) and St. George (56, p. 716), when investigating color preferences, also found that cool colors were generally preferred to warm colors. The findings of this study, however, also indicated that there was a significant difference in the preferences recorded for cool subjects and for warm subjects. Cool subjects preferred the cool fans and cool tones of all of the colors except orange and yellow while approximately the same number of warm subjects preferred the warm fan as the cool fan. Also, the warm subjects preferred both warm and cool tones of all the colors.

These results would support the theory expressed by McJimsey (44, p. 240) that people with cool coloring generally wear more cool colors. The preferences recorded for the warm brunettes would also give support to her idea that persons with predominantly warm coloring prefer to wear warm colors. On the basis of the statistical results reported, the hypothesis that warm subjects would prefer the fan of warm colors and warm tones of the colors is rejected, while the hypothesis that cool subjects would prefer the fan of cool colors and cool tones of the colors was accepted.

Although the results were not significant, there were some differences in preferences between some of the personal coloring groups. Warm brunettes consistently chose more warmth on all of the tests, with the exception of red, than any other personal coloring group. The cool brunettes and the cool blondes consistently selected coolness on all tests, with the exception of orange and yellow. There was some difference in the preferences for warmth and coolness between blondes and brunettes on the fan test and for the color red; however, there was little difference in preferences shown between these two groups on the other tests. These latter

results were contrary to the results reported by McInnes (43, p. 185) and Jaensch (4, p. 186). McInnes found the majority of the warm color preferences were related to brunettes and brownettes, while Jaensch found that the brunette complexion type preferred warm colors and the individual with a blonde complexion preferred cool colors.

Since there were no statistical differences found in the preferences for warmth and coolness between blondes and brunettes on any of the color preference tests the hypothesis that there would be no difference in preferences for warm or cool fans and warm and cool tones of the colors between blondes and brunettes was accepted.

Personal Coloring in Relation to Personality

One of the aims of the study was to determine the relationship between personal coloring and certain personality characteristics. An analysis of the persons scoring high, medium, and low on the personality factors being measured revealed that there were no significant relationships between the warmth or coolness of personal coloring or hair color and personality (see Appendices B-1-5). However, there were some interesting differences in the number of subjects who scored high and low on some of the personality factors. The following discussion reports these differences.

Eleven of the warm brunettes were found to be happy-go-lucky, expressive, frank, and enthusiastic (high scores on factor F) while only five were glum, sober, serious, introspective, and slow (low scorers on factor F). On factor H, 21 of the blondes were low scorers while only 14 of the brunettes scored in this direction. When the scores of factors A, F, and H were combined, 21 of the 100 subjects tended towards introversion (low scorers). Twice as many of the subjects with cool coloring were low scorers than were high scorers on this combination of factors. The same was also

true for the blonde subjects.

Since there were no significant differences between the personal coloring groups and their scores on the personality factors measured, it is essential to reject the hypotheses that subjects who were cool in coloring would score high on personality factor C and low on factors A, F, and H, and that subjects who were warm in coloring would score high on personality factors A, F, and H, and low on C. The hypothesis that there would be no differences in personality scores between blondes and brunettes was accepted. Apparently there has been no other research that has investigated any of these types of relationships.

Interrelation of Personal Coloring, Personality Characteristics, and Color Preferences

In order to determine whether there was an interrelation between personal coloring, personality, and color preferences the subjects were rated high, medium, and low on each of the personality factors A, C, F, and H. Color preferences were tallied and analyzed for each subject according to her personal coloring and personality rating. The F test showed that there were no significant differences in color preferences between warm and cool subjects or between blondes and brunettes scoring high and low on any of the personality factors (see Appendices C 1-5). However, a study of the frequency counts revealed that there were some interesting differences in color choices among some of these groups.

There was considerable difference in the response for warmth between cool brunettes scoring high and cool brunettes scoring low on personality factor C (see Table 7). Also, the color preferences recorded for these two groups were different than for the total cool brunette group. These results indicated that cool brunettes who were high scorers - more calm, emotionally stable, secure, and

Table 7. Preferences for Warmth by Cool Brunettes Scoring High and Low on Personality Factor C and Total Cool Brunette Group

	Number	Number Preferring Warm Fans	%	Number of Warm Tones of Color Preferred	%
Cool Brunettes scoring low	5	0	0.00	19	31.67
Cool Brunettes scoring high	13	4	30.70	77	49.36
Total Cool Brunette Group	25	6	24.00	133	44.33

mature - selected more warm tones of colors than did the cool brunettes who were more low scoring - emotional, less stable, and immature. Therefore, both of the cool brunette groups selected colors believed to be opposite in "character" to their personal coloring. On the other hand, warm blondes who were emotional, less stable, and immature selected more warm tone colors, thus the "character" of the color coincided with the personal coloring and the personality. The findings supported the theory proposed by Bullough (14, p. 102) that some individuals select colors which are related in character to their personality, while others seek those colors which are opposite.

