The impact of a health promotion program on student health concerns

Grace Elizabeth Stay
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THE IMPACT OF A HEALTH PROMOTION PROGRAM ON STUDENT HEALTH CONCERNS

A Dissertation
Presented to
The Faculty of the School of Education
The College of William and Mary in Virginia

In Partial Fulfillment
Of the Requirements for the Degree
Doctor of Education

by
Grace Elizabeth Stay
August 1999
THE IMPACT OF A HEALTH PROMOTION PROGRAM ON STUDENT HEALTH CONCERNS

by

Grace Elizabeth Stay

Approved June, 1999 by

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Sandra Ward, Ph.D.
To my parents, Kenneth and Grace Stay, for their enduring support
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THE IMPACT OF A HEALTH PROMOTION PROGRAM
ON STUDENT HEALTH CONCERNS

The purpose of this quasi-experimental study was to investigate whether an educational program presented in the classroom effected fourth and fifth grade students' exercise awareness, dietary self-efficacy, self-esteem and concerns about weight. The independent variable was a 16-session curriculum, Heart Power, which was presented by the classroom teachers and developed by the American Heart Association. Statistically significant results were obtained on measures of improved exercise awareness, dietary self-efficacy, and body-concept. There were not statistically significant results for overall self-esteem or weight concerns. The results suggest that a curriculum which was fairly easily integrated into the classroom, and preferred by teachers to the usual health curriculum, may be associated with positive changes in understanding and attitude toward physical activity and food choices.

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The Impact of a Health Promotion Program on Student Health Concerns
Chapter One

Introduction

Among the greatest health concerns in the country as we approach the twenty-first century is the development of lifestyles which are conducive to productive and healthy adulthood and which reduce chronic illnesses that tap resources on an individual, family, community and national level. Our society supports a multi-billion-dollar diet industry and participates in a high rate of dieting, yet prevalence rates for obesity range from 15% to 22% among American teenagers, and national indices inform us that from 1960 to 1980, a 50% increase in obesity occurred among American children and adolescents (Dietz, 1995 and Nuemark-Sztainer, 1995). Our society has become less active and consumes more prepared "fast-foods" than did previous generations, while the accepted definition of beauty has become narrower and pressures on young people, particularly young women, to conform to media images of physical perfection have increased (Sobal, 1995; Robison, 1997). In spite of this pressure, children have become heavier (Dietz, 1995). They experience more conflict regarding their physical adequacy (Sobal, 1995) and often develop negative body-images, which result in decreased physical activity and the use of inappropriate food restriction in an effort to comply with social pressures (Polivy and Herman, 1995). In the wake of increasing levels of obesity and other eating disorders among children and the limited effectiveness of treatments for these chronic problems, prevention programs which target body-image, appreciation of
physical diversity and self-awareness of the impact of daily choices are worthwhile investments. In addition, increasing understanding among all children of the factors which contribute to physical health may improve their food and exercise choices, thereby reducing extreme expressions of normal physical variation.

Glenny (1997) reviewed the literature on the treatment and prevention of obesity and summarized that the single most effective strategy in reducing obesity in children was the reduction of sedentary behaviors. The authors suggest that public health efforts should target the goals of reducing dietary fat intake and reducing sedentary behaviors. They also point out that researchers working with a child population should be aware that for growing children, strategies which result in even modest reductions of weight are of importance and should not be dismissed. Further, Wabitsche (1997) states that it is "an important and responsible task for the near future to prevent the development of obesity in children and adolescents" (p. 710).

Previous research into the effectiveness of prevention programs designed to eliminate the development of body-image distortions and eating disorders have yielded mixed but promising results. In 1993, Killen and associates conducted one of the few long-term studies involving an eating disorder prevention program. They reported an increase in knowledge about eating disorders in California middle school girls following an 18-lesson curriculum but no improvement in eating attitudes and weight regulation practices. Only a
"slight but significant" difference in body mass index was reported, but as noted elsewhere (Glenny, 1997), even modest weight changes in children can be valuable in protecting against future obesity.

Theoretical Rationale

Obesity is a complex problem with multiple etiological contributions including biological, environmental, familial, cognitive and genetic. The prevention and treatment of childhood obesity may be conceptualized through Albert Bandura's social cognitive theory, which provides a comprehensive theoretical orientation and emphasizes the multidimensional nature of psychological functioning. Social cognitive theory proposes a dynamic interaction among external stimuli, environmental consequences and cognitive factors (Bandura, 1977). The cognitive factors mediate the influence of environmental factors on behavior by impacting which events will be attended to, how they are perceived and remembered, and the way in which they influence future behaviors. Social cognitive theory has, since its inception, been applied to the treatment of refractory behavioral problems, such as addictions, eating disorders and obesity (O'Leary, 1987). Albert Bandura explored the application of his theory to disordered behavior, including the importance of goal-setting to weight loss as an exploration of the role of goal proximity to self-regulation of refractory behavior (Bandura and Simon, 1977). In addition to the early work done by Bandura and Simon, Jeffrey (1974) investigated the cognitive construct
of self-reinforcement as it related to weight reduction in adults.

Of the mediating cognitive processes through which behaviors are influenced, self-efficacy is another construct within social cognitive theory that is of therapeutic and preventive value regarding behavioral patterns, disordered or productive. Self-efficacy is seen as the individual's judgment of whether he or she has the capacity to deal competently with environmental demands - a judgment which influences his or her engagement in, or avoidance of, behavioral responses. The development of self-efficacy can be shaped by environmental and personal factors, such as the incentive to practice skills, the availability of necessary resources, and the absence of physical or social constraints. Bandura (1977) asserted that one's judgments regarding self-efficacy will determine the amount of effort and time that will be invested by an individual and her or his perseverance if she or he encounters deterrents which must be overcome to perform the behavior. Parcel et al. (1995) recently developed a scale to measure dietary self-efficacy in children, as this emerges as an important construct in health promotion and intervention programs.

Other recent work has investigated the application of specific aspects of social cognitive theory to various health behavior issues. Allen et al. (1993) looked specifically at weight loss expectancies among teenagers and identified five factors which were found to effectively discriminate among various levels of weight reduction behavior. Consistent with social cognitive theory, they found that teens who had strong, positive expectations regarding dieting were more
frequent dieters, more likely to use diet pills and more likely to engage in purging. Thombs et al. (1998) recently extend the work done by Allen (1993), attempting to replicate and further the understanding of the impact of expectancies on unhealthy dieting behavior. Their findings suggest that self-esteem was a better predictor of weight reduction behaviors than were expectancies and that gender and specific knowledge also were correlated with weight reduction behaviors. More specifically, girls with an inaccurate knowledge of the importance of exercise to weight loss were more likely to be involved in diet pill use and purging. The authors conclude that special attention needs to be given to self-esteem in weight management programs, that helping "youth distinguish between healthy and unhealthy reasons for dieting" (p.113), and enhancing their awareness of their own weight loss motivations are important aspects of programs which aim to combat the development of unhealthy weight regulation behaviors.

The treatment of both obesity and eating disorders have historically been primarily behavioral, with a focus on retraining the client's responses to food cues and instituting external referents for eating behaviors, including when, where, what and how much food is to be eaten. Another focus has been on the institution of regular and reasonable physical exercise through behavioral retraining. Behavioral treatment which has a stimulus-response focus, however, has been successful only in producing short-term change and often has resulted in clients regaining the weight they lost - often more - and experiencing
additional psychological stress (Foster and Wadden, 1995).

Social cognitive approaches offer more comprehensive strategies of prevention and treatment, and some behaviorists in the field assert that "a heightened sense of self-efficacy based on self-attribution of behavior change must be the target of obesity control programs" (O'Leary, 1987, p. 275).

Research has yielded evidence of the predictive ability of self-efficacy in adults with regard to dietary and activity behaviors and in children for a variety of learning tasks, social behaviors and substance use (Parcel et al., 1995). The concept of self-efficacy now holds an important role in the orientation of other disease prevention programs and is a promising construct in the field of obesity prevention.

The purpose of this quasi-experimental study was to investigate whether an educational program presented in the classroom effected elementary students' exercise awareness, dietary self-efficacy, self-esteem and concerns about weight. The independent variable is a 16-session curriculum, Heart Power, which was presented by classroom teachers and developed by the American Heart Association. The dependent variables were defined as weight concerns, dietary self-efficacy, exercise awareness and self-esteem. The intervening variables of race and gender were statistically controlled. The specific hypothesis investigated were:
1. The classes which participated in the Heart Power Program would demonstrate a decrease in weight concerns.

2. The classes which participated in the Heart Power Program would demonstrate an increase in dietary self-efficacy.

3. The classes which participated in the Heart Power Program would demonstrate an increase in knowledge regarding exercise.

4. The classes which participated in the Heart Power Program would demonstrate an increase in self-esteem.

Definition of Terms

1. Obesity - The American Medical Association's Guidelines for Preventive Services has established that adolescents with a Body Mass Index (BMI) between the 85th and 94th percentile for age and gender are "at risk" for becoming overweight and recommends that medical screening, and possibly intervention efforts begin at this point. A BMI at or above the 95th percentile is at the level of overweight at which intervention and in-depth medical assessments are recommended. BMI is established by height and weight, and the AMA offers a grid which medical professionals are advised to begin using with patients at age 11 to screen annually for obesity and eating disorders (Berg, 1997).

2. Weight concerns - Concerns expressed regarding being or becoming overweight, as measured by 8 questions on the Body Image and Eating Questionnaire for Children (Thelen et al., 1992).

3. Body-image or Body-concept - In general, the self-assessment individuals
make by comparing themselves to an external standard and determining whether their bodies deviate or comply with these accepted standards. If healthy individuals use an unrealistic standard, they may determine that they do not "measure up" and perceive themselves to be physically inadequate.

