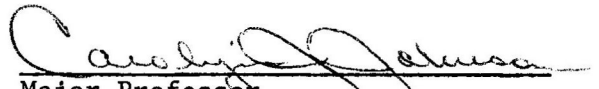


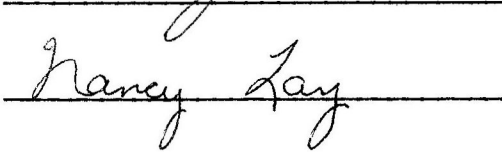
July 18, 1973

To the Graduate Council:

I am submitting herewith a thesis written by Estelle Clemence Carter, entitled "A Comparison of Natural Body Buoyancy of Negro and Caucasian Boys." I recommend that it be accepted for nine quarter hours of credit in partial fulfillment of the requirements for the degree of Master of Science, with a major in Physical Education.


Major Professor

We have read this thesis
and recommend its acceptance:

Accepted for the Council:


Vice Chancellor for
Graduate Studies and Research

A COMPARISON OF NATURAL BODY BUOYANCY OF
NEGRO AND CAUCASIAN BOYS

A Thesis
Presented to
the Graduate Council of
The University of Tennessee

In Partial Fulfillment
of the Requirements for the Degree
Master of Science

by
Estelle Clemence Carter
August 1973

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E.C.C.

ABSTRACT

The purpose of this study was to determine whether or not there was a difference in natural body buoyancy between Negro and Caucasian boys who ranged in age from six to twelve.

The subjects used in this study were 50 Negro and 50 Caucasian boys who were enrolled in the American Red Cross "Learn To Swim" Program in Knoxville, Tennessee. All subjects had passed the American Red Cross Beginner Swimming Course, which eliminated all who were not physically and mentally adjusted to the water. The subjects were classified according to race, age, weight, and height.

Two float tests were administered in order to determine natural body buoyancy. They were: (1) the vertical float test and (2) the turtle float test. Each subject was tested twice on each of the float tests. The Fisher Exact Probability Test was used to analyze the data gathered.

The analysis of results would seem to warrant the following conclusions:

1. That until the age of nine, age does not appear to be a factor in the floating ability of Negro and Caucasian boys.
2. That there is a tendency for a difference in floating ability to exist between Negro and Caucasian boys who weigh 70 to 79 pounds.
3. That there is a tendency for a difference in floating ability to exist between Negro and Caucasian boys who stand 54 to 56 inches in height.

4. That Negro boys ranging in age from six to twelve, weighing 40 to 130 pounds, and standing 45 to 63 inches in height do not float as consistently as Caucasian boys of the same physical characteristics.

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CHAPTER I

INTRODUCTION

The degree of body buoyancy which an individual possesses may affect the ease and efficiency with which swimming skills are learned. Since most teaching progressions utilize floating as the intrinsic step in learning to swim, it is important to know whether or not there are individual, sexual, racial, or age differences which might affect buoyancy.

Numerous studies have shown that differences exist at the college level in the floating ability of Negroes and Caucasians (4, 18, 19, 21). Studies have also indicated marked variations in floating ability with age which occurred in both males and females (33, 34). No studies have been found which deal with the differences in body buoyancy of any children below the age of ten, and racial differences in floating ability of children have not been studied at all.

I. STATEMENT OF THE PROBLEM

This study was concerned with a comparison of natural body buoyancy of Negro and Caucasian boys between the ages of six and twelve who were enrolled in the American Red Cross "Learn to Swim" Program. The criteria by which the comparison was made were the vertical float test and the turtle float test.

II. PURPOSE OF THE STUDY

The purpose of this study was to determine whether or not there was a difference in natural body buoyancy between Negro and Caucasian boys who ranged in age from six to twelve.

III. IMPORTANCE OF THE STUDY

This study was important in that it sought to determine whether or not differences in natural body buoyancy exist between Negro and Caucasian boys. The buoyancy of an individual is an inherent factor which contributes to ease and efficiency in learning swimming skills. Instructors of swimming have frequently observed and commented that the majority of Negroes in swimming classes exhibit a very low degree of buoyancy. Numerous studies have shown that racial differences do exist at the college level which might affect body buoyancy, but the possibility of racial differences in body buoyancy of children has not been studied.