It also appeared from the results that personality differences as measured by factor H may have had a little influence on the choice of colors by the blondes who were warm in coloring (see Table 8).

Those who were shy, timid, and cool (low scorers) preferred considerably less warm tones of the colors than did those who were more adventurous, "thick-skinned", active, and responsive (high scorers). The preferences by both of the groups were different

Table 8. Preferences for Warmth by Warm Blondes Scoring High and Low on Personality Factor H and the Total Warm Blonde Group

	Number	Number Preferring Warm Fans	%	Number of Warm Tones of Color Preferred	%
Warm Blondes scoring low	10	2	20.00	50	41.67
Warm Blondes scoring high	6	2	33.33	40	55.55
Total Warm blonde group	25	10	40.00	150	50.00

from the total warm blonde group, each in opposite directions, indicating that the preferences for cool tones coincided in "character" with personality but not with personal coloring. Furthermore the preferences for warm tones by the blonde subjects of warm coloring who had personalities which were "warm" indicated a mutual "character" between all three of the factors. The choice of colors by both of the warm blonde groups was in harmony with Bjerstedt's (9, p. 32) theory that preferences for colors are related to the "character" of the personality, and with the theory of warm-color vision and cool-color vision expressed by Jaensch (49, p. 201).

When the personality factors A, F, and H were combined, again, as in factor H, the only difference in preferences for warmth between the subjects scoring high and low occurred in the warm blonde group (see Appendix C-5). The warm blondes who tended toward extroversion (high scorers) preferred more warmth in color preferences than did any other personal coloring group. While these results were not significant, they seemed to indicate a positive direction in the relation of personality to personal coloring and to color preferences.

The hypothesis that subjects of warm coloring who had personalities which were outgoing, forward, sociable, and warm would select warm fans and warm tones of the colors was rejected. The hypothesis that subjects of cool coloring who had personalities which were calm, secure, passive, and cool would select cool fans and cool tones of the colors was also rejected. But the hypothesis that there would be no differences between blondes and brunettes in this three-way relationship was accepted.

The findings are somewhat contrary to the teachings of some of the authorities (44, 28) in clothing selection as well as to Bjerstedt's (9, p. 32) theory that the person who tends to prefer warm colors will show certain behavioral tendencies linked with the symbolic value of warm colors. Also, since there was little difference in color preferences between those individuals tending toward extroversion or introversion, the findings were not in agreement with the rather popular belief that extroverts and introverts select colors which are opposite in character.

From the review of the literature on the "character" of color it seemed reasonable to expect that individuals would select colors which would be harmonious with their personality and personal coloring; however, there was also some indication that some individuals might select colors to reinforce desired behavior. Therefore, emotional and less stable individuals would select colors which would evoke opposite feelings, such as calmness, passivity, and stability. The use of these colors might help the person to "check" irrational behavior and to cover up personality weaknesses. Compton (18) suggested that clothing may have been useful in this way to a group of psychotic women. She found that there was a relationship between the choice of the color and design of clothing fabrics and the subjects with

weak body boundaries. The relationship suggested that subjects with weak body boundaries tended to define or reinforce them through their choice of clothing fabrics. She said: "Such clothing may artifically provide them with a defense, supplying them a minimum constancy in new situations" (18, p. 44).

Limitations of the Study

It is necessary to evaluate the findings in light of the limitations of the study. While efforts were made to control intervening variables which would affect the results, the subjects were not selected on a random basis; therefore, the findings of this study cannot be applied to other groups.

Within this study it is possible that some statistically significant relations might have occurred between personal coloring, personality, and color preferences had the number of subjects been greater in each of the categories. The statistical analysis used was less effective for small groups. Also, there was an apparent discrepancy in the findings on the personality factors F and H. It was expected that the subjects would score in the same direction on these factors. Although some did, there were more subjects scoring high than low on personality factor F while the reverse was true for personality factor H.

SUMMARY AND CONCLUSIONS

The aim of the study was to explore the possibility of whether relationships existed between the warmth and coolness of personal coloring, certain personality characteristics, and the choice of warmth or coolness in colors to be used for clothing.

