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THE RELATIONSHIP BETWEEN EYE COLOR AND  
BEHAVIORAL INHIBITION IN PRESCHOOLERS

By  
Dana P. Huff

A Thesis

Submitted in partial fulfillment of the requirements of the  
Master of Arts Degree  
Of  
The Graduate School  
At  
Rowan University  
April 17, 2001

Approved by \_\_\_\_\_  
Professor

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## **ABSTRACT**

Dana P. Huff

The Relationship Between Eye Color and Behavioral Inhibition in Preschoolers  
2001

Thesis Advisors: Dr. John Klanderman and Dr. Roberta Dihoff  
School Psychology

The purpose of this study was to study the rate of behavioral inhibition in preschoolers as related to eye color. One study was conducted on 50 preschool age children randomly selected from a learning center. Subjects were not chosen for specific behavioral characteristics, though an emphasis was put on acquiring an even number of blue-eyed children versus brown or green-eyed children. Twenty-two blue-eyed children and 28 brown-eyed and green-eyed children participated. Classroom teachers filled out the Social Competence and Behavior Evaluation, Preschool Edition, based on observable characteristics demonstrated by each child. It is a likert-scale rating form that compiles summary scale results for 8 basic domains. The Isolation-Integration domain was used for the purpose of this study. The results were analyzed using an independent sample T-test. Each child's score on the Isolation-Integration scale, and their eye color (blue or other) were analyzed. The results were significant for blue-eyed children demonstrating a mean score of Isolation/Inhibition lower than that of the other eye colors (the lower the score, the more socially inhibited the child). Therefore concluding that the study showed blue-eyed preschoolers in this sample had higher rates of inhibition.

## **MINI-ABSTRACT**

Dana P. Huff

The Relationship Between Eye Color and Behavioral Inhibition in Preschoolers  
2001

Thesis advisors: Dr. John Klanderman and Dr. Roberta Dihoff  
School Psychology

The purpose of the study was to examine the relationship between eye color and the prevalence of behavioral inhibition. It was anticipated that blue-eyed children would exhibit higher rates of behavioral inhibition. Inhibition was measured using a likert-scale, filled out by classroom teachers. The analysis of results concluded that blue-eyed preschoolers had a higher average rate of social inhibition.

## **ACKNOWLEDGEMENTS**

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To Randy, whom, without his humor and his willingness to put up with my anxiety, I may not have survived this.

I would especially like to thank the ones who have made everything possible for me, my mother and father.

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## CHAPTER I

### **The Problem**

#### **Need**

Several years ago, it was noticed that a majority of the patients in an outpatient facility for children with behavioral and/or emotional disorders had blue eyes. This was very fascinating for many reasons. If there is a *correlation* between having blue eyes and particular behavioral *tendencies*, it could lead to further research on causes. Genetically speaking, if there is a link between the *pigmentation* of the eye and the occurrence of certain behavioral characteristics, there may be a way to predetermine possible irregularities using family history and eye color. Gene Therapy is going to be a common approach in the future. Since School Psychology encompasses many aspects of treatment, it is important to research all avenues of potential causes. It could also be used simply for *screening*; something else to look for when diagnosing problems, as in gender. For years, psychologists and scientists have studied the correlation of *physiological* characteristics and personality. Eye color may be one more characteristic related to particular traits within personality. Doing this research will add on to the theory that already stands.

The pigmentation of the eye is caused mainly by the distribution of *melanin* in the iris. While this is genetic, there may be an interesting link between the amount of melanin in the iris and the behavioral complications as a result. There may be a reason to test the amount



of melanin in people with different variations of light eyes. Perhaps it is not necessarily just blue eyes in particular, but a very light blue, with sparsely distributed melanin.

As with many characteristics of diagnoses in the DSM IV, whether or not there is a link between eye color and behavioral tendencies may only lead to further evidence of a diagnosis. For instance, *Autism* is a complicated disorder. There is no known cause, but it has been determined that it is more prevalent among males. This is not to say that females do not have Autism. It is just another characteristic of the disorder that may help to further substantiate a question of whether or not a person has a particular disorder. The same could be said about eye color. If there is substantial evidence correlating the prevalence of behavioral characteristics to particular eye colors, it could be one more way of determining a problem.

There has been much research to support theories that eye color is linked to athleticism and hearing and pain thresholds, and so on. If this is possible, then there may be something in the melanin that affects the amount of *serotonin* the brain produces, therefore making people more outgoing, thrill-seeking, or have higher pain thresholds.

There is much research on the theory that blue-eyed individuals are more likely to exhibit certain behavioral traits. The notion that eye color may specifically influence the behavioral tendencies of a person, making him more inhibited or more uninhibited has not been researched as thoroughly. More evidence supporting this theory may lead to further research on the links, causes, and possible implications for screening.

## **Purpose**

This research is to further understand the theories already proposed. It will be interesting to see if there is a correlation between eye color and behavioral tendencies.

Even more fascinating is if there is a link, what the possible reasons for it are, and what uses this knowledge may have in the future. There may be a relation between what causes certain behavioral traits, and what causes eye color. The purpose of this study is to research the possibility of a link between iris pigmentation and the prevalence of *behavioral inhibition*. It seems as though the classroom atmosphere puts emphasis on class participation, and the notion that the “squeaky wheel gets the grease.” It is then important to research behavioral inhibition as it could lead to other difficulties in school. Researching a possible link will give support to other theories, therefore substantiating them. This will research a correlation and then the possible causes using data linking eye color to other human traits. Once some research has been done on the possible causes of the correlation, research will also cover possible implications this information has for future use. It will investigate the possible correlation between light-eyed individuals and behavioral inhibition occurring more often in these individuals.

## **Hypothesis**

The hypothesis for this study is that there is a positive correlation between the prevalence of behavioral inhibition and light-eyed individuals. Similarly finding that behavioral inhibition is more prevalent among light-eyed individuals. This hypothesis is based on the notion that the pigmentation that causes blue eyes has behavioral implications on individuals.

## **Theory**

There are many theories linking eye color to human traits. It has been theorized that darker eyed individuals perform better at sports and athletics. It has also been theorized

that light-eyed individuals have a lower threshold for high frequency sounds. These theories lead one to theorize that on a whole, iris pigmentation is positively correlated to particular behavioral traits.

Certain traits may be due to chemicals present in the brain, such as serotonin. For instance, a dark eyed individual who is very successful in sports, may need more *sensory* input in order to be stimulated, thus making him outgoing in his sport. It may be that the amount of pigmentation in his iris *predisposes* him for needing more stimulation. Therefore, his behavior may be more *uninhibited* in order to acquire the proper amount of stimulation needed. This may be why blue-eyed individuals are more behaviorally inhibited. Their bodies don't require the same amount of stimulation, therefore causing them to be more inhibited or less uninhibited in unfamiliar settings.

Iris pigmentation depends on the distribution of melanin in the iris. Blue eyes contain less melanin and dark eyes contain more substantial amounts of melanin. There are some different explanations for why the amount of melanin in the iris would affect behavior. These will be discussed more in depth later, but there may be a correlation between the amount of melanin in the eye to the amount of certain neurons in the body that have different responses to certain environmental stimuli.

There is also a study theorizing that the likelihood of recovery from addictions in certain programs can be partially linked to eye color. A study proved that blue-eyed individuals were less likely to recover while in a group program, and more likely to recover using an individually driven method. This would again uphold the notion that blue-eyed individuals are more inhibited, therefore being more comfortable on an

individual level to achieve, rather than in a more out-going uninhibited setting such as a group.