IV. ASSUMPTIONS AND LIMITATIONS OF THE STUDY

This study was limited to 50 Caucasian and 50 Negro boys who ranged in age from six to twelve. This study was further limited to subjects who had passed the American Red Cross Beginner Swimming Course, which eliminated all who were not already physically and mentally adjusted to the water. All subjects who exhibited a fear to obtain or maintain the desired positions in the water were excluded from the study.

No consideration was given to socio-economic factors since all subjects were selected for reasons other than social and economic status. Contrasts were determined by a process of testing and identical tests were used for both groups.

One basic assumption in regard to this study was that all subjects took their maximum inhalation before assuming either the vertical float or turtle float position.

CHAPTER II

REVIEW OF LITERATURE

The literature contained numerous studies which have been conducted in the general area of aquatics with no special emphasis on the floating ability of the subjects tested.

The primary concern of this investigator was to determine the differences in the degree of buoyancy of Negro and Caucasian boys of pre-adolescent years.

The literature reviewed here in relation to the problem of buoyancy has been divided into two areas. They are: (1) physiological and anthropometrical comparisons of Negroes and Caucasians, and (2) studies of buoyancy.

I. PHYSIOLOGICAL AND ANTHROPOMETRICAL COMPARISONS OF NEGROES AND CAUCASIANS

Numerous investigations have consistently substantiated differences between Negro and Caucasian adults. Jordan (16) reported that beginning in 1920 there was an increase of interest in the anthropometric and physiological differences between Caucasian and Negro athletes. The anthropometric studies explored variances in height; weight; and measurement of arm and hand, leg and foot, and trunk. Investigators also proved possible differences in such physiological characteristics as reaction time, respirations, body temperature and the sweat mechanism.

Height

Metheny (20) compared anthropometric measurements of 51 Negro and 51 white college students. The mean height of the Negro group was 174.41 centimeters and that of the whites was 176.53 centimeters. This mean was comparable to a study by Todd (31) on Negro cadavers in which he found the height to be 174.4 centimeters. These heights exceeded Herskovits, Cameron, and Smith's (12) study which found the Negro height to be 171.1 centimeters. It must be considered that all of these studies dealt with college age students as subjects.

Weight

Metheny (20) found the average weight of the Negro was 5.40 pounds greater than the average weight of the white. Jones (15) found that, at age 18, Negro boys were 3.50 pounds heavier than white boys.

The weight of bones also has been found to vary between Negroes and Caucasians. Baker (1) reported a study of skeletons of Negro and white soldiers who were killed in the Korean War. He found that the Negro skeletons were approximately 7% heavier than the white skeletons, even though the Army records showed that the weight of the Negroes at the time of induction had been an average of 5% lighter than the whites.

Arm and Hand

There seems to be complete agreement among various investigators that Negroes have longer arms than Caucasians (12, 13, 28, 29, 31, 32).

Metheny (20) found that the Negro arm is 46.60% of his stature, while that of the white is 45.45%.

Concerning the proportions of the arm, Todd (31) stated that the upper arm of the Negro is short in proportion to arm length, while the greater length and width of the hand is proportioned to the greater arm length.

Leg and Foot

There seems to be complete agreement among various investigators that the Negro has longer legs than the white (6, 12, 13, 20, 29, 31, 32).

With reference to the foot, Metheny (20) found differences between the Caucasians and Negroes. The Negro foot was longer relative to stature and also longer relative to leg length. Cobb (6) reported foot length is proportionate to limb in both Negroes and Caucasians.

Trunk

The shorter trunk or sitting height of the Negro has been affirmed by many investigators (3, 12, 13, 20, 32).

Sheldon and others (27) found that Negroes are significantly more mesomorphic than whites, tending to have a more muscular trunk. With regard to the proportions of the chest, Todd and Lindela (32) reported that the Negro has a shallower chest than the white.

Most investigators appeared to accept as a fact that the Negro's pelvis is smaller than the Caucasian's (3, 5, 6, 13, 20, 28, 30, 31, 33).

Reaction Time

Schureman (25), Kerr (17), Bardeen and Elting (2), Todd and others (32), in studying the relationship of nerves as to number, size and ability to produce a response, found no significant differences between races. With infants, Williams and Scott (35) studied motor development of two groups of Negro infants and suggested that motor acceleration is not a racial characteristic.