4. Dietary self-efficacy - Refers to an individual's belief that he or she can exercise control over food choices and eating behavior, as measured on the Childhood Dietary Self-Efficacy Scale (Parcel et al., 1995).
Chapter Two

Review of the Literature

Introduction

Many researchers and writers in the field of obesity treatment have called for a "new paradigm" regarding the conceptualization of obesity and its treatment. Robison (1997) cites the "epidemic of dieting" as possibly contributing to both the development of eating disorders and the increase in obesity. He calls for a tolerance of normal physical variation and a shift in emphasis to physical health for people of all sizes. He also suggests that it is cultural changes which have increased sedentary behavior and high-fat food intake, while simultaneously applying extreme social pressure, particularly to females, to achieve unrealistic body shapes and sizes, all of which may well result in the exacerbation of normal variation to the point of physical risk.

Hawks and Richins (1994) also support a new paradigm in weight management which focuses primarily on increasing physical activity and reducing fat intake. They point out that childhood obesity impacts health both by increasing the number of fat cells the individual will have for the remainder of her or his life and by increasing the "set point", or level at which the body burns fat for fuel, through repeated dieting. The implication for health educators, these authors assert, is that prevention of obesity among children may be the best way to counter the biological mechanisms which later result in obesity. From the
perspective of social cognitive theory, correcting the expectations children have about the probable outcome of dieting behaviors, increasing their knowledge of appropriate health behaviors, and improving their self-confidence regarding their ability to obtain and sustain physical health through appropriate health-sustaining behavior may effectively prevent later health problems, including obesity.

**Research Regarding School-Based Programs**

Several large-scale, school-based programs have been initiated in an effort to improve nutrition and exercise in the school settings. In Nebraska, an effort at obesity prevention has been undertaken in the public schools. In a two-year trial of improving nutrition and physical activity in third through fifth grade children, nutrition was significantly improved among the treatment groups, although the exercise component was less successful. The nutrition program consisted of 18 lessons taught over a two-year period by classroom teachers, while school lunches were modified to decrease fat and sodium content. In addition, physical education programs were modified to decrease the emphasis on competitive sports, increase the time spent in actual activity, and assure that at least 30 minutes were spent three days a week in activity which exercised large muscle groups. While short-term changes were measured during physical education classes, there was no apparent carry-over during the rest of the week, as had been hoped. And while no significant change in obesity or weight was
found, higher HDL cholesterol (the "good" cholesterol) was achieved in the

treatment group (Berg, 1997).

Kansas also piloted a promising school health project in 1992, which it
called LEAN. The four components of this project included: improving the school
lunch; adapting the physical education program to assure daily, noncompetitive
activity; integrating a nutrition education program into the health curriculum, and
developing a community coalition to provide additional support activities after
school and during weekends and holidays. The program resulted in a
measurable change in students' attitudes about physical activity, which they
came to see as part of their family and community lives, not just as school-
related (Johnston, 1996). Harris et al. (1997) reported specifically on the school
intervention portion of the LEAN project and noted that the program, which was
implemented over the school year, also successfully reduced the fat content of
school lunches and improved students' fitness, as well as their knowledge, skills
and attitudes toward nutrition.

Luepker et al. (1996) reported on a similar comprehensive school-based
project, CATCH: The Child and Adolescent Trial for Cardiovascular Health,
which involved over 5,000 students from three states. The CATCH study was
funded by the National Heart, Lung and Blood Institute. The intervention
included modifications in three areas: school lunches, the health curriculum and
physical education classes. Again, this program successfully reduced the fat
content of school lunches and increased the level of physical activity at
intervention sites but did not significantly affect blood pressure, cholesterol levels or body size.

Smaller, more specific programs have also been attempted by researchers, with mixed results. Terry and Michaud (1993) developed a three-session "Healthy Growth" intervention for elementary teachers across the state of Iowa, with the goal of reducing inappropriate dieting among children. The lesson plans focused on three issues: body-image, normal physical growth patterns, and nutrition. The lessons were presented by the regular classroom teachers, having been incorporated into the existing health or physical education curriculum, and included teaching objectives, background information for teachers, worksheets and other learning activities, as well as short quizzes for each of the three sections. Prior to distribution across the state, the lesson plans were pilot-tested among 195 rural fourth and fifth grade children, and a significant increase in student knowledge was demonstrated.

Harrell et al. (1996) reported on the effectiveness of an eight-week educational program, Heart Power (American Heart Association, 1996), combined with an eight-week exercise program administered to third and fourth grade students in North Carolina. The randomized field trial included 12 schools, and yielded positive results which demonstrated that the students receiving the intervention: had significantly greater knowledge of cardiac health factors; increased self-reported activity levels; showed a trend for reductions in cholesterol, body fat and a reduced rise in blood pressure, and increased
aerobic power. More recently, Harrell et al. (1998) published the results of the same school-based intervention program, but this time they compared the effects of a classroom-based intervention with the effects of an individualized administration of the same program to an at-risk group of children with multiple risk factors for cardiovascular disease. The results demonstrated that both methods of administration were effective at significantly reducing cholesterol, increasing health knowledge and effecting a small decrease in body fat in children who received the intervention, as compared to children who participated in the standard health and PE programs.

In promoting the concept of a comprehensive school health program, Collins (1991) reviews research which suggests that children are influenced by the "preoccupation with thinness apparent in American society" (p. 297) and offers suggestions for incorporating preventive strategies into the school health program. To encourage the development of healthy body-image in children, Collins identifies school health service providers, physical educators, food services programmers, school psychologists, counselors and teachers as key members of the school team who can work together to assist students in maintaining a healthy sense of self throughout childhood and adolescence. She asserts that promoting healthy body-image can be accomplished through incorporating into the existing curricula the following: the demonstration of acceptance of physical diversity; the development of coping strategies; the education of students and their parents regarding healthy nutrition; an
understanding of physical development and the importance of enjoyable, regular physical activity; and the development of consumer education programs designed to teach children to be wary of advertising.

Neumark-Sztainer (1996) also proposes specific components of effective, comprehensive school-based programs aimed at the prevention of eating disturbances. She points out that programs of primary prevention must address the issues of both obesity and eating disorders in order to avoid emphasizing one problem while inadvertently contributing to the other. She also noted that the two issues, which may perhaps appear to be opposites, actually share behaviors such as concern about body-image, preoccupation with weight, dieting, binging and poor eating patterns. The factors which are considered by Neumark-Sztainer to be most important to school-based prevention programs include: body dissatisfaction and the sociocultural factors that contribute to negative body-image, the need for social acceptance of a range of body shapes and sizes, and cognitive factors, such as knowledge and attitudes about nutrition, exercise and weight loss behaviors, improved attitudes of both students and staff toward overweight individuals who are currently stigmatized, and an emphasis on the development of enjoyable and healthy eating and activity patterns.

Neumark-Sztainer also addresses the role of schools in primary and secondary prevention and considers variables such as determining target audiences and methods of presentation, which are dependent upon the resources available within individual communities.
Research Regarding Body-Image

Jaffee and Lutter (1995) report on a broad survey of girls who participated in YWCA summer programs in various locations throughout the United States. A group of 152 girls, ranging in age from 11 to 17 and representing 12 states, completed an eight-page questionnaire, which had previously been piloted on similar focus groups. The instrument was designed to elicit information about perceived weight, worry about weight, dieting behavior, and social influences on body-image. Although all the girls who completed the questionnaire were of average weight or less, based on body mass index and guidelines from the National Center for Health Statistics, 10% of those with favorable body-image, 27.6% of those with adequate body-image, and 65.4% of those with poor body-image rated themselves as overweight or very overweight. Perception about their weight was the primary determinant of both negative and positive body-image. Worry about weight was strongly associated with low body-image, as was talking to friends about feeling fat. Not talking about being fat was strongly related to high body-image. The girls were given 25 choices from which to select factors which influenced their feelings about their appearance, and girls with poor body-image chose four items significantly more than did the other girls: losing weight, my weight, my shape or figure, and wanting to be attractive to boys. Of particular importance, girls with poor body-image were significantly more likely to compare themselves to others with "perfect" bodies, rather than just to "others"; their selections included peers with "perfect" bodies, older girls
with "perfect" bodies, models in the media, movie stars, professional athletes and teachers. Regarding physical activity, girls' body-image increased as their participation on sports teams increased. There was no significant difference in the level of activity among the three groups. Racial differences emerged on several items and were most dramatic regarding body-image. Of the African-American girls, 40% considered themselves to be attractive or very attractive, while only 9.1% of the Caucasian girls thought so. While only three percent of the Caucasian girls reported they "always like" their looks, 36% of the African-American girls reported they "always like" the way they look. When asked to respond about their perceptions of their physical/athletic competence, African-American girls indicated significantly greater self-competence than did Caucasian girls. African-American girls also reported comparing themselves to others less frequently than other girls.

Parnell et al. (1996) surveyed a random sample of over 300 high school girls to determine racial differences in perceptions of ideal body size. The findings of this survey indicate that African-American teenage girls report greater social approval at greater weight, while Caucasian girls are more likely to desire to be smaller. The study also reveals significant racial differences in the factors influencing body size preference, with African-American families being more influential and peer groups having greater influence over Caucasian teens' preferences. While girls of African-American heritage appear to enjoy social approval of a broader range of physical size, it is also noted that among adult
African-American women the prevalence of obesity is almost twice that of Caucasian women and that the incidence of related chronic illnesses is also higher. Parnell and associates suggest that the cultural influences which result in the differences among African-American and Caucasian children regarding body-image, and the body-image differences themselves, may explain both the higher rate of obesity among African-American women and the more frequent occurrence of eating disorders among Caucasian women.

In a 1990 survey of over 1000 students in grades one, two and three, Elizabeth Collins (1990) found that 42% of the girls were already selecting an "ideal self" that was thinner than the figure chosen to represent "self". The girls also chose a thinner figure as the ideal girl than boys chose as an ideal girl. African-American children chose heavier figures as ideal than did Caucasian children, although females of both races generally preferred thinner figures than those chosen as "self". The results of this study suggest that a bias toward thinness begins to develop in girls by the age of six or seven.