There have been several studies on light-eyes and the prevalence of behavioral inhibition in the past. No one would conclude that any one variable such as eye color would in turn produce such behaviors in a person, only that eye color may be one more characteristic of a person exhibiting certain behaviors. The theory being, whatever causes eye color also contains a cause for certain behaviors.

There are theories that persons who exhibit inhibited behaviors in childhood are more likely to exhibit other problems as adolescents or adults. It is then important to study the rate of behavioral inhibition in children and again in adults, taking into account other factors such as eye color, which may lead to being part of the demographics when investigating possible disorders. If eye color is related to genetics, and blue eyes are a recessive trait, there is reason to speculate that certain disorders may be related to recessive genes.

In general, the working theory for this research is the notion that iris pigmentation is correlated to behavioral inhibition. The behavioral factors that make up inhibition may be influenced by biological factors that are partially marked by eye color.

## **Definitions**

*Autism* is a disorder marked by inappropriate interaction skills with adults, peers, and objects, and impaired communication. There is no known cause of Autism, though the rates are 4-5 times higher in males than in females.

*Behavioral Inhibition* is a term used to describe an individual who exhibits certain behaviors that appear to be restrained or suppressed. Some examples may be avoiding

unfamiliar people or settings, fewer spontaneous comments, or a feeling of apprehension when in new places or with new people.

*Correlation* is another word for relationship. If something is positively correlated with something else, then there is a common bond. If something correlates, then there is a reciprocal relationship between two comparable items. Example: Smoking is positively correlated with lung cancer.

*Melanin* is the dark pigmentation present in hair, skin, and in this case pupil. It occurs naturally throughout the body.

*Physiological characteristics* are traits related to physical aspects of the functional processes in humans. They are traits that are relational to living organisms.

*Pigmentation* refers to the color that is produced in body tissue. In this case, iris pigmentation refers to the color of an individual's eye.

To be *predisposed* to something in this instance, means that one is more susceptible or liable to certain tendencies, behaviors, or traits. There may be certain genes that predispose an individual to having particular characteristics.

A *screening* is an assessment tool used to acquire knowledge about individuals. It is usually used to detect problems or variations from the general population.

*Serotonin* is a substance found primarily in the brain. It is a neurotransmitter that is responsible for transmitting impulses throughout the body. It is widely believed that the release of serotonin plays a role in the processes of learning, sleep, and mood.

A behavioral *tendency* refers to the likelihood that someone or something will act in a particular way. Having a *tendency* to act a certain way means someone usually acts in a predictable manner given the situation.

*Uninhibited* is being free from constraints. One who exhibits uninhibited behavior does not feel restricted in different situations. An *uninhibited* individual would not act leery or uneasy in unfamiliar situations. Strangers are easily approached and there is more of a willingness to participate in new and/or difficult tasks.

## **Assumptions**

When conducting research, one must make many assumptions. These are thoughts that may adversely affect the outcomes of the study. While keeping in mind the possibility, one makes the assumption that these occurrences will have no ill affect. In this study, several assumptions are made.

The first assumption is, individuals will be honest and unbiased about certain personality traits demonstrated by their students. It is quite possible that the individuals involved may answer questions in a manner more consistent with how they *want* their students to be viewed, instead of how they truly are. Therefore, the assumption being: Individuals will answer honestly and have a firm understanding of the behavioral characteristics in question.

The second assumption is behavior is not the result of different socialization practices. While blue eyes are associated with Northern Europeans and Southern Europeans more often have dark eyes, one may contribute a correlation to cultural parenting styles. This may indeed be true, but this study will assume the individuals rating themselves had the general American viewpoint of favoring sociability and adventurous activity. Thus, it is assumed the participating individuals are being raised with the American viewpoint favoring sociable and adventurous personalities. This study will suggest that the inhibited

behavior exhibited by blue-eyed individuals cannot be explained solely by parental socialization, although there is no doubt that this has some relation to the correlation.

## **Limitations**

Every study has its limitations. In a perfect world, this study would sample hundreds of people, from various populations, spanning all ages, and over a long period of time. Due to time constraints and access, this study will be unable to do this.

This study will only collect data from one population. This limits the relevance and reliability of the research to the population in question. When comparing theories derived from data collected on different population groups, it will limit the correlation. Sampling one population may also lead to other variables in the study. Socially inhibited behavior tends to be a trait that individuals learn to compensate for. Inhibition may be more prevalent among children because they haven't yet learned that it is not a socially desired characteristic. These are some of the variables that may come about from sampling one particular population.

The sample size for this study is also quite small. The larger the sample size, the more reliable the test. In this case the sample size is small, therefore many generalizations will have to be made.

For a study on behavioral inhibition, it would be beneficial to research the same individuals throughout different stages in life. The rate of inhibition varies in different situations, and across ages. In this study, one sample will be collected, and it will not be possible to compare the same individuals' scores at different stages in life.

In regards to this topic, there is not much previous research. This limits the amount of pertinent literature pertaining to this thesis in particular. Although, there is plenty of

research on the various subject areas.

## Overview

In the forthcoming chapters, the thesis for this research will be outlined using a review of literature, the design of the study, the analysis of the results and a conclusion of the study.

In Chapter two the concentration will be on reviewing pertinent literature that supports the theory that iris pigmentation is positively correlated to behavioral inhibition. Initially, the organization of the review will be discussed. The focus will be on specific studies that are comparable to this one. Next, a more brief review of the literature that may be indirectly associated to this thesis will be included. The implications of the literature reviewed will also be discussed in Chapter two.

The focus of Chapter three will be the design of the study. In this chapter, the sample to be studied will be discussed. The measurement used will also be described. The hypothesis will be restated and the measure used to test the hypothesis will be described.

In Chapter four, the analysis of the results will be described. This analysis will be of the data collected and described in Chapters two and three.

Finally, the focus of Chapter five will be summarizing the research and findings from start to finish. The conclusions drawn from the test will be discussed, as well as what implications the results have for further research.



## **CHAPTER II**

### **Review of Literature**

A review of literature pertaining to iris pigmentation and behavioral inhibition revealed several studies related to eye color and its various correlations. First, a review of literature pertaining to the impact that the childhood temperament of behavioral inhibition may have later in life will be noted. Next, there will be an examination of the different correlations between eye color and several physiological characteristics. Then, there will be a review of studies directly related to the present study.

### **Implications of Behavioral Inhibition Later in Life**

Doubts about one's ability to contribute effectively to social encounters and the belief that one will be negatively evaluated by others may contribute to the inhibited behavior and social anxieties that characterize shyness (Crozier, 1995) Social withdrawal may reduce self-esteem or possibly even mold situations that provide little opportunity for positive experiences that boost self esteem, as sets the stage for Crozier's study in 1995. He set up this study to research the theory that behavioral inhibition may be a pre-determinant of low self-esteem. The study focused on 9-12 year olds because this is a period of rapid changes that may increase social withdrawal. The tendency to withdrawal in unfamiliar situations in childhood leads to shyness in adolescence. The hypothesis for this study is that low self-esteem in adolescence is more prevalent among shy adolescents. Questionnaires were developed based on phrases associated with self-

reports of shyness given by adolescents. One hundred and ninety-two children completed 2 questionnaires; a shyness scale and a self-esteem inventory. This study found that the tendency to label oneself as having traits of shyness is correlated with having low self-esteem. The correlation assessed in this study was a negative correlation. The more self-proclaimed traits of shyness, the lower the self-esteem. The correlation between the shyness scale and the self-perception scale of global self-worth was  $-.304$  for girls and  $-.358$  for boys.