A review of the literature dealing with color preferences indicated that one group of individuals generally preferred warm, bright, and intense colors while another group preferred cool, dull colors. Furthermore, leading authorities in clothing selection suggested that individuals with warm coloring should select warm colors for personal enhancement, while those with cool coloring should select cool colors. There were also reports from research which indicated that individuals who were more outgoing, forward, warm, sociable, and extroverted were found to select warm, bright colors while others who were more calm, quiet, cool, passive, and introverted selected cool, dull colors. It was, therefore, concluded that there might be an interaction between personal coloring, personality, and color preference.

In order to investigate these relationships a method was developed for the comparison of personal coloring to Munsell hues. The hues were divided into warm and cool tones of skin, eye, and hair color as well as into blonde and brunette hair coloring classifications. One hundred young women who met the standards set for the four personal coloring classifications - warm blonde, cool blonde, warm brunette, and cool brunette - were selected from the student population at the University. They were presented three color preference tests which were designed to force a choice between a warm and a cool color fan and between a warm and a cool tone of two groups of six colors - red, orange, yellow, green, blue, and purple. They were asked to select the colors which they would prefer to have for

their own clothing.

To determine the relation of personality to personal coloring and to color preference, four factors, A, C, F, and H, were selected from Cattell's 16 Personality Factor Test to be measured. These factors were believed to represent warmth and coolness of personality since they were described in terms found by other investigators to be associated with the warm or cool colors.

The analysis of the relationships showed that the warmth and coolness of personal coloring was sometimes related to the selection of warmth or coolness in colors to be used for clothing. A high percentage (84%) of cool subjects selected the fan of cool colors while not quite one-half (46%) of the subjects who were warm in coloring selected the fan of warm colors. The difference was significant and therefore the hypothesis that subjects with cool coloring would select the fan of cool colors was accepted. On the other hand, the hypothesis that subjects with warm coloring would select the fan of warm colors was rejected. Since there was considerable variation in preferences for the fans by blondes and brunettes the hypothesis that there would be no difference in preference between blondes and brunettes was accepted.

When the subjects were given more opportunity to make choices for warmth or coolness through the selection of warm and cool tones of the two groups of six colors, there was a slight tendency for warm subjects to select warm tones but cool subjects preferred the cool tones. The difference in choices between the two groups was significant. Slightly over one-half of the responses made by the subjects of warm coloring were for warm tones, although the warm tones of the cool colors were preferred less often than the cool tones. Therefore, the analysis indicated that the preferences were in the direction of the hypothesis which stated that warm subjects would select warm tones of the colors.

On the other hand, subjects with cool coloring selected considerably more cool tones than warm tones for all the colors except orange and yellow. The results of the choices supported the hypothesis that subjects with cool coloring would select cool tones of the colors. When the subjects were divided into blonde and brunette categories the difference in preferences for warm tones was not significant; therefore, the hypothesis that there would be no difference in preferences between blondes and brunettes was accepted. However, it was found that the brunette subjects with warm coloring consistently selected a higher percentage of warm tones, with the exception of red, than did any other personal coloring group.

Warmth and coolness of personal coloring was found not to be related to the personality characteristics measured. Therefore, the hypothesis that the personality characteristics described as being outgoing, forward, warm, emotional, happy-go-lucky, expressive, adventurous, active, and responsive would be related to those individuals of warm coloring was rejected. Also the hypothesis that personality characteristics described as being reserved, cool, emotionally stable, calm, sober, serious, shy, and restrained would be related to those individuals with cool coloring was rejected.

No significant relationships were found when the interactions of personal coloring, color preference, and the four personality characteristics were investigated. Therefore, the hypothesis that there would be a relationship between the warmth or coolness of personal coloring, color preferences, and personality characteristics was rejected.

It was concluded that, for the subjects of this study, the warmth or coolness of personal coloring was the only factor that was related to the preference for warmth or coolness in colors to be used for clothing.