Thompson et al. (1997) also found that African-American children in the fourth grade selected significantly heavier figures to represent ideals for self, male child, female child and male and female adults in line drawings. Her random sample of over 800 fourth grade children paralleled the Collins research reviewed above and followed the same trends into the fourth grade. This survey also revealed that 49% of the fourth grade girls chose an ideal self which was smaller than self, as did 30% of the boys. Although nearly half of the African-
American female subjects wished to be smaller than their current size, they again chose heavier ideals than did Caucasian girls. The results of this study suggest that body dissatisfaction and weight concern was strongest for Caucasian females, while both African-American and Caucasian males are generally spared such anxieties. As they comment: "In contrast to males, while a clear trend is not indicated, there is a suggestion that females are moving toward greater amounts of body dissatisfaction and weight concern in fourth grade" (p. 284).

Guinn, et al. (1997) assessed body-image perception, activity level, physical composition and self-esteem in a sample of Mexican-American eighth grade students. Their results suggested a significant positive relationship among body-image, self-esteem, and activity level; and a significant negative association between body-image and body fat composition. Their findings suggest that there is less body-image distortion among Mexican-American female adolescents than their Caucasian counterparts, and that body-image may be improved by increased physical activity and self-esteem building rather than by emphasizing weight loss. The authors note, "Additionally, teachers should demonstrate and encourage acceptance of the diversity in body size and shape occurring naturally among individuals of all sizes" (p. 114).
Research Regarding Nutrition and Diet

A survey conducted by Resnicow and Reinhardt (1991) assessed children's knowledge and attitude about fat, fiber and cholesterol. Over 5000 public school children from five states, age five to 18 participated in the survey, and the results indicated that while children had an understanding that eating fiber promotes health and that eating foods high in fat and cholesterol is potentially harmful, they had limited knowledge regarding which foods contained cholesterol and fiber. For example, while they were generally aware that butter contains cholesterol, they were unaware that ice cream does. In addition, while they knew that whole wheat bread contained fiber, they were less aware that fruit and vegetables do. The authors conclude that, "The present study suggests that American children are lacking essential information required to make positive food choices. This knowledge gap may ultimately have significant public health implications for increased risk of chronic disease" (Resnicow and Reinhardt, 1991, p. 71).

An investigation of factors associated with dieting and unhealthy eating patterns among Israeli adolescent females was published in 1996b (Neumark-Sztainer). The pattern of unhealthy dieting and binging which is common among teenagers in Western countries had also been established to be problematic in this population. The goal of this research was to develop a model of "nonsevere disturbed eating behavior among a nonclinical population" (p. 196), which could be used as a basis for educational programs of prevention based on social
cognitive theory. In this population, it was determined that body/self-image was a strong predictor of dieting and binging behaviors and that nutritional knowledge and attitudes were a strong predictor of nutritional intake. These results indicate that mildly disordered eating patterns could be predicted and suggest that the specific factors of nutritional knowledge, attitudes and body dissatisfaction be addressed by prevention programs to successfully intervene before girls begin patterns of unhealthy eating.

Mark Thelen, et al. (1992) assessed body-image, dieting behavior and eating attitudes in nonobese second, fourth and sixth grade students through the use of a questionnaire and line drawings. The results indicated significant differences among second grade girls and older girls with regard to both their concerns about becoming overweight and their desire to be thinner. Fourth and sixth grade girls consistently reported more eating-related problems than did boys. There was not any significant increase in the number of girls who reported dieting behavior from second to sixth grade, but it is noteworthy that an average of over 30% of these girls did report that they had dieted. The authors conclude that body weight and eating concerns emerge in elementary school-age girls and suggest that, "some of the efforts to prevent the development of body-image and eating difficulties should be directed toward children in the early elementary school grades" (p.45).

A Canadian dietitian, Linda Omichinski(1992), has developed nondieting strategies for use with teenagers to decrease negative body-image and
preoccupation with food and dieting. She comments: "Diet myths and diet mentality are entrenched in our culture. Curriculum and programs in schools are loaded with diet and weight bias. Educators are inadvertently passing on myths, fallacies and mixed messages simply because alternative material hasn’t existed." (In Berg, 1997, p.295) Her "Teens and Diets: No Weigh" program recommends that schools: advocate a healthy approach to nutrition and food which discourages dieting; help students develop respect for size diversity and understand normal growth patterns; encourage healthy food choices without encouraging good/bad perceptions of food, and emphasize the development of pleasurable physical activities that will last a lifetime rather than focusing exclusively on competitive sports in which few children can succeed. While this program is broadly used in Canada, no research of its effectiveness is available.

Balentine (1991) assessed body-image and eating behaviors in low-SES African-American adolescents. She found that students who were heavier than average were more likely to define themselves as having an eating disorder. Among the students who had tried to lose weight, fasting was the most frequently reported technique used. Although the African-American culture appears to offer more acceptance to African-American women with regard to body size, African-American adolescents who are overweight are at risk of using unhealthy and dangerous methods of weight control.

Parcel, et al. (1995) evaluated the relationship among children's self-efficacy and their self-reported consumption of food. The subjects were over
1000 third and fourth grade children in public schools in four states in the U.S. In addition to investigating the role of self-efficacy in the diets of children, these investigators also ascertained the psychometric properties of an instrument they developed: the Child Dietary Self-Efficacy Scale. Self-efficacy in food choices was established by asking students how "sure" they were that they could make certain decisions about foods - for example "How sure are you that you can eat fresh fruit instead of a candy bar?" - with students selecting among the responses "not sure", "a little sure", and "very sure". The results indicated that self-efficacy was the strongest predictor of usual food choices. Gender and grade also emerged as significant predictors of food choices, with girls scoring higher (more healthy) than boys and third graders scoring higher than fourth graders.

Research Regarding Physical Activity

In a 1988 nonconcurrent prospective study (Dennison et al., 1988), the physical activity levels of 453 young men were compared to their childhood physical fitness test scores. The results indicated that childhood fitness tracks into adulthood and that such physical fitness testing is a useful tool to identify boys who may grow to be inactive adults. In 1994, Kelder et al. reported the results of a longitudinal tracking of adolescent health behaviors. They followed over 2000 students through self-reports of food choice patterns, physical activity level and smoking and found these behaviors to track from sixth grade to one year after high school graduation, with behavioral patterns at sixth grade
remaining consistent through young adulthood. The authors conclude: "The early consolidation of health behaviors implies that interventions should begin prior to sixth grade before behavioral patterns are resistant to change" (p.1121).

Goran (1997) measured energy expenditure in obese young children in relation to various physical activities. He determined that the length of time spent in physical activity was more important than the intensity of the activity, suggesting that longer bouts of low-intensity activity may be more "protective" than shorter bouts of high-intensity physical activity. This supports the importance of reducing sedentary behavior in children through the development of enjoyable leisure activity which is likely to be sustained for a longer period and maintained, ideally, over the lifespan. In addition, educating children about the value of physical activity may increase the likelihood that they will participate in leisure activity because they have an expectancy of its value to their health.

Biddle and Goudas (1996) analyzed the effect of several variables on the activity levels of 13- and 14-year-old students in England. They hypothesized that student self-efficacy regarding both physical activity and adult encouragement would be associated with student physical activity level. Previous research into the influence of adult modeling on activity level had focused on parental influence and suggested a small but significant effect (Stucky-Ropp, 1993). Biddle and Goudas proposed that the additional influence of teachers might be an important determinant in how active children are and that a broader perspective be taken, looking at adult encouragement rather than
specific modeling. The results of their assessment of 147 children indicated that parent and teacher encouragement predicted both student intent and participation in strenuous physical activity and indirectly influenced student activity by increasing the child's perception of their own competence to participate in sports. As the authors conclude "If [this is] verified, adult encouragement could be identified as an important determinant of children's activity" (p.78).

Studies have shown that in American school children, activity levels are relatively low and that girls are significantly less active than boys (Heath, 1994). A 1996 study (Trost, et al.) of rural fifth grade children considered whether social cognitive determinants were related to the differences in activity levels between girls and boys. They sampled 365 fifth grade students from rural South Carolina schools which were predominantly African-American. These investigators looked at a variety of possible psycho-social determinants of activity, including social influences, beliefs about physiological and social outcomes of physical activity, intentions to be active, and physical self-efficacy which itself was viewed as having three dimensions: support seeking, barriers and competing activities. In addition, selected physiologic and environmental determinants were assessed. The results indicated that the self-efficacy factor of overcoming barriers and the environmental factor of participation in community sports were significant contributors to the gender difference in activity levels. From the perspective of social cognitive theory, boys were more active than girls in part
because they had more confidence that they could overcome the barriers of time constraints, fatigue, poor weather and homework obligations.

A 1992 (Muecke et al., 1992) study of Texas schoolchildren, ages eight to ten, was conducted to assess the associations among both low levels of physical exercise and exposure to high-fat food with childhood obesity. The sample of 240 children was found to have a 100% higher rate of childhood obesity than established in norms from 1976 to 1980. The case-control findings revealed that obesity was not associated with either risk factor alone, but when both risk factors occurred together in the same child, a 38% increase in the risk of obesity was present, suggesting the possibility of a "synergistic effect". The authors conclude that "earlier identification of high-risk children, and high-risk behavior, will set the foundation for future intervention strategies" (p.22).

Felts et al. (1992) used data collected from public high school students in North Carolina to assess the relationship between physical activity and teenagers' perceptions of their own weight. They found that adolescents who perceived themselves as "too fat" were less likely to participate in physical activity in or out of school. The authors call for an integration of school health and physical education programs, as well as an integration of school and community programs, to develop appropriate goals to address childhood obesity.