Associations between temperament in preschool, environmental factors, and school age personality traits were examined in this sample of 93 children. This study attempts to link temperament during early childhood with personality in later life. Children were enrolled in the study at six weeks of age and followed until nine years of age. By four years old, families had participated in home visits by research assistants to obtain temperament ratings, laboratory visits, questionnaires, and parent-rating scales. At four years of age, videos were taken of the family at either lunchtime or dinnertime. Parental behavior was recorded at this time. From birth until four years, reports of day care experience were also given on a monthly basis. The Colorado Childhood temperament Inventory (Bowe and Plomin, 1977) and the Emotionality, Activity, and Sociability Scale (Buss and Plomin, 1977) were given in increments. For the purpose of the present study, only data relevant to this topic will be discussed. The hypothesis of a correlation between extroversion in later childhood among children who experienced behavioral inhibition in early childhood was not found, due to a prominence of introversion in later childhood among children who experienced behavioral inhibition in early childhood. Behavioral inhibition was positively correlated with agreeableness and conscientiousness, though negatively correlated to openness. The temperament-personality associations found in

this study support the theory of a temperamental basis for personality (Ahadi and Rothbart, 1994.)

Another study that looked into the implications in adolescence of behaviorally inhibited behavior in childhood is one that first looked at children at the age of two, and then again at the age of 13. Seventy-nine children who had been labeled as inhibited or uninhibited at the age of two, were assessed through interview and observation at the age of 13. The reason for this study was the suggestion that temperament may predict forms of extreme anxiety (Chess and Thomas). Inhibition and uninhibition were assessed at both ages using a parent report and an observation of the child. Adolescents classified as inhibited or uninhibited at two years of age did not differ in regards to the presence of specific fears, separation anxiety, or performance anxiety. In regards to social anxiety, more inhibited than uninhibited adolescents experienced social anxiety (boys:  $c21=3.9$ ,  $p=.05$ ; girls:  $c21=4.4$ ,  $p=.04$ ). Sixty-one percent of 13 year olds who were classified as inhibited at two years old experienced social anxiety. Only 20 % of those previously classified as being inhibited never experienced generalized social anxiety. This study found that the original temperaments of two-year-olds are preserved into adolescence. Thus, inhibition was a predictor of generalized social anxiety.

### **Correlations Between Eye Pigment and Physiological Traits**

It has been shown that light-eyed individuals specialize in behaviors that require hesitation, inhibition, and self-paced activities. Dark-eyed individuals specialize in behaviors that require sensitivity, speed, and reactive responses. (Worthy, 1974). Rohmer and Meadows published a report comparing the relationship between eye color and Type A scores. Type A behavior is characterized by a style of coping referred to as an “anger-in” behavior. This is the suppression of hostility, which resembles the

inhibition of response. This study focused on 90 male and 90 female undergraduate students with 30 males and 30 females grouped into three eye-color classifications; blue, brown/black, and other. Each subject completed the Jenkins Activity Survey, which determines a Type A personality or a Type B personality. The primary question underlying this study was to determine if Type A scores are more prevalent among blue-eyed people. Of combined male and female scores on the Jenkins Activity Survey, 60% of those in the blue-eye category were rated as Type A. This is in comparison to the 48.3% of the brown/black category, and 53.3% in the other category being rated as Type A.

A study comparing melanin distribution and sensitivity to group therapy hypothesized that improvement on three dimensions of behavior from therapy would be related to participant eye color (Gary, et al.). The thought was that blue-eyed individuals would do better at activities they were able to direct themselves, therefore making the rate of improvement among blue-eyed individuals less than that of dark-eyed individuals. Thirty-five subjects participated in the study. Nine had blue eyes, 12 had green/hazel eyes, and 14 had dark eyes. This study found significant improvement for hazel/green eyed individuals. It disproved the theory being tested. Though, after consideration, the hazel/green-eyed individuals should make more progress. The test method was a self-report test. The self-report test asked subjects to judge their own change in behaviors which would involve a certain amount of learning from outside stimuli (a dark-eyed trait). It would also involve self-disclosure, which is a self-paced activity. This, it would be appropriate that the "middle of the range" eye color report the most amount of change since it encompasses both blue and brown eye colors.

The purpose of one study meant to predict outcomes in behavior therapy by using eye-color came from the popularity of behavioral therapies with children (Markle, et al. ). At

the same time, little attention has been given to the outcomes of specific treatment programs based on individual differences. The focus of this study is on self-paced versus reactive activities. Self-paced activities are those that the individual decides to initiate when he/she chooses, while the stimulus situation remains constant. Reactive activities are those that have to be initiated at a given time dictated by a stimulus situation (Markel, et al. ). Examples of self-paced sports are golf and bowling. Examples of reactive sports are boxing and hitting a baseball. Many studies have been done on the responsiveness to social stimuli by dark-eyed people. It appears that light-eyed individuals are more influenced by internal stimuli, whereas dark-eyed individuals appear more influenced by external stimuli. The different responses among dark-eyed and light-eyed individuals to external stimuli seem to be an increasingly important factor that is considered by behavior therapists working with children (Markle, et al. ). When working with children, the ability of the parents to apply rewards and consequences consistently, and the ability of the child to respond appropriately to the changes determine much of the outcome. This study hypothesizes that the “ability to react appropriately” is related to eye-color. Response-contingent programs (reinforcement by parents) are noted as Reactive programs because the outcome of treatment largely depends on the child’s reaction to external stimuli. Other treatments require response to internal stimuli. These treatments involve relaxation training and achievement motivation training. These are termed self-paced activities because the child initiates the response when he/she chooses. This research tested the hypothesis that light-eyed children would endure more success from self-paced activities. This study sampled 169 blue-eyed and 118 dark-eyed subjects between the ages of 0-17. For children between the ages of 0-12, 108 had blue eyes and 51 had dark eyes. Reactive programs were the only programs used for this age group. The percentage of successful treatment for blue and brown-eyed subjects 0-12 was

80.16% and 93.12%, respectively. For teenagers, 13-17, they employed both self-paced and reactive techniques. Individuals who received only one type of treatment were divided into four groups; light-eyed Reactive, dark-eyed Reactive, light-eyed Self-paced, and dark-eyed Self-paced. There was a total of 88 13-17 year olds. The percentage of successful treatment for blue-eyed Reactive was 57.80%, while dark-eyed Reactive was 94.55%. The percentage of successful treatment outcomes for light-eyed Self-paced and dark-eyed Self-paced was 87.81 and 85.14, respectively. For the 0-12 age group, reactive treatments were significantly more effective for dark-eyed children. While Self-paced treatments were only slightly more effective for blue-eyed children in the 13-17 age group.

This study found that dark-eyed children respond better to reactive (external stimuli) treatment. If eye-color data is collected routinely, it may save time when determining an initial method of treatment.