In considering speed of running, Hutinger (14) found that Negro boys had significant faster times than whites in the 35-yard dash at fourth and fifth grade levels. Harmon (11) used Miles Reaction Time Board to obtain measurement with which to compare Negro and Caucasian preschool children with respect to speed of simple reaction and found that the two races did not differ significantly in this variable. However, Williams and Scott (35) found that a group of Negro infants rated in homes of low socio-economic status were substantially above average in gross motor acceleration, while Negroes living in high status homes failed to demonstrate this superior development.

Ponthieux and Barker (23), using the AAHPER Youth Fitness Test for 10 and 12-year olds, observed that Negro boys exceeded white boys in pull-ups, standing broad jump, 50-yard dash, softball throw, and 600-yard run-walk, while the white boys exceeded the Negro boys only in the sit-ups.

Respiration

Damon (8) studied the pulmonary function of 392 white and 61 Negro soldiers who ranged in age from 18 to 20. The Negro soldiers had

13% smaller one-second and total vital capacities, as well as a 10% slower mid-expiratory flow rate. Motivation was apparently equivalent and the white soldiers smoked more than the Negro group.

Seltzer (26) found that greater oxygen supplying capacity was possessed by subjects with rounded heads, slender and broader faces, and longer and narrower noses. These characteristics are typical of the Caucasian race.

Body Temperature and Sweat Mechanism

Baker (1) made surveys of heat retention in whites and Negroes. Based on the fat, which serves as insulation, it was discovered that the deposits or layers of fat on whites made them more resistant to cold and more adjustable to the environment in arctic regions.

Glaser (10) compared the distributions of the sweat glands of whites and Negroes without reference to the type of gland. Skin samples from 29 arbitrarily chosen sites were studied. It was found that the regional distributions of the glands were the same in both races, but the Negroes showed a definite superiority in the number of glands present.

Dill and others (9) obtained results from studies of Southern Negroes and Caucasian sharecroppers which showed that Negroes withstand high temperatures better than whites.

II. STUDIES OF BUOYANCY

Many studies have been conducted which deal with buoyancy and its relationship to anthropometric, and physiological factors, and the

acquisition of swimming skills. The large portion of these investigations has been limited to the study of adults. The literature reviewed here in relation to the studies of buoyancy have been divided into three areas. They are: (1) comparisons of Negro and Caucasian women, (2) comparisons of Negro and Caucasian men, and (3) the floating ability of men and women.

Comparisons of Negro and Caucasian Women

Burdshaw (4) studied Negro and white college women in an effort to compare them on factors of buoyancy, selected body measurements, motor ability, and performance in beginner swimming. Buoyancy was measured by hydrostatic weighing, a technique that yields a more exact degree of buoyancy than the float or nonfloat assessment method. The results of this study indicated that Caucasian college women have more buoyancy than do Negro college women.

Connolly (7) conducted a study in order to determine the differences in floating ability of Negro and Caucasian girls as it affects swimming power. The study concluded that Negro high school girls do not float as well as Caucasian high school girls, although the difference was not significant.

Mitchem and Lane (21) conducted a study predicting buoyancy by anthropometric measures using 74 Caucasian women and 81 Negro women of college age. The purpose of this study was to predict buoyancy, as either floating or nonfloating and to determine the possibility of the existence of racial differences which affect buoyancy. They confirmed that Negro females were anthropometrically different; also,

while nonfloaters were detected in the Negro female group, none were present in the white sample.

Comparisons of Negro and Caucasian Men

Nickel and Allen (22) sought to account for the low degree of buoyancy of Negroes. They made a survey of 69 Caucasian and 52 Negro men. They found that among the 69 Caucasians tested there were 63 floaters and 6 nonfloaters, which was 91.3% who were floaters. On the other hand, among the 52 Negroes tested there were 17 floaters and 35 nonfloaters, which was 32.7% who were floaters.

Lane and Mitchem (18) investigated the predictability of anthropometric measurements of buoyancy for 121 Negro and Caucasian male college students. Three variables, standing height, chest depth, and sitting height, were the greatest contributors to the prediction of buoyancy for Caucasian men. They concluded that Negro males experience much more difficulty with buoyancy than Caucasians.