Wolf (1993) surveyed over 500 girls in the grades five through 12 to determine the differences among ethnic groups and grade level with regard to activity and obesity. The results demonstrated that Hispanic and Asian children
reported lower activity levels than did other racial groups, and that, among the entire population of children, only 36% met the Year 2000 goal for physical activity level. Physical activity level in this group was inversely related to age.

Burke et al. (1998) used a physical activity "enrichment" program for Australian school children who were determined to be "at risk" for cardiovascular disease. The enrichment program consisted of two 10-week activity programs, which involved the students daily in 20 minutes of small-group activities and included six classroom lessons to establish a rationale. In addition, the parents were involved in a nutrition education program. The children also kept physical activity records, which were reviewed by teachers to help students identify preferred activities, create personal goals and determine ways to increase the duration and intensity of activity. The modest program resulted in improved fitness and lowered cholesterol levels for at-risk students, and the results persisted six months later.

**Critique**

Various large-scale projects have demonstrated positive outcomes for intervention programs in some areas (Berg, 1997; Johnston, 1996; Harris, 1997; Luepker, 1996); however, the results have generally been mixed, with some programs reporting no measurable physical improvements, while other similar programs did demonstrate improvements in certain physiological measures. In addition, the program implementations ranged from three weeks to two years among various research projects. While a variety of authors offer suggestions
regarding the implementation of programs of prevention in the school setting, very few have been implemented and assessed for effectiveness. Terry and Michaud (1993) do offer support of the effectiveness of the three-session program they developed; however, they assessed only "student knowledge". While the program they presented offers body-image intervention, there is no assessment of this variable. Collins (1991) offers very specific recommendations for implementation of programs within the school setting, considering existing curriculum, the role of various staff members and school resources; but as with the program recommendations of Neumark-Sztainer (1996), there is no empirical evidence of the effectiveness of implementing the recommended strategies.

Among the research investigating weight concerns among children, the surveys and questionnaires assessing body-image and body dissatisfaction among children have gone far to inform us as to when in childhood negative body-image begins to emerge, to delineate cultural differences in body-image, and to suggest influences on body-image development. A variety of techniques have also been used, including the use of an array of line drawings from which young children choose depictions of "ideal" and "self". There is no information available on efforts to measure the effects of interventions on the development of body-image. Several studies have assessed changes in "attitudes" after interventions, but specific assessment of concerns regarding physical self have not been assessed.

The research involving the measurement and impact of self-efficacy upon
children's food choices and activity levels has resulted in the development of potentially valuable research tools and program recommendations. Parcell et al. (1995) offer a valid and reliable tool with which to measure children's dietary self-efficacy. As they note, the scale is specific to the dietary concepts of a low-fat/low-salt diet and is not a broad measure of nutritional knowledge or suitable for more general nutritional education programs. In addition, measures of dietary self-efficacy do not substitute for measures of actual dietary behaviors, which are likely to be influenced by other cognitive and environmental variables.

Neumark-Sztainer's (1996b) population of Israeli children was homogenous and indicated that nutritional knowledge and attitudes were important influences on nutritional intake. She recommends that nutritional education be included in preventive programs but did not assess the effectiveness of doing so. Thelen et al. (1992) also assessed eating behaviors and body-image among children and described these variables among a public elementary school population; but interventions were not implemented. In addition, as the authors note, weaknesses in their research included the lack of enough African-American children to determine racial differences in eating behaviors, the meaning of some of the language in the instrument to children, (such as "diet"), and the failure to determine whether any subjects were dieting under supervision for specific health reasons. All studies reviewed used self-report measures of eating behaviors, which are obviously less reliable than direct measures of behavior.
As in the research discussed above, the self-report nature of all of the school activity studies is problematic. Particularly when used to measure behaviors in younger children, the reliability of this form of data collection is less than ideal; because of the logistical problems involved in using observational methods, however, self-report measures are likely to continue to be used and efforts to improve their reliability are worthwhile. One study (Biddle and Goudas, 1996) attempted to address this problem by asking students for recall of only strenuous activity, which they considered more likely to be recalled. Children, however, are less likely to be involved in formal exercise, and assessment of leisure activity is of importance. The assessment of a broader range of activities is needed, as most studies seek information about specific strenuous activity or exclude activities that were of shorter duration, such as a 10 minute minimum time limit in the Muecke et al. (1992) study.

Summary

The purpose of this research project was to integrate and extend the research into the prevention of childhood obesity through a school-based program which previous research (Harrell et al., 1996 & 1998) found to be associated with positive effects on student health factors and knowledge of heart health. The current study determines whether the same program, similarly implemented, would have positive psychological effects on self-efficacy regarding food choices, self-esteem, a reduction of weight concerns and improved self-concept.
Chapter Three

Methodology

Sample

The target population in this research is elementary school children in the fourth and fifth grades. The previously discussed literature indicates this is the age when significant concerns regarding weight emerge and dieting behaviors begin (Collins, 1990; Dennison et al., 1998). Both genders are included in the study and 52 percent are African-American, 48 percent are Caucasian. The population also includes a small number (less than 1 percent) of children of Hispanic origin.

The convenience samples were drawn as intact classes from eight fourth grade and six fifth grade classes in two rural elementary schools in Virginia. School enrollments are about 600 students, grades kindergarten through five, and average 61% African-American at the fourth grade level, 2% Hispanic and 37% Caucasian. At the fifth grade level, the two schools average 47% African American students, 4% Hispanic, and 49% Caucasian. Within this elementary school population, 63% of the students were eligible for free lunch programs because family income is at, or below, 130% of the national poverty level. In addition, 70% of the first through fifth grade level students were eligible for Chapter One services because achievement scores in math and/or reading fell below the 40th percentile.
Procedures

From the 14 classes at each of two grade levels in two schools, two Fourth grade and two Fifth grade classes were randomly assigned as treatment groups, and two at each grade level (four and five) were randomly assigned as control groups, yielding four treatment groups (two fourth and two fifth grades) and four control groups (also two fourth and two fifth grades). The mean class size for fourth grade was 26.5 and the mean class size of the fifth grade was 27.5. All classes received regular health instruction from their classroom teachers with the same curriculum, based on the Virginia Standards of Learning. (Although the SOLs have recently been replaced in many instructional areas, new standards for health have not been developed. The present health instruction continues to be based on the older SOLs.) Health instruction is rotated with social science instruction in all classes involved.

The parents of students in all involved classes were notified (see appendix A) by the building principal that some students would be participating in a supplementary program in health class and were given the choice to "opt out". Both treatment and control groups took pretests including The Child Dietary Self-efficacy Scale, Body Image and Eating Questionnaire and What's Your Activity IQ test, Piers-Harris Children's Self-Concept Scale. These were administered by the classroom teacher one week prior to the implementation of the treatment program.
The treatment program was implemented by classroom teachers in health classes. Upon completion of all 16 sessions, both treatment and control groups took the Child Dietary Self-efficacy Scale, What's Your Activity IQ?, the Body Image and Eating Questionnaire for Children, and the Piers-Harris Children's Self-Concept scale as post-tests to determine changes in weight concerns, activity awareness, dietary self-efficacy and self-esteem. Three weeks after the collection of the post-test data, the post-tests were readministered to determine whether any obtained differences had persisted over time.

Control group classes participated in the usual school health curriculum, without incentives for additional activity periods, during the data collection period. Upon completion of the treatment, the Heart Power curriculum and incentives were offered to the control classes, as well as those other Fourth and Fifth grade classes that did not participate in the study.

In addition to the formal measures used with the subjects, parents were mailed a survey with a stamped, self-addressed envelope and a letter requesting their voluntary participation (see appendix E). The survey consists of nine items which ask about parental exercise and diet routines, the availability of fresh fruit and vegetables in the home, and parent concerns about their child's weight.

The teachers who used the Heart Power program were also surveyed about their impressions of various aspects of the program and their suggestions regarding its future use within the school system (see appendix F).
Treatment

The treatment program was administered to each of the four treatment groups over an eight-week period, two sessions per week, with each session lasting 30 to 45 minutes. The Heart Power curriculum, developed by the American Heart Association (Level 3-5), was used by the classroom teachers in place of the usual health text. The program is a fully integrated heart health program which emphasizes: 1. knowledge about heart function, 2. choosing healthy foods, 3. getting enough physical exercise and 4. living tobacco free. It offers suggestions for investigations in each of the four areas of emphasis, lecture guidelines, project ideas, reading booklets with related stories and poems, a videotaped game show regarding heart health, classroom posters and stethoscopes. Each intervention classroom had its own kit. As part of the health curriculum, treatment groups were to develop a routine of walking for at least 20 minutes, at least three times per week. A class party was offered as an incentive for participation in the Heart Power program.

Instrumentation

1. The Body Image and Eating Questionnaire for Children (Thelen, et al. 1992) was used to assess student dieting history and weight concerns (see Appendix B). The instrument contains 14 items, which break into three variables: concern about being or becoming overweight, restrained eating, and diet
behaviors. Thelen et al. (1992) sampled a population of 191 public school students in the second, fourth and sixth grades from the Midwestern U.S. to determine the reliability and validity of the instrument. They determined the coefficient alphas on the three variables to be: being or becoming overweight (weight concerns) = .83, restrained eating = .81, and diet = .77. Only the weight concerns portion of the instrument was used, which consisted of eight items.

2. The Child Dietary Self-Efficacy Scale (Parcel et al., 1995) contains 15 items regarding food choices, such as, "How sure are you that you could choose fresh fruit over a candy bar?", from which subjects select responses: “not sure”, “a little sure”, and “very sure” (see Appendix C). Using a population of 1,127 third and fourth grade students from California, Louisiana, Minnesota and Texas, they determined the test-retest reliability of the CDSS to be .63. Internal consistency yielded a coefficient alpha of .84. The self-efficacy factor was determined to be adequate and associated with usual food choices, yielding a reliability of .58.