The correlation between eye color and inhibition comes from the notion that eye color may represent an indirect code of psychological markers of uncertainty associated with physiological processes (Rosenberg and Kagan, 1989). Iris pigmentation may reflect the production of neuromelanin in the central nervous system- therefore assuming that individuals with low levels of melanin have lighter eyes. More over, it is questioned that the production of melanin may partly be a function of norepinephrine and cortisol production. Kagan suggests that there may be a relation between physiological indices of arousal in the limbic system and the temperament of "behavioral inhibition." Rubin and Both re-examined the original study because it was questionable whether or not the findings would still hold true over time. And, if the correlation between eye color and behavioral inhibition declined with age, then it may be taken as proof that environmental factors play a more important role than genetic factors when explaining sociability in

childhood. Rubin and Both hypothesize that any association between eye color and inhibition will decline with age. Children in Kindergarten, Second, and Fourth grade were observed during free play, 10-15 second intervals. Their behavior was then coded on a scale. They observed the children in Isolated Play (all forms of solitary play plus all unoccupied onlooker behaviors), Social Play (all forms of group play plus all conversations with peers), and Isolated Passivity (the frequency of solitary-constructive play and solitary-exploratory play). Their data indicates that light-eyed children are over-represented in the extremely inhibited Isolated Playgroup in Kindergarten and Second grade, but not in Fourth grade. Extremely withdrawn children in the Isolated Passivity group also had an over-representation of light-eyed children, but only in Second grade. Collectively, this data suggests that biological/temperamental factors (like eye color) may indeed impact upon sociability, but with age, environmental factors become more influential. Though, Rubin and Both admit that the result of no relationship between eye color and behavioral inhibition in Fourth graders may have been due to the smaller sample size.

Another study focused on the link between dark haired/ light-eyed individuals and their liability to psychopathology. Cohen (1978) collected data from large undergraduate classes including information regarding eye color, hair color, and whether or the individual or a first-degree relative had been hospitalized for psychological reasons. This study also focused solely on females. The results concluded that the percentage of females with a liability to psychopathology and light eyes is higher than the percentage of females with dark eyes and a liability to psychopathology ( $\chi^2(1) = 9.318, p < .005$ ). As the correlation could not be explained, a discussion on hand preference supported the notion that there could be a biological marker for mental processes. Left-handedness is sometimes derived from brain damage or a congenital sensitivity making an infant less

likely to adapt to certain processes (Bakan, 1975). For individuals that do not have a familial link to left-handedness, it is suggested that there is a discrepancy in the left hemisphere of the brain. In addition, there is evidence that there is a link between psychopathology and discrepancies in the left hemisphere (Gur, 1977).

### **Review of Similar Studies**

In a study conducted by Kagan and Rosenberg, behavioral inhibition and the degree of pigmentation in the iris were investigated. Several biological factors are considered in explaining this correlation. Pauehaus and Martin (1986) theorized that measures of peer aggression, attention span, and impulsivity in the preschool years has been predicted by the number of minor physical abnormalities in utero. This has also been predictive of activity level, clumsiness, sociability, and emotionality in adult males. This is evidence of research supporting a relation between physical and psychological characteristics. Rosenberg and Kagan identified a possible link between the childhood temperamental quality of inhibition to the unfamiliar and the degree of pigmentation in the iris. The three signs identified as behaviorally inhibited behavior by Rosenberg and Kagan are as follows: 1. Withdrawal from or long latencies to interact with unfamiliar adults or objects, 2. Cessation of play and vocalization following introduction of something novel, and 3. Prolonged proximity to a parent in an unfamiliar setting. These signs are concurrent with two to three year olds. Four and five year olds exhibit different signs such as: 1. A long latency to speak to an unfamiliar adult, 2. Reluctance to initiate social contact with an unfamiliar child, and 3. A tendency to stand or play apart from other children in group contexts. For the purpose of the study conducted by Rosenberg and Kagan, two and three year old children were sampled.



The data suggests that inhibition is correlated to a lower threshold for limbic arousal. Many studies on the distribution of eye color among people with schizophrenia, phenylketonuria, autism, and other classifications, support the notion that specific psychological characteristics may be associated with states of uncertainty. Research on melanin and the influence it has on stress reactions provide one basis for the relationship between iris pigmentation and inhibition. The study included 46 children (23 blue-eyed and 23 brown-eyed) at 21 months of age. The second group included 54 children (27 blue-eyed and 27 brown-eyed at 31 months of age. Assessments of the physiological traits revealed that inhibited children have more stable heart rates and had colic, chronic constipation, or allergies during infancy. This implies higher levels of limbic arousal.

The most important finding from this study was that children who exhibited behaviorally inhibited behavior over the four years of the study were more likely to have blue eyes and had more stable heart rates. In the first group, 57% of inhibited children had blue eyes. In the second group, 64% of children had blue eyes. Data collected from a large sample of Caucasian children living in the area revealed that 40-45% of that population has blue eyes. When children from both samples were combined, there was a significant correlation between eye color and inhibited behavior ( $\chi^2=7.97$ ,  $p$  less than .01).

From this data, it is suggested that eye color may work as a marker of some unknown central nervous system process. The amount of melanin in the iris may be a sign of differences in the threshold of arousal of the limbic structures responsible for physiological reactions such as change in muscle tone, increases in heart rate, blood pressure, and pupillary dilation (more inhibited than uninhibited children presented with greater activity in one or more of these areas).

Alpha-melanocyte stimulating hormone (alpha MSH) has been assumed to have direct effects on eye color and physiological activity. This binds to the outer surface of melanocytes and stimulates production of melanin. Therefore, people with low levels of alpha MSH would have lighter colored eyes.

Research also suggests that alpha MSH influences mood and emotion. It is said to reduce reports of “state anxiety” (Miller, et al. 1974; Sandman, et al. 1975). This research revealed that alpha MSH is released in response to stressful situations and may reduce pain. Rosenberg and Kagan hypothesized that low levels of alpha MSH may be associated with high levels of arousal in the limbic system, hence, inhibited behavior. As was previously stated, alpha MSH has also been linked to low quantities of melanin, therefore, blue eyes.

Rosenberg and Kagan conducted another study on elementary school children. Teachers from classrooms nominated the most inhibited and the most uninhibited child in their rooms, along with their eye color. There were 126 inhibited and the 128 uninhibited. The children were observed and teachers were asked to fill out questionnaires pertaining to the eye color and the number of students in their classes. Sixty percent of the inhibited children had blue eyes ( $\chi^2 = 11.6, p < .001$ ).

Some children will continuously approach new situations without hesitation, while others are typically more cautious and evasive. This revisitation to Rosenberg and Kagan’s previous study selected children based on eye color, rather than temperament. It consisted of 32 two-year old children with blue eyes and 29 two-year old children with brown eyes. The children were involved in a series of assessments measuring heart rate, pulse rate, interaction with an adult stranger, interaction with a new and possibly frightening toy, and separation or reunion with parent. The variables measured were as follows; 1) the amount of time to touch a toy, 2) the amount of time until the first

vocalization, 3) the number of times a child looked towards mother, and 4) total time spent within arm's reach of mother. When scores were compared across the board, blue-eyed children were more inhibited than brown-eyed children were. Interestingly, girls were also found to be more inhibited than boys. Kagan has figured that the inhibited subjects from all of his studies represent about 10-15% of the population of Caucasian children. In this study, seven out of nine of the most inhibited children had blue eyes, while seven out of nine of the least inhibited had brown eyes.

Heart rates also proved significant among inhibited and uninhibited children. While there was not a significant correlation between higher, stable heart rates and blue eyes, there was a correlation. These measurements suggest that the inhibited children began the entire session with a higher, more stable heart rate and their heart rate increased during more stressful activities. This is a profile that is characteristic of inhibited children (Reznick, et al. 1986).

Since these children were selected based on eye color and not behavior patterns, it was assumed that there would not be a large representative sample of inhibited children. That was indeed the case.