The Floating Ability of Men and Women

Rork and Hellebrandt (24) studied the floating ability of women. The experiment was performed on a homogeneous group of 27 young adult women who were expert swimmers. The results obtained from the 27 adult women suggested that floating ability is improved if the volume of air in the lungs is increased, the specific gravity of the body is lowered and the specific gravity is less than 1.0.

Whiting (33) conducted a study with 877 females between the ages of ten and eighteen years in an effort to investigate marked

variations in floating ability with age in the female. Four tests were given: tuck float after a maximum inhalation; tuck float after a maximum expiration; tuck float during normal respiration; and horizontal floating on the back. Results indicated that superior tuck floating ability after maximum inhalation and during normal breathing and superior horizontal floating ability of the female occurred from the age of about 13 years onward. The tests also showed that the tuck float with lungs fully inflated enabled almost 100% ability to float at all age levels tested.

Whiting (34) conducted a similar study using 1,040 males between the ages of 9 and 24 years. Using the same methods, it was reported that a significant increase in floating ability occurred in the male between 10 and 13 years of age. It was also found that from 13 years of age onward, the male has an almost complete inability to float horizontally. An analysis of Whiting's studies (33, 34) indicates a highly significant difference between the floating ability of the male and female during normal respiration over the age range of 10 to 18 years with the female having superior floating ability.

CHAPTER III

PROCEDURE

This study was conducted in order to determine whether or not there was a difference in natural body buoyancy between Negro and Caucasian boys who ranged in age from six to twelve.

The procedure used in this study was divided into the following four areas: (1) selection of subjects; (2) selection of float tests; (3) administration of the tests; and (4) treatment of the data.

I. SELECTION OF SUBJECTS

The subjects for this study were 50 Negro and 50 Caucasian boys ranging in age from six to twelve. All subjects used in the study were enrolled in the American Red Cross "Learn to Swim" Program in Knoxville, Tennessee. All subjects had passed the American Red Cross Beginner Swimming course, which eliminated all who were not already physically and mentally adjusted to the water. Any subject who exhibited a fear to obtain or maintain the desired positions in the water was excluded from the study.

Studies by Whiting (33, 34) and observations have indicated variations in the floating ability of males and females. Since the male has less floating ability, if a difference would appear between the ages of six through twelve, it would likely appear in the male.

II. SELECTION OF FLOAT TESTS

Two tests were selected to determine buoyancy. These tests were: the turtle float and the vertical float.

The turtle float allows for the segments of the body to be as close as possible to the center of buoyancy, which point is the chest. Therefore, this position is most advantageous to determine buoyancy. The vertical float when used experimentally by Lanoue (8) enabled seven out of ten subjects who had been sinkers in a jellyfish position to become floaters and remain on the surface without movement. Consequently, these two floating positions appeared to be the best tests to administer in order to determine buoyancy.

III. ADMINISTRATION OF THE TEST

The 100 subjects used in this study were tested individually on each of the two float tests. The following data were collected prior to testing the subjects for buoyancy: weight, height, age, and race. The following instruments were used to obtain the data for the study:

1. Height measurements were obtained by employing a Scovill tape.
2. Weight measurements were obtained by using Borg scales.

The following tests were conducted in an outdoor swimming pool:

TEST I. Turtle float after a maximum inhalation. A procedure was standardized for determining buoyancy of subjects standing in chest-deep water for the turtle float. The subjects were given the following directions:

Place your hands on the front of your thighs, take a deep breath and bend forward, placing your face in the water. Slide your hands down your legs and hold your ankles until your chest touches your thighs. Maintain this position until the signal is given.

The desired position was demonstrated on the deck of the swimming pool and in chest-deep water. Each subject entered the water and assumed the turtle position. The subject was rated a floater if his back rose to the surface of the water and as a non-floater if he sank below the surface. Each subject was tested twice on the turtle float.

TEST II. Vertical float after a maximum inhalation. A procedure was standardized for determining buoyancy of subjects in 6 to 8 feet of water for the vertical float. The subjects were given the following directions:

Place your hands at your side and keep your body as straight as possible. Keep your head in line with your body so that you are facing the wall. Take a deep breath and hold it until the signal is given.