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APPENDICES

APPENDIX A-1

Preferences for Warm Tones of Warm Colors

	Number	Number of Warm Tones Preferred	Percentage	F ratio
Warm Subjects	50	177	59.00	.04
Cool Subjects	50	174	58.00	
Total	100	351	58.50	
Warm Blondes	25	85	55.00	.04
Cool Blondes	25	85	55.00	
Warm Brunettes	25	92	61.33	
Cool Brunettes	25	89	59.33	
Total	100	351	58.50	
Blondes	50	170	55.00	.56
Brunettes	50	181	60.33	
Total	100	351	58.50	

APPENDIX A-2

Preferences for Warm Tones of Cool Colors
by Warm Blondes and Brunettes and Cool Blondes and Brunettes

	Number	Number of Warm Tones Preferred	Percentage	F ratio
Warm Blondes	25	65	43.33	
Cool Blondes	25	45	30.00	.07
Warm Brunettes	25	70	46.67	
Cool Brunettes	25	44	29.33	
Total	100	224	37.33	
Blondes	50	110	36.67	.16
Brunettes	50	114	38.00	
Total	100	224	37.33	

APPENDIX A-3

Preferences for Warmth and Coolness in Color by Subjects Who Have Had Clothing Selection and by Subjects Who Have Not Had Clothing Selection

	Number of Subjects	Number of Warm Fans Preferred	%	Number of Warm Tones of Color Preferred	%
Warm Blondes having C.S.	8	3	37.50	54	56.25
Warm Blondes not having C.S.	17	7	41.18	96	47.05
Cool Blondes having C.S.	8	1	12.50	36	37.50
Cool Blondes not having C.S.	17	1	5.88	94	46.07
Warm Brunettes having C.S.	8	6	70.50	55	57.29
Warm Brunettes not having C.S.	17	7	41.18	107	52.45
Cool Brunettes having C.S.	11	2	18.18	60	45.45
Cool Brunettes not having C.S.	14	4	28.57	73	43.45

APPENDIX B-1

Personal Coloring in Relation to Low and High Scores on Personality Factor A

	Number Scoring Low	Percentage of Group	Number Scoring High	Percentage of Group
Warm Subjects	16	32	17	34
Cool Subjects	11	22	16	32
Total	27	27	33	33
Warm Blondes	10	40	8	32
Cool Blondes	6	24	10	40
Warm Brunettes	6	24	9	36
Cool Brunettes	5	20	6	24
Total	27	27	33	33
Blondes	16	32	18	36
Brunettes	11	22	15	30
Total	27	27	33	33

APPENDIX B-2

Personal Coloring in Relation to Low and High Scores on Personality Factor C

	Number Scoring Low	Percentage of Group	Number Scoring High	Percentage of Group
Warm Subjects	11	22	17	34
Cool Subjects	12	24	13	26
Total	23	23	30	30
Warm Blondes	5	20	8	32
Cool Blondes	7	28	10	40
Warm Brunettes	6	24	9	36
Cool Brunettes	5	20	3	12
Total	23	23	30	30
Blondes	12	24	18	36
Brunettes	11	22	12	24
Total	23	23	30	30

APPENDIX B-3

Personal Coloring in Relation to Low and High Scores on Personality Factor F

	Number Scoring Low	Percentage of Group	Number Scoring High	Percentage of Group
Warm Subjects	13	26	17	34
Cool Subjects	14	28	17	34
Total	27	27	34	34
Warm Blondes	8	32	6	24
Cool Blondes	8	32	10	40
Warm Brunettes	5	20	11	44
Cool Brunettes	6	24	7	28
Total	27	27	34	34
Blondes	16	32	16	32
Brunettes	11	22	18	36
Total	27	27	34	34

APPENDIX B-4

Personal Coloring in Relation to Low and High Scores on Personality Factor H

	Number Scoring Low	Percentage of Group	Number Scoring High	Percentage of Group
Warm Subjects	17	34	11	22
Cool Subjects	18	36	10	20
Total	35	35	21	21
Warm Blondes	10	40	6	24
Cool Blondes	11	44	4	16
Warm Brunettes	7	28	5	20
Cool Brunettes	7	28	6	24
Total	35	35	21	21
Blondes	21	42	10	20
Brunettes	14	28	11	22
Total	35	35	21	21

APPENDIX B-5

Personal Coloring in Relation to Low and High Scores on the Cluster of Personality Factor A, F, and H

	Number Scoring Low	Percentage of Group	Number Scoring High	Percentage of Group
Warm Subjects	11	22	10	20
Cool Subjects	10	20	5	10
Total	21	21	15	15
Warm Blondes	7	28	3	12
Cool Blondes	5	20	3	12
Warm Brunettes	4	16	7	28
Cool Brunettes	5	20	2	8
Total	21	21	15	15
Blondes	12	24	6	12
Brunettes	9	18	9	18
Total	21	21	15	15

Appendix C-1. Preferences for Warmth by Subjects Low and High on Personality Factor A