3. An eight-item test from the Heart Power curriculum (What’s your Activity IQ?) was used to assess student understanding of the need for physical exercise for physical health (see Appendix D).

4. The Piers-Harris Children’s Self Concept Scale was used to assess overall self-concept, with the individual scale assessing Physical Appearance and Attributes was also being scored and analyzed. The Piers-Harris is a commonly used instrument of 80 “yes-no” questions, with a reliability rating
ranging from .42 to .96 (test-retest), as reported by the authors (Piers, p.53), and convergent and discriminate validity ratings ranging from .73 to .78.

**Research Design**

This study employed a quasi-experimental, multiple factor treatment design, using intact groups. Four pre- and post-test measurements assessed changes in weight concerns, dietary self-efficacy, understanding of the role of physical activity, and self-esteem.

**Specific Hypotheses**

1. Students participating in the treatment program would demonstrate a decrease in weight concerns, as measured on the weight concerns factor of the Body Image and Eating Questionnaire for Children.

2. Students participating in the treatment program would demonstrate an increase in dietary self-efficacy, as measured on the Child Dietary Self-efficacy Scale.

3. Students participating in the treatment program would demonstrate an increase in their understanding of the importance of activity to health, as measured by the curriculum assessment “What's your activity IQ?”.

4. Students participating in the treatment program would demonstrate an increase in self-concept as measured on the Piers-Harris Children's Self-Concept Scale.
5. Students participating in the treatment program would demonstrate an increase in their body-concept, as measured on the third factor of the Piers-Harris Children's Self-Concept Scale: Physical Appearance and Attributes.

**Statistical Procedure**

A repeated measures analysis of variance was used to evaluate the five hypotheses, as well as the relationships among the five dependent variables and the factors of race and gender to determine interactions among these factors and the dependent variables.

**Figure 1**

<table>
<thead>
<tr>
<th></th>
<th>gender</th>
<th>race</th>
<th>treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>self-efficacy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>weight concerns</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>activity awareness</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>self-concept</td>
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</tr>
<tr>
<td>body-concept</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Chapter Four

Analysis of Results

Introduction

In presenting the research findings, this chapter will overview the procedures used, as well as the modifications from the original design. The results of each measure will be presented, organized by hypotheses, and will include appropriate tables and figures.

All testing was done with students in their health classes with their regular teachers. The students were given the choice either of putting their names on their papers or of having their teacher assign them numbers. Each protocol was coded so that it could be matched with other administrations completed by the same student. In each class, several protocols had to be omitted. The students were either absent for one part of the testing, or turned in incomplete protocols. Additionally, only four Hispanic children participated, and all were in the control groups. These protocols were also omitted. The total number of students omitted from treatment and control groups follows:

Treatment groups = 104 - 12 = 92
Control groups = 95 - 16 = 79
Total N = 171

Repeated measures analysis of variance was used to analyze the hypotheses and interactions among factors (gender, race). The .05 level of confidence was used for acceptance or rejection of the research hypotheses in
all comparisons.

Modifications were made in the post-testing procedures because of teachers concerns regarding the time involved in testing. The delayed post-testing was conducted only for the treatment groups, and the Piers-Harris Children's Self-Concept Scale was eliminated in the delayed post-testing procedures. This reduced the time involved in the third round of testing from approximately 45 minutes to 20 minutes. Delayed post-testing was conducted three weeks after post-testing.

It is also noted that the design of the treatment included the involvement of the experimental classes in a walking routine of 20 minutes at least three times each week. This routine, however, was not established in any of the treatment classes, and the teachers indicated a combination of time constraints and inclement weather as the reasons for this omission.

Another deviation from the treatment design involved the length of time over which the Heart Power lessons were administered. While it was planned that the program would take eight weeks to implement, with two sessions per week, this was not feasible. The schools involved rotate health with social science classes, generally in two-week rotations. Teachers were able to modify the usual rotation to allow a four-week block for health, with instruction four days per week, which doubled the frequency of classes per week from the original plan, and cut the total length of implementation from eight to four weeks.
Hypothesis One: Students participating in the Heart Power curriculum were predicted to demonstrate a decrease in weight concerns, as measured on the Weight Concerns portion of the Body Image and Eating Questionnaire. The Weight Concerns measure consists of eight items, four of which are answered "yes/no"; three of which are answered "never", "sometimes", "a lot" or "all the time"; and one of which is answered "very underweight", "a little underweight", "about the right weight", "a little overweight" and "very overweight". Because there were both dichotomous and likert-type responses, the items were standardized such that favorable responses were scored sequentially - the more favorable, the more points - while the most unfavorable responses received scores of zero. The possible raw scores ranged from 0 - 15. The hypothesis was analyzed with a repeated measures analysis of variance. The main factors were treatment (experimental or control), time (pre-, post- and delayed post-), gender and race (African-American, Caucasian). The dependent variable was the raw score from the Weight Concerns measure.

The repeated measures analysis of variance is presented on table 1 and as can be seen, there was not a significant time by treatment effect for this measure.
Table 1

Analysis of Variance for Weight Concerns

<table>
<thead>
<tr>
<th>Source</th>
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<th>df</th>
<th>MeanSq</th>
<th>F</th>
<th>Sig</th>
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<td>0.001</td>
<td>.98</td>
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<td>Gender x Race</td>
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<td>50.78</td>
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<td>Gender x Treatment</td>
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<td>.0007</td>
<td>.00</td>
<td>.99</td>
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<tr>
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<tr>
<td>Gender x Race x Treatment</td>
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<td>1</td>
<td>0.01</td>
<td>0.001</td>
<td>.98</td>
</tr>
<tr>
<td>Error</td>
<td>3278.96</td>
<td>163</td>
<td>20.12</td>
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Within-Subjects Effects

<table>
<thead>
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<td>Time x Gender</td>
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<td>Time x Race</td>
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<tr>
<td>Time x Gender x Race</td>
<td>3.94</td>
<td>1</td>
<td>3.94</td>
<td>1.74</td>
<td>.19</td>
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<td>Time x Gender x Treatment</td>
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<td>.00009</td>
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<tr>
<td>Time x Race x Treatment</td>
<td>.09</td>
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<td>.09</td>
<td>.04</td>
<td>.85</td>
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<td>Time x Gender x Race x Treatment</td>
<td>2.30</td>
<td>1</td>
<td>2.30</td>
<td>1.01</td>
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<tr>
<td>Error(Time)</td>
<td>370.28</td>
<td>163</td>
<td>2.27</td>
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</tr>
</tbody>
</table>
The null hypothesis cannot be rejected and there is not evidence to support the research hypothesis. There was not a significant decrease in measured student weight concerns related to the treatment procedure over the course of this investigation. There are, however, significant time and time by gender effects, and as can be seen in table 2, these interactions were maintained at the delayed post-testing:

Table 2

Analysis of Variance Table for Weight Concerns, Pre, Post and Delayed

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Sqs</th>
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<tr>
<td>Error</td>
<td>2333.04</td>
<td>87</td>
<td>26.82</td>
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</tr>
</tbody>
</table>

Within-Subjects Effects

| Time            | 49.40      | 2  | 24.70   | 10.53| .00 |
| Time x Gender   | 15.00      | 2  | 7.50    | 3.29 | .04 |
| Time x Race     | 8.39       | 2  | 4.20    | 1.79 | .17 |
| Time x Gender x Race | 20.24     | 2  | 10.12   | 4.31 | .02 |
| Error(Time)     | 408.18     | 174| 2.35    |      |     |
It is noted that the above scores are those of the treatment groups only, as delayed post-testing was not conducted with the control groups.

Figure 2, Weight Concerns: Time by Gender

As there was not a treatment by time effect for this measure, further analysis of the interactions obtained were not warranted, but the above graph depicts the time by gender effect obtained.

Hypothesis Two: The students participating in the Heart Power curriculum were predicted to experience an increase in dietary self-efficacy, as measured on the Child Dietary Self-Efficacy Scale. The CDSS consists of 15 items, with students
selecting a response from "not sure", "a little sure" and "very sure". These items were assigned scores of -1, 0 or +1, with higher scores being more favorable.

The possible raw scores ranged from -15 to +15. The hypothesis was analyzed with a repeated measures analysis of variance. The main factors were again treatment (experimental or control), time (pre- and post-), gender and race. The dependent variable was the obtained raw scores on the CDSS.

Table 3

Analysis of Variance Table for CDSS

<table>
<thead>
<tr>
<th>Source</th>
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<th>Mean</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
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<tr>
<td>Gender</td>
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<td>1</td>
<td>17.30</td>
<td>.30</td>
<td>.598</td>
</tr>
<tr>
<td>Race</td>
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<td>295.13</td>
<td>5.03</td>
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<tr>
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<tr>
<td>Gender x Race</td>
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<tr>
<td>Gender x Treatment</td>
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<td>.73</td>
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<tr>
<td>Race x Treatment</td>
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<td>53.95</td>
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<td>Gender x Race x Treatment</td>
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<td>324.43</td>
<td>5.53</td>
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<tr>
<td>Error</td>
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<td>163</td>
<td>58.65</td>
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</table>
As can be seen on table 3, there was a significant time by treatment effect on the CDSS. In addition, there are several other complex interactions: a time by race by treatment effect, indicating an interaction between the treatment and race over time, and a time effect. Other statistically significant interactions are noted in the between-subjects effects: a race effect, a treatment effect, and a gender by race by treatment effect. The null hypothesis can be rejected, and further investigation of the group means was necessary to evaluate these interactions:
Table 4

Descriptive Statistics for CDSS

<table>
<thead>
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<th>Gender</th>
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<th>Group</th>
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<td>4.39 / 5.28</td>
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<td>4.82 / 6.01</td>
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<td>Cauc</td>
<td></td>
<td>Control</td>
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<td>6.89 / 7.47</td>
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<td>5.77 / 6.19</td>
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<td>5.88 / 6.57</td>
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<td>Control</td>
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<td></td>
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<td>5.71 / 6.49</td>
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<td>5.70 / 6.16</td>
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<tr>
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<td></td>
<td>Control</td>
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<td>5.68 / 6.41</td>
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Table 4, cont.