The desired position was demonstrated on the deck of the swimming pool and in deep water. The subject's head was lowered into the water by the investigator in order to counteract any bobbing effect on the body. Held by both hands, palms covering the ears with the thumb at the back of the head and fingers under the mandible, the subject was rated as to how much of his body floated above the surface. If any part of a facial feature cleared the surface, the subject was rated accordingly. Each subject was tested twice on the vertical float.

IV. TREATMENT OF THE DATA

A chart was used to record data obtained on the float tests according to the various physical classifications used. The investigator

initially recorded the subject's name, race, age, height and weight. The subject was then taken to the pool and rated for the turtle float, and the vertical float. Each subject's data was recorded individually.

Each subject was classified a floater or non-floater on the turtle float. On the vertical float, the subject was classified non-floater or floater; and, if any part of a facial feature cleared the surface, this was recorded.

The Fisher Exact Probability Test was used to determine whether Negro boys and Caucasian boys differed with respect to their floating ability; therefore, with respect to the relative frequency with which they fell into each of the two categories.

ANALYSIS OF THE DATA

Data were collected and analyzed in order to compare the natural body buoyancy of Negro boys and Caucasian boys, ranging in age from six to twelve. The criteria by which the comparison was made were: the turtle float test and the vertical float test. Charts contained data obtained on the float tests according to the subject's age, race, height, and weight. Each subject's data was recorded individually.

This chapter contains the analyses of the float tests and a discussion of the findings.

The Fisher Exact Probability Test was used to determine whether Negro boys and Caucasian boys differed with respect to floating ability; therefore, with respect to the relative frequency with which they fell into each of the two categories. The Fisher Test was used to analyze data collected on subjects who were classified according to each of three factors: age, height, and weight. Also, a test was conducted on Negro and Caucasian data collectively, disregarding age, height, and weight as factors.

Table I indicates probabilities associated with observed frequencies with which subjects of various ages fell into racial and floating status categories. The only age at which Caucasian boys floated significantly more frequently than did Negro boys was age nine.

Table II gives probabilities associated with frequencies with which subjects of various weights fell into racial and floating status

TABLE I
A COMPARISON OF FLOATING ABILITY ACCORDING TO AGE

Age	Negro		Caucasian		Probability
	Float	Non-Float	Float	Non-Float	
6	0	0	2	0	.5000
7	3	0	5	0	1.
8	3	0	7	0	1.
9	4	3	10	0	.0514*
10	5	2	9	0	.1750
11	9	2	11	0	.2380
12	13	6	6	0	.1530

*Significant at .05 level of confidence.

TABLE II
A COMPARISON OF FLOATING ABILITY ACCORDING TO WEIGHT

Pounds	Negro		Caucasian		Probability
	Float	Non-Float	Float	Non-Float	
100+	5	2	5	0	.3181
90-99	4	2	6	0	.2272
80-89	12	3	6	0	.3421
70-79	6	4	13	0	.0237*
60-69	8	2	14	0	.1630
50-59	2	0	4	0	1.
40-49	0	0	2	0	1.

*Significant at .02 level of confidence.

categories. The only wieght at which Caucasian boys floated significantly and more frequently than did Negro boys was 70 to 79 pounds.

Table III indicates probabilities associated with observed frequencies with which subjects of various heights fell into racial and floating status categories. The only height at which Caucasian boys floated significantly more frequently than did Negro boys was 54 to 56 inches.

Table IV shows that when 50 Negro boys were compared to 50 Caucasian boys; 37 Negro boys were rated as floaters and 13 were rated as non-floaters while all 50 Caucasian boys were rated as floaters. Caucasian boys ranging in age from six to twelve, weighing 90 to 130 pounds, and standing from 45 to 63 inches in height were significantly more buoyant (.005 level) than Negro boys of equal physical characteristics.

TABLE III

A COMPARISON OF FLOATING ABILITY ACCORDING TO HEIGHT

Inches	Negro		Caucasian		Probability
	Float	Non-Float	Float	Non-Float	
45-57	0	0	4	0	1.
48-50	1	0	1	0	1.
51-53	6	1	15	0	.3181
54-56	7	4	13	0	.0310*
57-59	11	3	11	0	.1582
60-62	9	5	4	0	.2336
63+	8	0	2	0	1.

*Significant at .03 level of confidence.