An examination of the results within ethnically similar groups confirmed the prior findings in the more diverse group. Twenty-two children of northern descent were selected from the group and there was an association between blue eyes and behavioral inhibition. If one argues that mothers from the same ethnic background have the tendency to treat their children in a similar fashion, then there should be no association between the eye color and prevalence of behavioral inhibition.

When Kagan's prior three samples are combined with this study, the likelihood of coincidence is less than  $1.25 \times 10^{-8}$  (Rosenberg and Kagan, 1986).

## Summary

In this study, relevant research has been discussed in regards to the topics of eye color and behavioral inhibition. . This research reveals reasons why it is important to address behavioral inhibition in children. As evidence from the research suggests, behavioral inhibition in childhood holds threatening implications for anxiety later life. In determining the reasons for addressing behavioral inhibition in children, it is important to consider characteristics that are correlated with inhibition in order to provide reason for screening.

There are several behavioral characteristics that are classified as inhibited such as, latency to approach an unfamiliar child, amount of time to separate from parent, and so on. Along with these factors, one biological factor in particular has been suggested of behaviorally inhibited children, and that is the prevalence of blue eyes. This study also examined the likelihood of a behaviorally inhibited child having blue eyes in several studies. It has been suggested that the melanin, which causes pigmentation in the iris, may be a cause of arousal in the nervous system. The more melanin, the darker the eye-color. This therefore indicates that the lower the amount of melanin, the lower the threshold for arousal. The implication for having a low threshold for arousal is that it wouldn't take much to produce arousal in the limbic system. In order to back up the claim of a correlation between eye color and behavioral inhibition, other correlations were reviewed regarding eye color. As revealed in this review of literature, eye color has been linked to several physiological characteristics such as athleticism, personality, responsiveness to therapy, hearing thresholds, and so on. This review is evidence of a biological marker of behavioral inhibition.

In chapter three, the method of assessing behavioral inhibition in children will be described. Children from a Preschool Learning Center will participate in the sample.

Teachers and Teachers' aides will be given the Social Competence and Behavior Rating Scale to score each child accordingly. Data will then be compared with the eye color of each child who participates. Unlike the studies reviewed in Chapter Two, children will not be selected based on their eye color or whether or not they are behaviorally inhibited. All children in the center who have been given parental consent will be sampled. The scores will be discussed in later chapters.

## **CHAPTER III**

### **Design of the Study**

An outline of the study in question will be discussed below. There will be a description of the sample population, and the measure used to acquire the data. Next, the design of the study will be discussed, followed by statements about the testable hypothesis, and how the results will be analyzed. A summary will conclude, and encapsulate the entire design of the study.

#### **Sample**

For the purpose of this study, a sample of preschool-age children was chosen. The children were between the ages of two and six. Fifty children from a learning center located in the suburban town of Princeton, New Jersey participated in the study. Of the fifty participants, there were 19 females and 31 males. 21 children had blue eyes, 24 had brown/black eyes, and 5 had green eyes.

#### **Measures**

The Social Competence and Behavior Evaluation, Preschool Edition was used to rate participants on social isolation versus social integration. It is appropriate for use on children between the ages of two and six. The scale has been standardized on more than 1,200 preschool children. It has 80 items that are easily completed in 15 minutes by preschool or kindergarten teachers, and/or other caregivers familiar with the child. The assessment consists of 80 situation specific behaviors that are answered Always, Often, Sometimes, and Never. The assessment has 8 basic scales, though only one was used for

the purpose of this research. The other scales are Depressive-Joyful, Anxious-Secure, Angry-Tolerant, Aggressive-Calm, Egotistical-Prosocial, Oppositional- Cooperative, and Dependent-Autonomous. The scale in question measures Isolation and Integration. Inter-rater reliability for the sample is between .72 and .89. Internal consistency was reported as coefficient alpha = .80- .89. Test-retest information is only available for a sample study done on Canadian children. It has estimates of a 2 week test-retest reliability of .74- .87 and a 6 month reliability of .59- .70. Convergent and discriminant validity were examined by correlating the SCBE with the Achenbach Child Behavior Checklist. Criterion validity was measured through a study of a portion of the sample using peer sociometrics and direct observation measures. That study validated the social competence and anxious/withdrawn aspects of the scale.

## **Design**

Before beginning any sampling, a consent form was sent home to parents and guardians. The design of the study was explained in writing to families, and they were in turn asked to sign a form if they did not wish for their child to participate. After allowing several weeks for parents to return the forms, the staff members at the Learning Center were prepped on the process for collecting data. Prior to filling out the rating scales, Dana Huff thoroughly explained the technique and design of the rating scale. Since it was important that the rater be familiar with the children so as to judge certain behaviors that may not have been observed on the day in question, only individuals capable of making interpretations of past behaviors filled out the checklist. It is important to note that each child remained anonymous. Teachers and teachers' assistants were also screened on their color recognition before they filled out demographics related to each child's eye color. Classroom teachers and teachers' assistants administered the Social

Competence and Behavior Evaluation. They were asked to rate each child on certain behavioral aspects observed in the classroom. Attached to each rating scale was a demographics page. The raters were then asked to list the participants' age, gender, and eye color (blue, brown/black, and green). Once the rating scales were completed, they were given back to Dana Huff for analysis. A score for Isolation-Integration was then obtained for each child. The basic scores were then incorporated onto the basic scale ranging from 0-50. The lower the score, the more behaviorally inhibited the child scored.

### **Testable Hypothesis**

For the purpose of this study, the Null hypothesis is "there will be no correlation between preschoolers having blue eyes and displaying signs of behavioral inhibition." The testable hypothesis for this sample is "there will be a higher percentage of children with blue eyes and behavioral inhibition than preschoolers with other eye colors and behavioral inhibition.

### **Analysis**

This data was analyzed using an independent sample t-test. This method was appropriate since the comparison was only between eye color and rating scores, and the subjects were randomly chosen. If scores had been obtained on more than one occasion for each child, a repeated measures test would have been more appropriate. Two separate tests were run. The first test compared the blue-eyes' scores versus the other colors' scores. The second test compared the blue-eyes' scores, versus the brown/black eyes' scores, versus the green eyes' scores. In each test the eye colors were assigned numbers. Blue eyes = 1 and other colors = 2 for the first comparison. The second comparison



assigned blue eyes= 1, brown/black= 2, and green= 3. Each score on the isolation-integration scale was inserted according to the corresponding eye color.

### **Summary**

Twenty-One blue-eyed, 24 brown/black-eyed, and 5 green/hazel-eyed preschoolers participated in the sample. Teachers were asked to fill out The Social Competence and Behavior Evaluation Checklist for each participant, accompanied by a demographics page. This assessment screened for patterns of social competence, affective expression, and adjustment difficulties. The demographics consisted of age, gender, and eye color. This data was analyzed using an independent sample t-test in order to test whether or not there were a higher percentage of preschoolers with blue eyes and behavioral inhibition, than preschoolers with other eye colors and behavioral inhibition. The results of the analysis will be discussed in Chapter 4.

## **CHAPTER IV**

### **Analysis of Data**

The results will be presented in this chapter. The following results are from the testing of the previously stated hypothesis, "There is a positive correlation between the prevalence of behavioral inhibition and blue-eyed individuals."

#### **Results**

After administering the rating scales and analyzing the data, the null hypothesis, "There is no correlation between the prevalence of behavioral inhibition and blue-eyed individuals" has been rejected. The analysis of data yielded results that rejected the null hypothesis with a significance value of .021. Scores for blue-eyed children were lower on average, than the scores of children with other color eyes.