<table>
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<th>Group</th>
<th>Pretest/Posttest</th>
<th>Pretest/Posttest</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>AA</td>
<td>Control</td>
<td>.18 / -.02</td>
<td>5.52 / 6.27</td>
<td>45</td>
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<td></td>
<td></td>
<td>Experimental</td>
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<td>5.13 / 5.68</td>
<td>44</td>
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<td>Total</td>
<td>.56 / 2.47</td>
<td>5.32 / 6.47</td>
<td>89</td>
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<tr>
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<td>Control</td>
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<td>6.16 / 6.60</td>
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<tr>
<td></td>
<td></td>
<td>Experimental</td>
<td>4.77 / 6.56</td>
<td>5.88 / 6.34</td>
<td>48</td>
</tr>
<tr>
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<td></td>
<td>Total</td>
<td>2.90 / 4.67</td>
<td>6.36 / 6.80</td>
<td>82</td>
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<tr>
<td>Total</td>
<td></td>
<td>Control</td>
<td>.22 / .85</td>
<td>5.77 / 6.45</td>
<td>79</td>
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<tr>
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<td>Experimental</td>
<td>2.95 / 5.83</td>
<td>5.82 / 6.05</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>1.68 / 3.53</td>
<td>5.94 / 6.70</td>
<td>171</td>
</tr>
</tbody>
</table>
Figure three depicts the specific interaction of race by treatment by time:

Figure 3

CDSS, Treatment X Time

There are several noteworthy points revealed by the mean scores. A pre-existing group difference is apparent, with the Caucasian experimental group having a higher pre-test score than the other three groups. Secondly, three groups, including the Caucasian control group, had higher scores upon post-testing, suggesting a time effect. It is noted that both the Caucasian control and
experimental groups experienced similar score increases. Thirdly, the group which experienced the most dramatic increase in mean scores was the African-American students in the experimental group, whose post-test mean scores were approximately four points above their pre-test mean scores.

There are also significant between-subject effects noted on table three, including a gender by race by treatment effect. Review of the group means reveals that Caucasian boys in the experimental group ($\bar{x} = 6.25$) scored higher than other groups on pretesting (nearly three points above next group, Caucasian girls in the experimental group), and maintained higher post-test scores ($\bar{x} = 7.46$, approximately 1.75 points above Caucasian girls in the experimental group).

The following analysis of variance table demonstrates that the observed pre-post differences were maintained over the three-week interval between post-testing and delayed post-testing of the experimental group:

Table 5

Analysis of Variance Table for CDSS: Pre, Post and Delayed

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Sq</th>
<th>df</th>
<th>Mean Sq</th>
<th>F</th>
<th>Sig</th>
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</thead>
<tbody>
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<td>457.46</td>
<td>5.11</td>
<td>.03</td>
</tr>
<tr>
<td>Gender x Race</td>
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<td>163.54</td>
<td>1.83</td>
<td>.18</td>
</tr>
<tr>
<td>Error</td>
<td>7787.38</td>
<td>87</td>
<td>89.51</td>
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</tbody>
</table>
Table 5, cont. Within-Subject Effects

<table>
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<th>Mean Sq</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
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<td>326.54</td>
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<td>.00</td>
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<tr>
<td>Time x Gender</td>
<td>18.73</td>
<td>2</td>
<td>9.36</td>
<td>1.06</td>
<td>.35</td>
</tr>
<tr>
<td>Time x Race</td>
<td>65.99</td>
<td>2</td>
<td>32.99</td>
<td>3.74</td>
<td>.03</td>
</tr>
<tr>
<td>Time x Gen x Race</td>
<td>68.46</td>
<td>2</td>
<td>34.23</td>
<td>3.88</td>
<td>.02</td>
</tr>
<tr>
<td>Error(Time)</td>
<td>1536.28</td>
<td>174</td>
<td>8.83</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Hypothesis Three:** The students participating in the Heart Power curriculum were predicted to demonstrate increased understanding of the importance of exercise to health through increased scores on the Heart Power Activity IQ test. The Activity IQ test, which measures general knowledge of exercise, is from the Heart Power curriculum and consists of eight multiple-choice items. Items were scored one point each, yielding a possible score range of zero to eight. The hypothesis was analyzed with a repeated measures analysis of variance. The main factors were again treatment (experimental or control), gender, race and time (pre- and post-). The dependent variable was the obtained raw scores on the Activity IQ test.

As can be seen from the table below, a significant time by treatment effect was demonstrated for this measure, indicating that the null hypothesis can be rejected.
Table 6

Analysis of Variance Table for Activity IQ

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Sq</th>
<th>df</th>
<th>Mean Sq</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1</td>
<td>1.21</td>
<td>.49</td>
<td>.49</td>
</tr>
<tr>
<td>Race</td>
<td>11.39</td>
<td>1</td>
<td>11.39</td>
<td>4.62</td>
<td>.03</td>
</tr>
<tr>
<td>Treatment</td>
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<td>1</td>
<td>82.45</td>
<td>33.41</td>
<td>.00</td>
</tr>
<tr>
<td>Gender x Race</td>
<td>20.39</td>
<td>1</td>
<td>20.39</td>
<td>8.26</td>
<td>.01</td>
</tr>
<tr>
<td>Gender x Treatment</td>
<td>4.10</td>
<td>1</td>
<td>4.10</td>
<td>1.66</td>
<td>.20</td>
</tr>
<tr>
<td>Race x Treatment</td>
<td>2.96</td>
<td>1</td>
<td>2.96</td>
<td>1.20</td>
<td>.29</td>
</tr>
<tr>
<td>Gender x Race x Treatment</td>
<td>.45</td>
<td>1</td>
<td>.45</td>
<td>.18</td>
<td>.67</td>
</tr>
<tr>
<td>Error</td>
<td>402.19</td>
<td>163</td>
<td>2.47</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Within-Subject Effects

| Time                  | 46.39     | 1  | 46.39   | 41.72 | .00 |
| Time x Gender         | .17       | 1  | .17     | .16   | .69 |
| Time x Race           | .05       | 1  | .05     | .05   | .83 |
| Time x Treatment      | 47.36     | 1  | 47.36   | 41.72 | .00 |
| Time x Gender x Race  | .21       | 1  | .21     | .19   | .67 |
| Time x Gender x Treatment | .02 | 1  | .02     | .02   | .90 |
| Time x Race x Treatment | 2.32   | 1  | 2.32    | 2.09  | .15 |
| Time x Gen x Rac x Tretmnt | .03  | 1  | .03     | .03   | .87 |
| Error                 | 181.28    | 163| 1.18    |       |     |
The groups who participated in the treatment program demonstrated an improved score on the Activity IQ test, and as demonstrated in Table 7, the improvement lasted over time. A significant time effect is also noted, and in the table of between-subjects effects the following interactions are noted: race, treatment and gender by race. Further exploration of the group means will elucidate these interactions so analysis can be carried out.

Table 7

Descriptive Statistics for Activity IQ

<p>| | | | | |</p>
<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
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<td>Gender</td>
<td>Race</td>
<td>Group</td>
<td>Pretest / Posttest</td>
<td>Pretest / Posttest</td>
</tr>
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<td>Control</td>
<td>5.58 / 5.38</td>
<td>1.41 / 1.72</td>
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<tr>
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<td>1.38 / 1.72</td>
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<td>Control</td>
<td>5.31 / 5.63</td>
<td>1.45 / 1.59</td>
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<td></td>
<td></td>
<td>Experimental</td>
<td>5.42 / 6.83</td>
<td>1.47 / .96</td>
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<td></td>
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<td>1.44 / 1.37</td>
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<tr>
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<td></td>
<td>Control</td>
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<td>1.41 / 1.65</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Experimental</td>
<td>5.48 / 7.00</td>
<td>1.41 / 1.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>5.47 / 6.29</td>
<td>1.40 / 1.56</td>
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<tr>
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<td>AA</td>
<td>Control</td>
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<td>1.43 / 1.33</td>
</tr>
<tr>
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<td></td>
<td>Experimental</td>
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<td>1.63 / 1.08</td>
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</table>

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Table 7, cont.

<table>
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<tr>
<th>Gender</th>
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<th>Group</th>
<th>Pretest/Posttest</th>
<th>Pretest/Posttest</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>4.95 / 5.10</td>
<td>1.54 / 1.10</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Control</td>
<td>5.67 / 5.72</td>
<td>1.24 / 1.32</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Experimental</td>
<td>6.00 / 7.29</td>
<td>1.14 / .95</td>
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<td>Control</td>
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<td>1.44 / 1.03</td>
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<td>1.44 / 1.60</td>
<td>85</td>
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<td>1.48 / 1.59</td>
<td>45</td>
</tr>
<tr>
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<td></td>
<td></td>
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<td>1.48 / 1.72</td>
<td>89</td>
</tr>
<tr>
<td></td>
<td>Cauc</td>
<td>Control</td>
<td>5.50 / 5.68</td>
<td>1.33 / 1.43</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Experimental</td>
<td>5.71 / 7.06</td>
<td>1.34 / .98</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
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<td>1.33 / 1.36</td>
<td>82</td>
</tr>
<tr>
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<td>Total</td>
<td>Control</td>
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<td>1.42 / 1.56</td>
<td>79</td>
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<td>Experimental</td>
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<td>1.42 / 1.04</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>5.44 / 6.22</td>
<td>1.42 / 1.57</td>
<td>171</td>
</tr>
</tbody>
</table>
The following graph specifically depicts the treatment by time effect:

Figure 4

![Activity IQ graph with Time x Treatment]