	Subjects Scoring Low					Subjects Scoring High				
	Number of Subjects	Number Preferring Warm Fan	%	Number of Warm Tones Preferred	%	Number of Subjects	Number Preferring Warm Fan	%	Number of Warm Tones Preferred	%
Warm Subjects	16	4	25.00	104	54.77	17	10	58.80	111	54.41
Cool Subjects	11	2	18.18	60	45.45	16	3	18.75	82	42.71
Total	27	6	22.22	164	50.62	33	13	43.33	193	48.73
Warm Blondes	10	3	33.33	64	53.33	8	5	62.50	50	52.08
Cool Blondes	6	0	0.00	37	51.39	10	2	20.00	44	36.67
Warm Brunettes	6	1	16.67	40	55.55	9	5	55.55	61	56.48
Cool Brunettes	5	2	40.00	23	38.33	6	1	16.67	38	52.78
Total	27	6	33.33	164	50.62	33	13	43.33	193	48.73
Blondes	16	3	18.75	101	52.60	18	7	38.89	94	43.52
Brunettes	11	3	27.27	63	47.72	15	6	40.00	99	55.00
Total	27	6	33.33	164	50.62	33	13	43.33	193	48.73

Appendix C-2. Preferences for Warmth by Subjects Scoring Low and High on Personality Factor C

	Subjects Scoring Low					Subjects Scoring High				
	Number of Subjects	Number Preferring Warm Fan	%	Number of Warm Tones Preferred	%	Number of Subjects	Number Preferring Warm Fan	%	Number of Warm Tones Preferred	%
Warm Subjects	11	7	63.63	72	54.54	17	7	41.18	115	56.37
Cool Subjects	12	0	0.00	52	36.11	23	5	21.73	124	44.93
Total	23	7	30.43	124	44.92	40	12	30.00	239	49.79
Warm Blondes	5	3	60.00	37	61.67	8	2	25.00	53	55.21
Cool Blondes	7	0	0.00	33	39.28	10	1	10.00	47	39.17
Warm Brunettes	6	4	66.67	35	48.61	9	5	55.00	62	57.41
Cool Brunettes	5	0	0.00	19	31.67	13	4	30.77	77	49.36
Total	23	7	30.43	124	44.92	40	12	30.00	239	49.79
Blondes	12	3	25.00	70	50.00	18	3	16.67	100	46.30
Brunettes	11	4	36.36	54	41.67	22	9	40.91	139	52.65
Total	23	7	30.43	124	44.92	40	12	30.00	239	49.79

Appendix C-3. Preferences for Warmth by Subjects Low and High on Personality Factor F

	Subjects Scoring Low					Subjects Scoring High				
	Number of Subjects	Number Preferring Warm Fan	%	Number of Warm Tones Preferred	%	Number of Subjects	Number Preferring Warm Fan	%	Number of Warm Tones Preferred	%
Warm Subjects	13	4	30.76	84	49.70	17	12	70.58	102	50.00
Cool Subjects	14	2	14.28	79	47.02	17	3	17.64	81	39.70
Total	27	6	22.22	163	50.31	34	15	44.12	183	44.85
Warm Blondes	8	2	25.00	48	50.00	6	5	83.33	37	51.39
Cool Blondes	8	0	0.00	45	46.87	10	2	20.00	44	36.67
Warm Brunettes	5	2	40.00	36	60.00	11	7	63.63	65	36.93
Cool Brunettes	6	2	33.33	34	47.23	7	1	14.28	37	44.05
Total	27	6	22.22	163	50.31	34	15	44.12	183	44.85
Blondes	16	2	12.50	93	48.44	16	7	43.75	81	42.19
Brunettes	11	4	36.36	70	53.03	18	8	44.44	102	47.22
Total	27	6	22.22	163	50.31	34	15	44.12	183	44.85

Appendix C-4. Preferences for Warmth by Subjects Low and High on Personality Factor H