#### **Discussion**

The analysis of data yielded quite interesting results. Once rating scales for the fifty children had been filled out by their teachers, Dana Huff computed the scores in order to obtain each child's rating on the Isolation-Integration scale. Each child's score was analyzed using an independent sample T-test. The results yielded a lower mean score on the Isolation-Integration scale among the blue-eyed children as compared to the mean score of brown-eyed and green-eyed children. The Isolation-Integration scale ranged from 0-50. Scores falling below a 24 for boys and below a 26 for girls indicates a social behavior to be concerned about. There were very few children who had such results, though overall, the blue-eyed children demonstrated more Isolation than other children. The statements pertaining to social Isolation-Integration assess the extent to which the

child is a part of the peer group. Children who score on the lower end tend to be more socially inhibited and do not actively pursue interactions with peers. The scores on this scale did not indicate that each blue-eyed child had a score on the low end of the scale. The results simply indicate that blue-eyed children had a lower average score, therefore indicating that these children tended to be more socially inhibited in one way or another.

### **Summary**

In conclusion, the hypothesis, “there is a positive correlation between the rate of behavioral inhibition and blue-eyed individuals” has been accepted. There were significant results indicating that the mean scores of blue-eyed children were less than the mean scores for brown-eyed and green-eyed children, therefore indicating that blue-eyed children were on average more socially inhibited.

**Table 4.1**

**Group Statistics**

	COLOR	N	Mean	Std. Deviation	Std. Error Mean
SCORE	1.00	22	30.0909	8.5685	1.8268
	2.00	28	35.7857	6.0880	1.1505

**Table 4.2**

**Independent Samples Test**

		Levene's Test for Equality of Variances	
		F	Sig.
SCORE	Equal variances assumed	5.719	.021
	Equal variances not assumed		

**Table 4.3**

**Independent Samples Test**

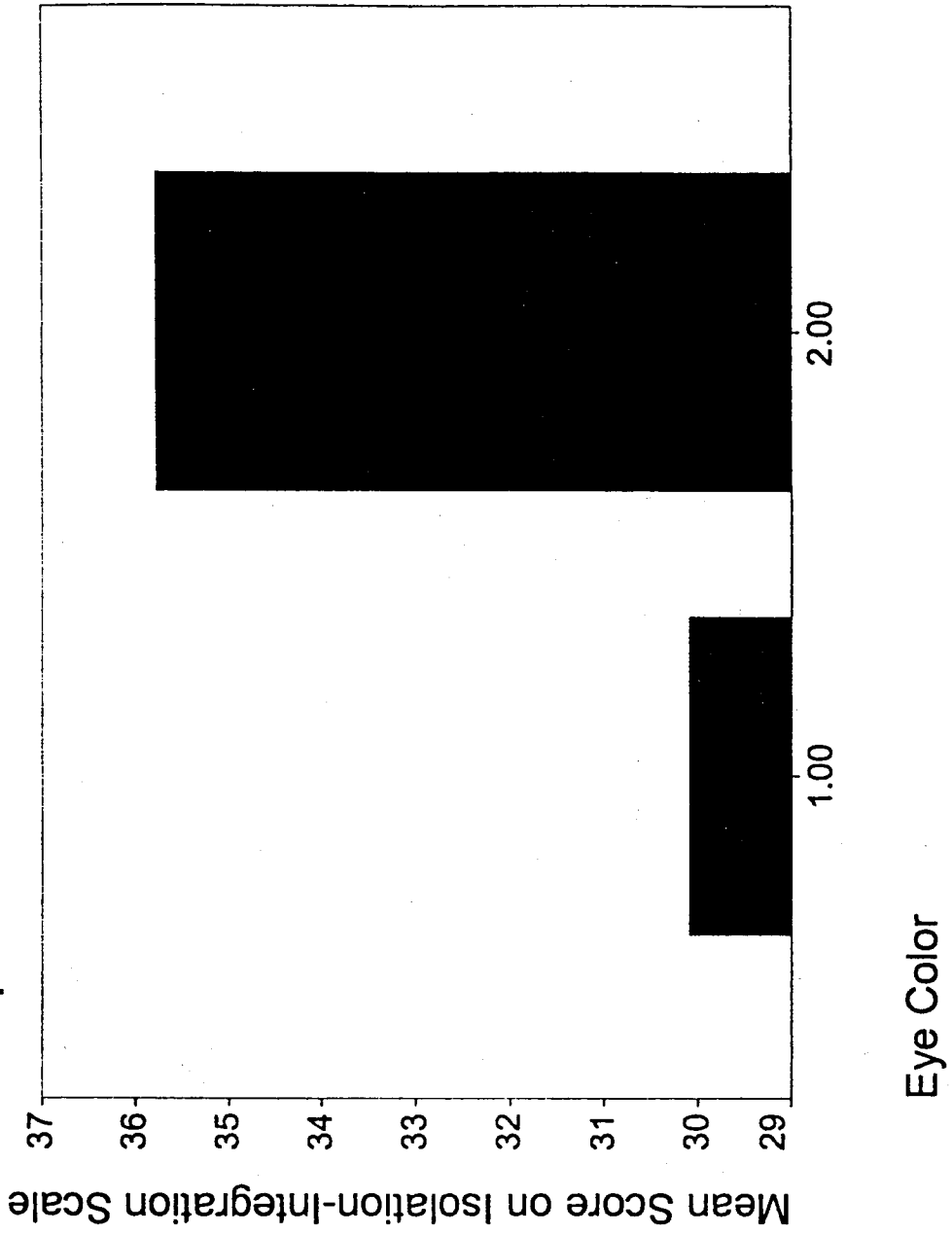
		t-test for Equality of Means			
		t	df	Sig. (2-tailed)	Mean Difference
SCORE	Equal variances assumed	-2.746	48	.008	-5.6948
	Equal variances not assumed	-2.638	36.497	.012	-5.6948

**Table 4.4**

**Independent Samples Test**

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence Interval of the Difference	
			Lower	Upper
SCORE	Equal variances assumed	2.0735	-9.8639	-1.5257
	Equal variances not assumed	2.1589	-10.0712	-1.3184

Graph 4.1



## **CHAPTER V**

### Summary and Conclusions

The inspiration for this study came about from the general observation that there was an unusual number of children with blue eyes, attending a program designed specifically for those having difficulty integrating with peers and adults. After further research, it was hypothesized that children with blue eyes would be more likely to exhibit behavioral inhibitions than children with dark eyes. This was based on prior studies that investigated the correlation between light-eyed children being more inhibited and dark-eyed children being more uninhibited.

Due to the fact that inhibition/shyness is a social trait, it is often times more significant during childhood. Once a person matures and learns the social skills expected of the culture, shyness/inhibition tends to decrease. The subjects used to test the hypothesis for this thesis were preschool age, so as to look at individuals before they have learned to overcome many inhibitions. The preschoolers were from The Kiddie Academy in Princeton, New Jersey. They ranged in age from three years old to five years old. Fifty children were chosen at random (with an emphasis on acquiring equal numbers of blue-eyes and brown/green eyes), and had no knowledge that the teachers were filling out rating scales pertaining to each child's behavior.