As can be seen, there was a pre-existing difference between the two groups, although it was relatively small in magnitude. The experimental group experienced a significant increase in obtained scores after treatment, while the control group remained essentially the same. In evaluating obtained between-subjects differences in gender and race, it is noted that while boys of both races scored similarly on pre and post-testing, Caucasian girls scored somewhat higher, and African-American girls somewhat lower, than the boys.
The following is an analysis of variance of pre-, post-, and delayed scores and reveals the maintenance of the improved scores over time:

Table 8

Analysis of Variance Table for AIQ, Pre, Post and Delayed

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<thead>
<tr>
<th>Source</th>
<th>Sum of Sq</th>
<th>df</th>
<th>Mean Sq</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>.14</td>
<td>1</td>
<td>.14</td>
<td>.06</td>
<td>.81</td>
</tr>
<tr>
<td>Race</td>
<td>2.91</td>
<td>1</td>
<td>2.91</td>
<td>1.22</td>
<td>.27</td>
</tr>
<tr>
<td>Gender x Race</td>
<td>9.80</td>
<td>1</td>
<td>9.80</td>
<td>4.11</td>
<td>.05</td>
</tr>
<tr>
<td>Error</td>
<td>207.48</td>
<td>87</td>
<td>2.39</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Within-Subjects Effects

| Time            | 148.45    | 2  | 74.22   | 93.26 | .00  |
| Time x Gender   | .59       | 2  | .30     | .37   | .69  |
| Time x Race     | .56       | 2  | .28     | .35   | .70  |
| Time x Gender x Race | .41 | 2  | .20     | .254  | .78  |
| Error(Time)     | 138.48    | 174| .80     |       |      |

Hypothesis Four: The students participating in the Heart Power curriculum were predicted to experience an increase in overall self-concept as measured on the Piers-Harris Children's Self-Concept Scale. The Piers-Harris Children's Self-Concept scale was hand-scored, as its authors instruct, and yielded a standard score (mean = 50 and standard deviation = 10), with a possible score range of 25 - 63. The hypothesis was analyzed with a repeated measures analysis of
variance. The main factors were again treatment (experimental or control), time (pre- and post-test), gender and race. The dependent variable was the obtained total scores on the Piers-Harris Children's Self-Concept Scale.

Table 9

Analysis of Variance Table for Piers-Harris, Total

<table>
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<th>Source</th>
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<th>Mean Sq</th>
<th>F</th>
<th>Sig</th>
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<td>256.24</td>
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<td>.00</td>
</tr>
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<td>106.36</td>
<td>1.61</td>
<td>.21</td>
</tr>
<tr>
<td>Treatment</td>
<td>181.35</td>
<td>1</td>
<td>181.35</td>
<td>.67</td>
<td>.42</td>
</tr>
<tr>
<td>Gender x Race</td>
<td>548.54</td>
<td>1</td>
<td>548.54</td>
<td>1.14</td>
<td>.29</td>
</tr>
<tr>
<td>Gender x Treatment</td>
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<td>1</td>
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<td>.07</td>
</tr>
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<td>.31</td>
<td>2.95</td>
<td>.09</td>
</tr>
<tr>
<td>Gender x Race x Treatment</td>
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<td>119.35</td>
<td>.01</td>
<td>.97</td>
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<td>163</td>
<td>159.10</td>
<td>.75</td>
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</table>
Table 9, cont.

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<th>Source</th>
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<th>df</th>
<th>Mean Sq</th>
<th>F</th>
<th>Sig</th>
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</thead>
<tbody>
<tr>
<td>Time</td>
<td>183.21</td>
<td>1</td>
<td>183.21</td>
<td>10.79</td>
<td>.01</td>
</tr>
<tr>
<td>Time x Gender</td>
<td>6.78</td>
<td>1</td>
<td>6.78</td>
<td>.40</td>
<td>.53</td>
</tr>
<tr>
<td>Time x Race</td>
<td>5.44</td>
<td>1</td>
<td>5.44</td>
<td>.32</td>
<td>.57</td>
</tr>
<tr>
<td>Time x Treatment</td>
<td>1.44</td>
<td>1</td>
<td>1.44</td>
<td>.09</td>
<td>.77</td>
</tr>
<tr>
<td>Time x Gen x Race</td>
<td>64.79</td>
<td>1</td>
<td>64.79</td>
<td>3.82</td>
<td>.05</td>
</tr>
<tr>
<td>Time x Gendr x Treatmnt</td>
<td>.20</td>
<td>1</td>
<td>.20</td>
<td>.01</td>
<td>.92</td>
</tr>
<tr>
<td>Time x Race x Treatment</td>
<td>4.86</td>
<td>1</td>
<td>4.86</td>
<td>.29</td>
<td>.59</td>
</tr>
<tr>
<td>Time x Gendr x Rac x Treat</td>
<td>87.91</td>
<td>1</td>
<td>87.91</td>
<td>5.18</td>
<td>.02</td>
</tr>
<tr>
<td>Error(time)</td>
<td>2766.82</td>
<td>163</td>
<td>16.97</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As indicated above, there was not a statistically significant time by treatment effect for the full Piers-Harris, and the null hypothesis cannot be rejected. There were, however, several other interactions of note: a time by gender by race by treatment effect emerges, as does a time effect and a between-subjects gender difference; but without a time by treatment effect, further analysis of these interactions were not warranted.
**Hypothesis Five:** The children participating in the treatment program were predicted to experience an improvement in body-concept, which would be demonstrated through improved scores on the third factor of the Piers-Harris: Physical Appearance and Attributes. This subscale of the Piers-Harris consists of 13 items and yields T-scores which range from 23 to 69. The hypothesis was analyzed with a repeated measures analysis of variance. The main factors were again treatment (experimental or control), time (pre- and post-), gender and race. The dependent variable was the obtained score on the third factor of the Piers-Harris Children's Self-Concept Scale.

Table 10

Analysis of Variance Table for Piers-Harris, Third Factor

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Sqs</th>
<th>df</th>
<th>MeanSq</th>
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<tr>
<td>Race</td>
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<td>172.73</td>
<td>1.15</td>
<td>.29</td>
</tr>
<tr>
<td>Treatment</td>
<td>.07</td>
<td>1</td>
<td>.07</td>
<td>.00</td>
<td>.98</td>
</tr>
<tr>
<td>Gender x Race</td>
<td>598.91</td>
<td>1</td>
<td>598.91</td>
<td>3.97</td>
<td>.05</td>
</tr>
<tr>
<td>Gender x Treatment</td>
<td>37.30</td>
<td>1</td>
<td>37.30</td>
<td>.25</td>
<td>.62</td>
</tr>
<tr>
<td>Race x Treatment</td>
<td>37.34</td>
<td>1</td>
<td>37.32</td>
<td>.25</td>
<td>.62</td>
</tr>
<tr>
<td>Gender x Race x Treatment</td>
<td>159.00</td>
<td>1</td>
<td>159.00</td>
<td>1.05</td>
<td>.31</td>
</tr>
<tr>
<td>Error</td>
<td>24.59</td>
<td>163</td>
<td>150.84</td>
<td></td>
<td></td>
</tr>
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</table>
Table 10, cont.

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Sqs</th>
<th>df</th>
<th>Mean Sq</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>77.33</td>
<td>1</td>
<td>77.33</td>
<td>2.98</td>
<td>.09</td>
</tr>
<tr>
<td>Time x Gender</td>
<td>3.14</td>
<td>1</td>
<td>3.14</td>
<td>.12</td>
<td>.73</td>
</tr>
<tr>
<td>Time x Race</td>
<td>83.90</td>
<td>1</td>
<td>83.90</td>
<td>3.24</td>
<td>.07</td>
</tr>
<tr>
<td>Time x Treatment</td>
<td>219.88</td>
<td>1</td>
<td>219.88</td>
<td>8.49</td>
<td>.00</td>
</tr>
<tr>
<td>Time x Gender x Race</td>
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<td>1</td>
<td>84.30</td>
<td>3.25</td>
<td>.07</td>
</tr>
<tr>
<td>Time x Gender x Treatment</td>
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<td>9.13</td>
<td>.35</td>
<td>.55</td>
</tr>
<tr>
<td>Time x Race x Treatment</td>
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<td>1</td>
<td>2.44</td>
<td>.09</td>
<td>.76</td>
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<tr>
<td>Time x Gender x Race x Treatment</td>
<td>62.92</td>
<td>1</td>
<td>62.92</td>
<td>2.43</td>
<td>.12</td>
</tr>
<tr>
<td>Error(Time)</td>
<td>4223.66</td>
<td>163</td>
<td>25.91</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As depicted in table 10 above, there was a statistically significant time by treatment effect on the Physical Appearance and Attributes scale of the Piers-Harris, as well as a between-subjects difference in race by gender. The null hypothesis can be rejected; the treatment group did experience a statistically significant difference in their obtained scores over the course of the treatment. To investigate the other interactions, a review of the means on the table of descriptive statistics is necessary and follows on table 11.
Table 11