TABLE IV
A COMPARISON OF FLOATING ABILITY OF NEGRO
AND CAUCASIAN BOYS

Negro		Caucasian		Probability
Float	Non-Float	Float	Non-Float	
37	13	50	0	.005*

*Significant at .005 level of confidence.

CHAPTER V

SUMMARY AND CONCLUSIONS

This study was concerned with a comparison of natural buoyancy of Negro and Caucasian boys who ranged in age from six to twelve. The criteria by which the comparison was made were the vertical float test and the turtle float test.

The subjects for this study were 50 Negro and 50 Caucasian boys who were selected from the American Red Cross "Learn to Swim" Program in Knoxville, Tennessee. The 100 subjects used in this study were tested individually on each of the two float tests. Prior to testing the subjects, the following data were collected: weight, height, age, and race. The Fisher Exact Probability Test was used to analyze data collected according to age, height, and weight. Further, a test was conducted on Negro and Caucasian data collectively, disregarding age, height, and weight as factors.

Although absolute accuracy may not be presumed in tests of this type, the analysis of the results of this study would seem to warrant the following conclusions:

1. That until the age of nine, age does not appear to be a factor in the floating ability of Negro and Caucasian boys.
2. That there is a tendency for a difference in floating ability to exist between Negro and Caucasian boys who weigh 70 to 79 pounds.
3. That there is a tendency for a difference in floating ability to exist between Negro and Caucasian boys who stand 54 to 56 inches in height.

4. That Negro boys ranging in age from six to twelve, weighing 40 to 130 pounds, and standing 45 to 63 inches in height do not float as consistently as Caucasian boys of the same physical characteristics.

The following recommendations are based upon the review of literature undertaken by the investigator and upon the results of this study:

1. That teachers of swimming use special techniques with the non-buoyant person in order to facilitate learning.

2. That further studies be conducted in order to ascertain the causes of the differences in floating ability between Negro and Caucasian boys.

3. That a similar study be conducted using Negro and Caucasian males ranging in age from nine to eighteen.

4. That a similar study be conducted using Negro and Caucasian females ranging in age from nine to eighteen.

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APPENDIXES

APPENDIX A

DATA FROM NEGRO SUBJECTS

Name	Age	Weight	Height	Turtle	Vertical
M.F.	8	66	51	Float	Eyes
J.H.	10	76	58	Float	Hair
K.B.	12	100	63	Float	Eyes
S.G.	9	71	51	Float	Hair
C.P.	10	64	54	Float	Hair
K.C.	9	75	54	Sink	Sink
R.S.	9	72	55	Float	Hair
M.B.	11	69	56	Float	Hair
E.H.	7	80	56	Float	Hair
K.L.	8	56	50	Float	Eyes
B.L.	12	81	58	Float	Hair
K.W.	12	99	63	Float	Hair
I.S.	11	86	56	Sink	Sink
M.T.	12	94	61	Sink	Sink
S.M.	11	76	56	Float	Hair
H.S.	7	59	51	Float	Hair
J.J.	10	75	57	Sink	Sink
W.M.	12	116	62	Float	Hair
D.M.	9	85	56	Float	Hair
D.A.	12	138	64	Float	Hair
J.W.	12	91	62	Sink	Sink
B.W.	10	83	57	Float	Hair
K.W.	12	76	59	Sink	Sink
C.R.	10	84	58	Float	1 Inch Above Eyes
J.K.	10	65	53	Float	Hair
C.M.	12	85	60	Float	Hair
A.M.	12	82	60	Float	Hair
D.L.	12	88	61	Float	1 1/2 Inches Above Eyes
J.J.	12	87	60	Sink	Sink
V.J.	11	80	57	Float	Hair
L.A.	12	90	61	Float	Hair
K.J.	11	118	61	Float	Eyes
A.K.	12	85	61	Float	Hair
W.M.	8	60	52	Float	Eyes
R.F.	9	62	52	Sink	Sink
S.F.	7	60	51	Float	Hair
R.J.	11	81	59	Sink	Sink
R.L.	12	98	59	Float	Hair
D.W.	11	99	59	Float	Hair
K.B.	12	102	63	Sink	Sink
R.R.	11	78	55	Float	Hair
K.T.	9	62	52	Float	Hair