The Social Competence and Behavior Evaluation, Preschool Edition was used to assess the extent to which each child is interacting with his/her peer group. It is an 80 question, likert-response scale, that anyone familiar with the daily routines, aspects, and

behaviors of a child's life, can fill out. The evaluation considers other social skills such as dependence vs. autonomously, although scores for the other scales were not analyzed. The scale ranges from 0-50. The lower the score, the more isolated the child is from the peer group. Twenty-two blue-eyed children participated and 28 brown-eyed and green-eyed children participated in the study. Their scores were analyzed using an independent sample T-test. The results were significant at  $p < .021$ . Blue-eyed children demonstrated a mean score lower than the mean score of brown-eyed and green-eyed children.

There are some theories as to why this correlation may exist. Studies have linked the amount of melanin to the amount of serotonin produced by the body. It has been said that the more melanin present, the less serotonin the body produces. Since dark-eyed persons have more melanin, their bodies would contain less serotonin. One suggestion is that dark-eyed individuals naturally have less serotonin, therefore making it necessary for them to "seek out" stimulation and have higher thresholds for pain. This theory would prove true for blue-eyed individuals demonstrating higher rates of inhibition. Blue-eyed persons have less melanin, and more serotonin, therefore making it less necessary for them to interact with the environment to gain stimulation. Too much interaction may be over stimulating for a person with little melanin. This theory backs up the studies that have shown that dark-eyed persons perform better at group sports and other group activities.

It is important to investigate these theories further. If eye-color predisposes an individual to certain behavioral traits, it would be invaluable to professionals working and interacting with people. For instance, teachers can make better assumptions as to the most appropriate ways to teach children. Counselors can make better assumptions as to the most appropriate way to address recovery for addicts and others. For example, if blue-eyed persons tend to be more inhibited and require less stimulation, group therapy

may not be appropriate. This person may be more successful in a one-one setting. This is not to suggest that eye-color alone may be used to predict behaviors, but instead as a tool to be used for planning and intervention.

The findings of this thesis suggest that there is a correlation between having blue-eyes and being more behaviorally inhibited. While the results are based on teacher observation alone, rather than a combination of observations and physiological responses to specific stimuli, one can still conclude from this study that there is a correlation. This study was not designed to answer *why* the correlation exists. It was designed to further substantiate the theory that it *does* exist.

While there is little research on the specific nature of this study, there is a substantial amount of research linking eye color to other characteristics. This certainly warrants further research in order to study the link between eye color and behavior inhibition. Undoubtedly, a larger sample size should be used to study the correlation. As was the purpose of this study to find a correlation to be used as a characteristic in developing strategies for teaching and/or intervention, another implication may be to study behavioral inhibition within ethnic groups. An assumption was made that ethnic groups primarily having blue-eyes have specific cultural traits that may correspond with being considered behaviorally inhibited. A study such as this may eliminate the theory that chemicals related to the brain and eye color have influence on behavior. Further research is needed in the area of serotonin levels in relation to eye color. Finally, a longitudinal study would be helpful to determine whether children with blue eyes are more likely to demonstrate behavioral inhibition at later ages, and whether or not the inhibition leads to other implications.



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## **APPENDIX 1**

**PLEASE PRESS HARD WHEN CIRCLING YOUR RESPONSE**

	Never	Sometimes	Often	Always		
41. Is involved wherever the children are having lots of fun. ....	1	2	3	4	5	6
42. Hits, bites or kicks other children. ....	1	2	3	4	5	6
43. Cooperates with other children in group activities. ....	1	2	3	4	5	6
44. Gets into conflict with other children. ....	1	2	3	4	5	6
45. Comforts or assists another child in difficulty. ....	1	2	3	4	5	6
46. Has to be first. ....	1	2	3	4	5	6
47. Refuses to share toys. ....	1	2	3	4	5	6
48. Takes care of toys. ....	1	2	3	4	5	6
49. Doesn't talk or interact during group activities. ....	1	2	3	4	5	6
50. Attentive towards younger children. ....	1	2	3	4	5	6
51. Stays calm when there are conflicts in the group. ....	1	2	3	4	5	6
52. Initiates or proposes games to other children. ....	1	2	3	4	5	6
53. Spontaneously apologizes to other children for causing a problem. ....	1	2	3	4	5	6
54. Makes games competitive. ....	1	2	3	4	5	6
55. Spontaneously helps a child pick up toys or other objects. ....	1	2	3	4	5	6
56. Delights in playing with other children. ....	1	2	3	4	5	6
57. Goes unnoticed in a group. ....	1	2	3	4	5	6
58. Works easily in groups. ....	1	2	3	4	5	6
59. Takes pleasure in hurting other children. ....	1	2	3	4	5	6
60. Shares toys with other children. ....	1	2	3	4	5	6
61. Recovers quickly when he/she falls or hurts self (doesn't cry very long). ....	1	2	3	4	5	6
62. Hits teacher or destroys things when angry with teacher. ....	1	2	3	4	5	6
63. Helps with everyday tasks (e.g., distributes snacks). ....	1	2	3	4	5	6
64. Persistent in solving own problems. ....	1	2	3	4	5	6
65. Disrespectful of teacher. ....	1	2	3	4	5	6
66. Accepts compromises when reasons are given. ....	1	2	3	4	5	6
67. Clear and direct when he/she wants something. ....	1	2	3	4	5	6
68. Stops talking immediately when asked. ....	1	2	3	4	5	6
69. Needs teacher's presence to function well. ....	1	2	3	4	5	6
70. Asks for help when it is unnecessary. ....	1	2	3	4	5	6
71. Opposes the teacher's suggestions. ....	1	2	3	4	5	6
72. Cries for no apparent reason. ....	1	2	3	4	5	6
73. Is autonomous and able to organize him/herself. ....	1	2	3	4	5	6
74. Defiant when reprimanded. ....	1	2	3	4	5	6
75. Clingy towards teacher in novel situations (e.g., field trip). ....	1	2	3	4	5	6
76. Takes initiative in situations with new people. ....	1	2	3	4	5	6
77. Ignores directives and continues what he/she is doing. ....	1	2	3	4	5	6
78. Accepts teacher's involvement in own activity. ....	1	2	3	4	5	6
79. Cries when parent leaves. ....	1	2	3	4	5	6
80. Asks permission when necessary. ....	1	2	3	4	5	6

**Instructions**

The following is a list of statements describing a child in three broad categories: emotional adjustment, social interactions with peers, and social interactions with adults. Use the following scale to rate the child by circling one choice for each statement to indicate the child's typical behavior or emotional state. Each of the ratings indicates how often a typical emotional state or behavior occurs:

Rating	Description
1	Almost NEVER occurs.
2 or 3	SOMETIMES occurs.
4 or 5	OFTEN occurs.
6	Almost ALWAYS occurs.

If you want to circle another number after you have made a choice for the same item, cross out your prior choice and circle another one. Do not erase the unwanted choice because it may damage the form.

Make every effort to assign a rating to each statement; leave an item blank only if you have no way of evaluating the child on that particular statement. If more than a few items are left without any rating, the results may not be meaningful.