	Subjects Scoring Low					Subjects Scoring High				
	Number of Subjects	Number Preferring Warm Fan	%	Number of Warm Tones Preferred	%	Number of Subjects	Number Preferring Warm Fan	%	Number of Warm Tones Preferred	%
Warm Subjects	17	6	35.29	100	49.02	11	5	45.45	77	58.33
Cool Subjects	18	1	5.55	89	41.20	10	3	30.00	57	47.50
Total	35	7	20.00	189	45.00	21	8	26.25	134	53.17
Warm Blondes	10	2	20.00	50	41.67	6	2	33.33	40	55.55
Cool Blondes	11	0	0.00	60	45.45	4	1	25.00	19	39.58
Warm Brunettes	7	4	57.14	50	54.52	5	3	60.00	37	61.67
Cool Brunettes	7	1	14.29	29	34.52	6	2	33.33	38	38.89
Total	35	7	20.00	189	45.00	21	8	26.25	134	53.17
Blondes	21	2	9.52	110	43.65	10	3	20.00	59	49.17
Brunettes	14	5	35.71	79	47.02	11	5	45.45	75	56.82
Total	35	7	20.00	189	45.00	21	8	26.25	134	53.17

Appendix C-5. Preferences for Warmth by Subjects Who Scored Low and High on the Cluster of Personality Factors A, F, H

	Subjects Scoring Low					Subjects Scoring High				
	Number of Subjects	Number Preferring Warm Fan	%	Number of Warm Tones Preferred	%	Number of Subjects	Number Preferring Warm Fan	%	Number of Warm Tones Preferred	%
Warm Subjects	11	4	36.33	72	54.54	10	6	60.00	70	58.33
Cool Subjects	10	1	10.00	54	45.00	5	1	20.00	26	43.33
Total	21	5	23.33	126	50.00	15	7	46.66	96	53.33
Warm Blondes	7	2	28.57	40	47.62	3	2	66.67	22	61.11
Cool Blondes	5	0	0.00	33	55.00	3	1	33.33	12	33.33
Warm Brunettes	4	2	50.00	32	66.67	7	4	57.14	48	57.14
Cool Brunettes	5	1	20.00	21	35.00	2	0	0.00	14	58.33
Total	21	5	23.33	126	50.00	15	7	46.66	96	53.33
Blondes	12	2	16.67	73	50.69	6	3	50.00	34	47.22
Brunettes	9	3	33.33	53	49.07	9	4	44.44	62	57.41
Total	21	5	23.33	126	50.00	15	7	46.66	96	53.33

Appendix D-1. Color Preferences and Personality Scores of Warm Brunettes

Fan Preferred Warm = 1 Cool = 2	Strips Warm = 1 Cool = 2 R O Y G B P	Pages Warm = 1 Cool = 2 R O Y G B P	Personality Factors Low = 1, Medium = 2, High = 3 A C F H AFH	Clothing Selection Yes = 1 No = 2
1	2 1 1 2 1 1	2 1 1 1 1 1	2 1 1 1 1	1
1	1 1 1 1 1 2	1 1 1 1 1 1	3 3 3 3 3	2
1	2 2 1 2 2 1	1 1 1 2 2 1	3 2 3 2 2	1
2	2 1 1 2 1 1	2 2 1 2 1 1	1 2 2 1 1	2
2	2 2 1 2 2 2	2 1 1 2 2 1	2 2 3 3 2	2
2	2 2 1 2 2 2	1 1 1 1 2 1	3 1 3 2 3	1
2	2 2 2 2 2 2	2 2 1 2 2 1	3 1 3 2 3	2
1	1 2 2 1 2 2	1 1 2 1 2 2	2 3 3 2 2	2
1	2 1 1 1 1 1	2 1 2 1 2 2	2 1 2 3 2	2
2	2 2 1 1 2 2	1 1 1 1 2 2	1 2 1 1 1	2
1	1 1 2 1 2 2	1 2 1 1 1 2	3 1 3 2 3	2
2	1 2 1 1 2 2	1 2 1 1 2 2	1 2 2 2 2	2
2	1 1 1 2 2 1	1 1 1 2 1 1	1 3 2 2 2	2
1	1 1 1 1 1 1	1 1 1 1 1 1	2 3 2 1 2	2
1	1 1 1 1 2 1	1 1 1 1 2 1	2 2 1 1 1	1
2	2 1 2 1 2 1	2 1 1 1 2 1	3 3 1 3 2	2
1	1 2 1 1 2 1	1 2 1 1 2 1	3 2 3 3 3	1
1	2 2 2 1 2 2	2 2 2 1 2 2	2 3 3 1 2	2
2	2 1 1 2 2 2	2 1 1 2 2 2	2 2 1 2 2	2
1	1 1 1 1 2 2	1 1 1 1 2 1	1 3 2 2 2	1
1	2 2 1 2 1 2	2 2 1 2 1 2	2 1 2 2 2	1
2	2 1 1 2 2 2	2 1 2 2 2 1	2 3 2 1 2	2
2	2 1 2 2 1 2	2 2 2 2 1 2	1 3 2 2 2	1
2	2 2 1 2 1 1	2 1 1 2 1 1	3 2 3 2 3	2
1	1 2 1 1 2 2	1 1 1 1 2 2	3 2 3 2 3	2