Name	Age	Weight	Height	Turtle	Vertical
R.K.	12	77	57	Float	Hair
D.S.	9	70	54	Sink	Sink
L.G.	10	67	55	Sink	Sink
T.B.	11	85	58	Float	Hair
M.B.	12	102	61	Sink	Sink
G.M.	12	131	63	Float	Eyes
T.G.	11	89	58	Float	Hair
K.J.	11	66	57	Float	1 1/2 Inches Above Eyes

APPENDIX B

DATA FROM CAUCASIAN SUBJECTS

Name	Age	Weight	Height	Turtle	Vertical
D.C.	7	64	52	Float	1 1/2 Inches Above Eyes
D.C.	10	65	55	Float	1 Inch Above Eyes
G.M.	11	95	59	Float	Eyes
S.B.	9	70	53	Float	Eyes
B.C.	7	69	47	Float	Eyes
K.M.	8	73	52	Float	Eyes
K.S.	9	58	52	Float	1 Inch Above Eyes
J.K.	7	63	51	Float	2 Inches Above Eyes
T.T.	12	80	60	Float	1 Inch Above Eyes
S.T.	10	65	55	Float	1 1/2 Inches Above Eyes
B.W.	8	56	52	Float	2 Inches Above Eyes
R.S.	11	79	58	Float	1 Inch Above Eyes
D.P.	10	71	54	Float	1 Inch Above Eyes
S.H.	9	102	56	Float	Nose
J.A.	8	74	56	Float	2 Inches Above Eyes
K.R.	10	81	58	Float	1 Inch Above Eyes
R.M.	9	69	55	Float	Eyes
B.J.	11	74	59	Float	Eyes
R.J.	9	74	56	Float	2 Inches Above Eyes
B.I.	7	64	51	Float	1 Inch Above Eyes
A.H.	8	65	54	Float	2 Inches Above Eyes
D.T.	11	84	56	Float	Eye
M.P.	7	44	46	Float	1 Inch Above Eyes
M.A.	9	115	60	Float	Mouth
J.S.	9	94	57	Float	1 Inch Above Eyes
T.C.	10	63	52	Float	Hair
F.D.	9	60	52	Float	Hair
S.B.	11	93	59	Float	1 Inch Above Eyes
P.D.	10	50	51	Float	Hair
B.D.	11	64	54	Float	1 Inch Above Eyes
M.S.	12	74	56	Float	2 Inches Above Eyes
A.T.	12	82	56	Float	Eyes
R.L.	12	100	60	Float	1/2 Inch Above Eyes
S.T.	6	63	46	Float	1/2 Inch Above Eyes
G.S.	10	94	57	Float	2 Inches Above Eyes
I.S.	12	87	60	Float	Eyes
E.F.	11	71	55	Float	2 Inches Above Eyes
C.M.	6	45	45	Float	1 Inch Above Eyes
J.B.	9	77	52	Float	1/2 Inch Above Eyes
S.C.	10	70	53	Float	1 Inch Above Eyes

Name	Age	Weight	Height	Turtle	Vertical
C.G.	8	55	49	Float	2 Inches Above Eyes
B.H.	12	111	63	Float	Eyes
A.M.	11	88	58	Float	2 Inches Above Eyes
W.G.	11	104	67	Float	Eyes
J.B.	11	78	57	Float	2 Inches Above Eyes
D.M.	9	75	52	Float	Eyes
D.R.	8	62	51	Float	Hair
R.R.	8	66	52	Float	Hair
M.J.	10	90	58	Float	Eyes
B.W.	11	95	58	Float	1 Inch Above Eyes

VITA

Estelle Clemence Carter was born in Bluefield, West Virginia on August 4, 1950 to Mr. and Mrs. R. T. Carter.

She attended Virginia High School in Bristol, Virginia, graduating in 1968. The following September she entered Virginia Intermont College of Bristol, Virginia, and in 1970, received an A.A. degree with a major in Physical Education. From 1970-1972 she attended East Tennessee State University of Johnson City, Tennessee, where she received the degree of B.S. with a major in Physical Education and a minor in Health. She is presently a graduate assistant in the School of Health, Physical Education and Recreation at The University of Tennessee, where she anticipates receiving the degree of M.S. in August, 1973.