Child's Name Brianna - Blue

Gender:  M  F Age 5 yrs. 11 mos. ID \_\_\_\_\_

School Kiddie Academy

Child's Class Teacher hrishe

Evaluator \_\_\_\_\_

Date of Evaluation 2/10/01

**PLEASE PRESS HARD WHEN CIRCLING YOUR RESPONSE**

	Never	Sometimes	Often	Always		
1. Enjoys demonstrating new songs, games and other things he/she has learned. ....	1	2	3	4	5	6
2. Maintains neutral facial expression (doesn't smile or laugh). ....	1	2	3	4	5	6
3. Sensitive to another's problem. ....	1	2	3	4	5	6
4. Wets or dirties pants at school. ....	1	2	3	4	5	6
5. Curious. ....	1	2	3	4	5	6
6. Tired. ....	1	2	3	4	5	6
7. Easily frustrated. ....	1	2	3	4	5	6
8. Gets angry when interrupted. ....	1	2	3	4	5	6
9. Looks directly at you when speaking. ....	1	2	3	4	5	6
10. Irritable, gets mad easily. ....	1	2	3	4	5	6
11. Worries. ....	1	2	3	4	5	6
12. Laughs easily. ....	1	2	3	4	5	6
13. Easily adjusts to new situations. ....	1	2	3	4	5	6
14. Gets bored quickly and appears uninterested in playing. ....	1	2	3	4	5	6
15. In a good mood. ....	1	2	3	4	5	6
16. Patient and tolerant. ....	1	2	3	4	5	6
17. Takes pleasure in own accomplishments. ....	1	2	3	4	5	6
18. Tolerates interruptions and disturbances. ....	1	2	3	4	5	6
19. Difficult to console when he/she cries. ....	1	2	3	4	5	6
20. Self-confident. ....	1	2	3	4	5	6
21. Explores his/her environment. ....	1	2	3	4	5	6
22. Readily adapts to difficulties. ....	1	2	3	4	5	6
23. Timid, afraid (e.g., avoids new situations). ....	1	2	3	4	5	6
24. Sad, unhappy or depressed. ....	1	2	3	4	5	6
25. Anxious, nervous (e.g., bites fingernails). ....	1	2	3	4	5	6
26. Active, ready to play. ....	1	2	3	4	5	6
27. Whines or complains easily. ....	1	2	3	4	5	6
28. Inhibited or uneasy in the group. ....	1	2	3	4	5	6
29. Listens attentively when spoken to. ....	1	2	3	4	5	6
30. Screams or yells easily. ....	1	2	3	4	5	6
31. Bullies weaker children. ....	1	2	3	4	5	6
32. Forces other children to do things they don't want to do. ....	1	2	3	4	5	6
33. Gets upset when the teacher attends to another child. ....	1	2	3	4	5	6
34. Inactive, watches the other children play. ....	1	2	3	4	5	6
35. Negotiates solutions to conflicts with other children. ....	1	2	3	4	5	6
36. Remains apart, isolated from the group. ....	1	2	3	4	5	6
37. Children seek him/her out to play with them. ....	1	2	3	4	5	6
38. Does not respond to other children's invitations to play. ....	1	2	3	4	5	6
39. Takes other children and their point of view into account. ....	1	2	3	4	5	6
40. Self-centered, does not recognize other children's interests. ....	1	2	3	4	5	6

Please turn the form over and complete items 41 through 80.

# SCBE Scoring Sheet

1. 5 (4) 3 2 1 0	4 + 4 + 3 + 3 + 4 = 20	+ = 39	20	23	41	156	41. 0 1 2 3 (4)
2. 0 1 2 3 (4) 5	(1) (12) (15) (17) (26)						39
3. 5 (4) 3 2 1 0	4 + 4 + 2 + 5 + 4 = 19	+ = 46	18	19	41	87	43. 0 1 2 3 (4)
4. 0 1 2 3 4 (5)	(2) (6) (14) (19) (24)						46
5. (5) 4 3 2 1 0	5 + 5 + 4 + 4 + 5 = 23	+ = 42	23	23	43	96	45. 0 1 2 3 (4)
6. 0 1 2 3 (4) 5	(5) (9) (13) (20) (21)						42
7. 0 1 2 3 (4) 5	5 + 5 + 4 + 4 + 5 = 23	+ = 43	19	23	43	87	47. 5 4 3 2 1
8. 0 1 2 3 (4) 5	(4) (11) (23) (25) (28)						43
9. (5) 4 3 2 1 0	4 + 4 + 4 + 3 + 4 = 19	+ = 41	23	23	43	96	49. 5 (4) 3 2 1
10. 0 1 2 3 4 (5)	(3) (16) (18) (22) (29)						41
11. 0 1 2 3 4 (5)	5 + 4 + 5 + 4 + 5 = 23	+ = 47	19	23	43	96	51. 0 1 2 3 (4)
12. 5 (4) 3 2 1 0	(7) (8) (10) (27) (30)						47
13. 5 (4) 3 2 1 0	4 + 4 + 4 + 3 + 4 = 19	+ = 40	23	23	43	96	53. 0 1 (2) 3 4
14. 0 1 (2) 3 4 5	(37) (41) (52) (56) (58)						40
15. 5 4 (3) 2 1 0	5 + 5 + 5 + 4 + 4 = 23	+ = 41	19	23	43	96	55. 0 1 2 (3) 4
16. 5 (4) 3 2 1 0	(34) (36) (38) (49) (57)						41
17. (5) 4 3 2 1 0	3 + 3 + 4 + 5 + 4 = 19	+ = 43	23	23	43	96	57. 5 (4) 3 2 1
18. 5 4 3 (2) 1 0	(35) (39) (48) (50) (51)						43
19. 0 1 2 3 4 (5)	5 + 5 + 5 + 4 + 4 = 23	+ = 41	23	23	43	96	59. 5 4 3 2 1
20. 5 (4) 3 2 1 0	(31) (32) (42) (44) (59)						41
21. (5) 4 3 2 1 0	4 + 4 + 2 + 3 + 4 = 17	+ = 47	23	23	43	96	61. 0 1 2 3 (4)
22. 5 (4) 3 2 1 0	(43) (45) (53) (55) (60)						47
23. 0 1 2 3 (4) 5	5 + 5 + 5 + 4 + 4 = 23	+ = 40	23	23	43	96	63. 0 1 2 3 (4)
24. 0 1 2 3 (4) 5	(63) (66) (68) (78) (80)						40
25. 0 1 2 3 (4) 5	5 + 4 + 4 + 4 + 5 = 22	+ = 40	23	23	43	96	65. 5 4 3 2 1
26. 5 (4) 3 2 1 0	(62) (65) (71) (74) (77)						40
27. 0 1 2 3 (4) 5	4 + 4 + 4 + 4 + 2 = 18	+ = 40	23	23	43	96	67. 0 1 2 3 (4)
28. 0 1 2 3 4 (5)	(61) (64) (67) (73) (76)						40
29. 5 (4) 3 2 1 0	4 + 4 + 5 + 4 + 5 = 22	+ = 40	23	23	43	96	69. 5 (4) 3 2 1
30. 0 1 2 3 4 (5)	(69) (70) (72) (75) (79)						40
31. 0 1 2 3 4 (5)							71. (5) 4 3 2 1
32. 0 1 2 3 4 (5)							72. 5 4 3 2 1
33. 0 1 2 3 4 (5)							73. 0 1 2 3 (4)
34. 0 1 2 3 4 (5)							74. 5 4 3 2 1
35. 5 4 (3) 2 1 0							75. 5 (4) 3 2 1
36. 0 1 2 3 4 (5)							76. 0 1 2 3 4
37. 5 (4) 3 2 1 0							77. (5) 4 3 2 1
38. 0 1 2 3 4 (5)							78. 0 1 2 3 (4)
39. 5 4 (3) 2 1 0							79. (5) 4 3 2 1
40. 0 1 2 3 4 (5)							80. 0 1 2 3 4

Accuracy Check:  
Sum of the eight Basic Scale raw scores here

339

Please make sure that these totals are the same