Appendix D-2. Color Preferences and Personality Scores of Cool Brunettes

Fan Preferred Warm = 1 Cool = 2	Strips Warm = 1 Cool = 2						Pages Warm = 1 Cool = 2						Personality Factors Low = 1, Medium = 2, High = 3					Clothing Selection Yes = 1 No = 2
	R	O	Y	G	B	P	R	O	Y	G	B	P	A	C	F	H	AFH	
2	2	1	1	2	1	1	2	1	1	1	1	1	2	3	1	1	2	1
2	2	1	1	2	1	1	2	1	1	2	1	2	3	3	2	2	2	2
1	1	2	1	2	1	1	1	2	1	2	1	1	1	2	1	2	1	1
1	2	2	1	2	1	1	1	1	1	2	1	2	1	3	2	1	2	2
2	2	1	1	2	1	1	2	1	1	2	1	1	3	3	3	3	3	1
2	2	1	1	2	2	2	2	2	1	2	2	2	1	2	1	2	1	1
2	2	1	1	2	2	1	2	2	1	2	2	1	2	1	3	2	2	1
2	2	1	2	2	1	2	2	1	2	2	1	2	2	1	2	2	2	1
2	2	1	1	1	2	1	2	2	1	2	2	2	2	3	3	2	2	1
2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	1	2	2
2	1	1	1	2	2	2	1	1	1	2	2	2	2	2	2	3	2	1
2	2	1	1	2	2	1	2	1	1	2	2	1	3	3	2	2	2	2
2	2	1	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2
2	2	1	2	2	2	2	2	1	2	2	2	2	1	1	2	1	1	1
1	2	1	2	1	2	2	1	1	1	1	2	2	3	3	1	2	2	2
2	2	1	2	1	2	2	2	1	1	1	2	2	2	1	1	1	1	2
2	2	2	1	2	2	1	2	2	1	2	2	2	2	2	1	1	1	1
1	1	1	1	2	2	2	1	1	1	1	2	2	2	3	2	3	2	1
2	2	1	1	2	2	2	2	1	1	2	1	2	2	2	2	2	2	2
2	1	2	1	1	2	2	1	1	2	1	2	2	3	3	3	3	3	2
2	2	1	1	2	2	2	1	1	1	1	2	2	2	3	3	3	2	2
2	2	1	1	2	2	2	2	1	2	2	2	2	1	1	3	1	2	2
1	2	1	1	2	2	1	2	2	1	2	2	2	2	3	3	3	2	2
2	2	1	1	2	2	1	2	1	1	2	2	2	3	3	2	2	2	2
1	1	1	1	2	1	1	2	1	1	1	2	1	2	2	2	2	2	2

Appendix D-3. Color Preferences and Personality Scores of Warm Blondes

Fan Preferred Warm = 1 Cool = 2	Strips Warm = 1 Cool = 2						Pages Warm = 1 Cool = 2						Personality Factors Low = 1, Medium = 2, High = 3					Clothing Selection Yes = 1 No = 2
	R	O	Y	G	B	P	R	O	Y	G	B	P	A	C	F	H	AFH	
2	2	1	2	1	2	2	2	1	2	1	2	2	2	2	1	1	1	1
1	2	2	1	2	1	1	2	1	1	2	1	1	3	3	2	2	2	2
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1
2	1	2	2	2	2	2	1	1	1	1	2	1	1	2	3	3	2	2
1	1	1	1	1	2	1	1	1	1	1	1	2	3	3	2	3	3	1
1	1	1	1	1	2	2	1	2	2	1	2	2	2	2	1	1	1	1
1	1	2	1	1	2	1	1	2	1	1	2	1	1	1	2	2	2	2
1	1	2	2	2	1	2	1	2	2	1	1	2	2	2	3	3	2	2
2	2	1	2	2	1	2	2	1	2	2	1	2	2	3	2	1	2	2
1	2	1	2	2	2	1	2	1	2	1	2	2	3	2	3	2	3	2
2	1	2	2	2	2	2	1	1	1	1	2	2	1	2	2	2	2	1
1	1	1	1	2	2	2	1	1	1	1	2	2	1	1	3	2	2	2
2	2	1	1	2	2	2	2	1	1	1	2	2	1	1	1	1	1	2
2	2	1	1	2	1	1	2	1	2	2	1	1	1	3	2	3	2	2
2	1	1	1	2	1	1	1	1	2	2	2	2	3	2	2	1	2	1
2	2	1	2	2	2	2	1	1	2	2	1	1	2	3	1	2	2	2
2	2	2	1	1	1	1	1	2	1	2	2	1	2	3	1	1	2	1
2	2	2	1	2	2	1	2	2	1	2	2	2	3	2	2	2	2	2
2	1	1	2	1	2	2	2	2	2	1	2	2	2	3	2	3	2	2
1	2	1	2	2	2	2	2	1	2	1	1	1	3	2	3	1	2	2
2	1	2	1	1	1	1	1	1	1	1	2	1	3	3	2	3	3	2
2	2	2	1	2	1	1	2	2	2	1	1	1	1	2	2	1	1	2
2	2	1	1	2	2	1	2	1	1	2	2	2	1	2	1	1	1	2
2	2	1	1	2	2	2	2	1	1	2	2	2	1	1	1	1	1	1
1	1	1	2	2	1	1	1	1	2	1	2	2	3	2	3	2	2	2

Appendix D-4. Color Preferences and Personality Scores of Cool Blondes

Fan Preferred Warm = 1 Cool = 2	Strips Warm = 1 Cool = 2						Pages Warm = 1 Cool = 2						Personality Factors Low = 1, Medium = 2, High = 3					Clothing Selection Yes = 1 No = 2
	R	O	Y	G	B	P	R	O	Y	G	B	P	A	C	F	H	AFH	
2	2	1	2	1	2	2	2	2	1	1	2	2	1	1	1	1	1	1
2	1	1	1	2	2	1	1	1	1	2	2	1	2	1	1	2	2	2
2	2	2	1	1	2	1	2	2	1	1	2	1	2	3	3	2	2	2
2	1	1	2	1	2	1	2	1	2	1	2	1	2	2	3	3	2	2
2	1	2	1	2	1	2	2	2	1	2	1	2	3	3	3	3	3	2
2	2	1	1	2	2	2	1	1	1	2	2	2	3	2	1	1	2	2
1	2	2	1	2	2	2	1	1	1	2	2	1	3	3	3	2	2	1
2	2	2	2	2	2	2	2	1	2	1	2	2	2	1	3	1	2	2
2	2	2	1	1	2	2	2	1	1	1	2	2	2	3	2	1	2	2
2	2	2	2	2	2	1	2	1	1	1	2	1	3	1	2	2	2	2
2	1	1	1	2	2	2	2	1	2	1	2	1	2	1	1	1	1	1
2	1	1	1	2	2	2	2	1	1	2	2	2	3	3	1	1	2	1
2	2	1	2	1	2	1	2	1	1	1	2	1	1	1	2	2	2	2
2	2	2	1	2	1	1	2	1	1	2	1	2	1	3	2	1	1	2
2	1	1	1	1	1	2	1	1	1	1	1	2	1	2	1	2	2	2
2	2	1	1	2	1	2	2	1	1	2	1	1	3	2	3	2	2	1
2	1	1	1	2	2	2	1	1	2	2	2	2	2	2	2	2	2	1
2	2	1	1	2	2	2	2	1	1	2	2	2	3	3	3	1	2	2
2	2	1	1	2	2	2	2	1	1	2	2	2	1	3	1	1	1	2
2	2	2	2	1	2	1	2	1	2	2	2	2	2	3	1	1	1	1
2	2	2	2	2	2	2	2	1	2	2	2	2	3	1	3	2	2	1
2	1	1	1	2	2	2	1	2	1	2	2	1	1	2	2	1	2	2
2	2	2	1	2	1	2	2	2	1	2	1	2	3	3	3	3	3	2
1	2	2	1	2	2	2	2	1	1	2	2	2	3	2	3	3	3	2
2	1	1	1	2	1	2	2	2	1	2	1	1	2	2	2	2	2	2

APPENDIX E

Personal Data Record

Subject Number _____

Skin _____

Hair _____

Eye _____

Please indicate your choice of Color Fan by checking A or B

_____A

_____B

Please indicate A or B for each of your color choices:

Group X	Group Y
I____	I_____
II____	II_____
III_____	III_____
IV_____	IV_____
V_____	V_____
VI_____	VI_____

Have you completed a course in clothing selection?

Yes _____ No _____

Age _____

Major School _____