Descriptive Statistics for Piers-Harris, Third Factor

<table>
<thead>
<tr>
<th>Gender</th>
<th>Race</th>
<th>Group</th>
<th>Pretest / Posttest</th>
<th>Pretest / Posttest</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td>AA</td>
<td>Control</td>
<td>56.67 / 55.83</td>
<td>7.95 / 10.99</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Experimental</td>
<td>57.36 / 60.50</td>
<td>7.72 / 6.77</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>57.00 / 58.07</td>
<td>7.76 / 9.42</td>
<td>46</td>
</tr>
<tr>
<td>Cauc</td>
<td></td>
<td>Control</td>
<td>59.25 / 59.81</td>
<td>6.60 / 8.31</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Experimental</td>
<td>57.25 / 59.00</td>
<td>8.33 / 8.34</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>58.05 / 59.33</td>
<td>7.66 / 8.23</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>Control</td>
<td>57.70 / 57.43</td>
<td>7.46 / 10.09</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Experimental</td>
<td>57.30 / 59.72</td>
<td>7.96 / 7.58</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>57.49 / 58.65</td>
<td>7.69 / 8.86</td>
<td>86</td>
</tr>
<tr>
<td>Girls</td>
<td>AA</td>
<td>Control</td>
<td>58.00 / 59.86</td>
<td>10.47 / 9.31</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Experimental</td>
<td>55.68 / 59.36</td>
<td>9.97 / 8.23</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>56.81 / 59.60</td>
<td>10.17 / 8.67</td>
<td>43</td>
</tr>
<tr>
<td>Cauc</td>
<td></td>
<td>Control</td>
<td>56.22 / 52.00</td>
<td>9.80 / 12.57</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Experimental</td>
<td>53.25 / 55.00</td>
<td>11.28 / 11.01</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>54.52 / 53.71</td>
<td>10.65 / 11.65</td>
<td>42</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>Control</td>
<td>57.18 / 56.23</td>
<td>10.07 / 11.49</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Experimental</td>
<td>54.41 / 57.09</td>
<td>10.63 / 9.92</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>55.68 / 56.69</td>
<td>10.41 / 10.61</td>
<td>85</td>
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</tbody>
</table>
Table 11, cont.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Race</th>
<th>Group</th>
<th>Pretest/Posttest</th>
<th>Pretest/Posttest</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>AA</td>
<td>Control</td>
<td>57.29 / 57.75</td>
<td>9.13 / 10.33</td>
<td>45</td>
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<td></td>
<td></td>
<td>Experimental</td>
<td>56.52 / 59.93</td>
<td>8.86 / 7.47</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>56.91 / 58.81</td>
<td>8.96 / 9.05</td>
<td>89</td>
</tr>
<tr>
<td>Cauc</td>
<td>Control</td>
<td>Control</td>
<td>57.65 / 55.68</td>
<td>8.46 / 11.34</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Experimental</td>
<td>55.25 / 57.00</td>
<td>10.02 / 9.87</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>56.24 / 56.45</td>
<td>9.42 / 10.46</td>
<td>82</td>
</tr>
<tr>
<td>Total</td>
<td>Control</td>
<td>Control</td>
<td>57.44 / 56.84</td>
<td>8.79 / 10.75</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Experimental</td>
<td>55.86 / 58.40</td>
<td>9.45 / 8.88</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>56.59 / 57.68</td>
<td>9.16 / 9.79</td>
<td>171</td>
</tr>
</tbody>
</table>
The following graph specifically depicts the time by treatment effect:

Figure 5
Piers-Harris Third Factor, Treatment by Time

As can be seen in the above graph, figure 5, a pre-existing difference emerges between the experimental and control groups' obtained pretest scores. The control group's score comes down at post-test, however, while the experimental group score rises, reversing the approximately 1.20 point difference between the groups. In exploring the means for the between-groups interaction of gender by race, it is noted that Caucasian girls score lower on this measure than do African-American girls or boys. In fact, Caucasian boys and African-American students scores fall within approximately one point of one
another (combined mean scores), while Caucasian girls score approximately three and a half points below. Additionally, Caucasian control-group girls' mean scores, which were initially approximately three points higher than experimental girls' scores, dropped over four points from pre- to post-testing, while the experimental group girls' mean scores increased over 1.5 points.
Chapter Five

Summary and Discussion

The purpose of this research project was to determine whether a specific health promotion curriculum would be more influential than the standard school health program in promoting an understanding of the components of physical health, reducing concerns about weight, and improving dietary self-efficacy, self-concept and body-concept. Five hypotheses were developed to evaluate the relative effectiveness of the health program, and the results of each will be discussed individually.

Interpretation of Results

**Hypothesis One:** Students participating in the Heart Power curriculum were predicted to experience a decrease in weight concerns, as measured on the Weight Concerns portion of the Body Image and Eating Questionnaire for Children. The findings indicate that there was not a statistically significant difference in students' measured weight concerns in relation to treatment versus control groups. Significant differences did emerge among gender groups and over time and were maintained upon delayed post-testing. A time by gender by race effect was also noted. As there was no treatment by time effect, these interactions were not analyzed further. The authors of the Body Image and Eating Questionnaire, Thelen et al. (1992), found that fourth and sixth grade girls had more weight concerns than did second grade girls, or boys at any grade level. Although further analysis was not done, it was noted that boys' pre- and
post-test scores were higher (more favorable) than girls', and that boys' post-test scores increased more than did girls' post-test scores, as depicted in Figure 1. The obtained results are consistent with previous research which indicates that late in the elementary school years, girls begin to develop more concerns about their weight and physical adequacy than do boys (Collins, 1990; and Thompson et al., 1997).

It is hypothesized that the overall decrease in weight concerns that was hoped for did not occur because weight concerns may, for children, be related to physical attractiveness and not associated to health per se. It may be that a curriculum such as Heart Power, which focuses on health and does not relate health to beauty, may not influence young students' concerns about impending physical development and the issue of attractiveness. Killen et al. (1993) also found that an 18-lesson curriculum on eating disorders failed to alter eating attitudes in middle school girls. They hypothesized that such attitudes were too entrenched by middle school and should be addressed earlier in development.

Furthermore, there were several inconsistencies among the protocols of individual children which were of interest. Some students, for example, indicated that they felt they were "about the right weight" but still worried about becoming fat or wished they were thinner. Several students responded that they were "a little underweight", but wished they were thinner. Such inconsistencies may indicate that students did not understand the terminology of the items, or that even in elementary school-aged children, concerns and beliefs about physical
well-being are influenced by media messages that "thinner is always better".

A trend that appears in this study and one which is consistent with prior research is also of note. Caucasian girls obtained lower scores on the Weight Concerns measure than did African-American girls, suggesting that they experience more concern about their body size than do their African-American counterparts. The trend was also present for boys, although to a lesser degree. This is consistent with several previous studies (Parnell et al., 1996; Collins, 1990; and Thompson et al. 1997), which found that African-American children selected heavier figures as ideal than did Caucasian children, especially Caucasian girls; and African-American children and Caucasian boys experience greater body satisfaction than do Caucasian girls. This trend warrants monitoring. Continued exploration of the factors which contribute to the differences in body-esteem among boys and girls, and African-American and Caucasian children is also merited.

**Hypothesis Two:** Students participating in the Heart Power curriculum were predicted to experience an increase in their dietary self-efficacy, as measured on the Child Dietary Self-Efficacy Scale. There was a statistically significant improvement in treatment group scores on the CDSS, as compared to controls, and the improvement was maintained at the delayed post-testing three weeks later. Furthermore, there were several other significant interactions: a time effect, and a time by race by treatment effect. Between-subjects effects by race,
treatment and gender by race by treatment are also noted.

As shown in figure 3 (p. 48), which depicts the mean scores for race by
treatment by time, a preexisting group difference is apparent with the Caucasian
experimental group scoring higher (more favorably) than other students on the
pre-test of the CDSS. In addition, examination of the group means reveals that
Caucasian boys in the experimental group scored higher than all other groups.
This result is inconsistent with research conducted by the instrument's authors.
Parcel et al. (1995) found in their evaluation of over 1000 students that girls
tended to score higher than boys.

One possible explanation of this difference may be developmental. Parcel et
al. (1995) found fourth grade students scoring lower than did third grade
students, and they did not include older students in their research. If the same
trend continues into fifth grade, the higher degree of dietary self-efficacy
demonstrated by girls in their study may dissipate.

Another suggested explanation of the complex interactions found is that
dietary self-efficacy is not stable in children, which may explain preexisting
differences among the control and experimental groups. The test allowed
responses of "not sure", "a little sure" and "very sure", which may be more
sensitive than yes / no responses would be to environmental factors such as
hunger (whether the test was taken prior to lunch versus just after), peer
questions or teacher responses during test administration.

It is also noted that the African-American experimental group experienced
the most dramatic improvement in scores, while the African-American control
group scored just slightly lower on post-testing. Both Caucasian groups,
however, experienced score increases of a similar magnitude, although it is
apparent that a preexisting difference existed, with the Caucasian experimental
group scoring higher at the outset

Finally, the practical significance may be questionable for all but the African-
American students, who did demonstrate a difference of four points from pre-test
to post-test. As mentioned above, both the experimental and control groups of
Caucasian children experienced a mean score increase of similar magnitude
and of less than two points. The obtained results suggest the possibility that if
the obtained differences are related to the treatment program, African-
American students were more affected than other students.

**Hypothesis Three:** Students participating in the Heart power curriculum were
predicted to experience an increased understanding of the importance of
exercise to health, as demonstrated through increased scores on the Activity IQ
test. The results were statistically significant for this measure as well, with
treatment-group students having significantly higher Activity IQ scores at post-
testing than did the control group. Further, this score improvement was
maintained at the delayed post-testing. This result appears to have not only
statistical significance, but also to be of practical value. The instrument has a
score range of 0 - 8, and a mean increase of 1.5 points was obtained for the
treatment group. The magnitude of this change reflects a meaningful difference in student scores, and this difference appears to be associated with exposure to the treatment program.

It is also noted, however, that while the Activity IQ test was part of the curriculum and possesses face validity, the absence of empirical evidence confirming its validity is a weakness. In addition, there are only eight items on the instrument which limits its power to assess student understanding of the value of exercise.

Social cognitive theory would support that accurate knowledge will increase student motivation to exercise. If this change in understanding is validated and found to be associated with the Heart Power curriculum, it may be a valuable finding. In reviewing previous research in childhood obesity, Glenny (1997) concluded that the reduction of sedentary behavior was the single most effective strategy in reducing childhood obesity. Likewise, Thombs et al. (1998) found that girls who did not have an accurate understanding of the importance of exercise to weight control were more likely to be involved in dangerous methods of weight reduction. The usefulness of the Heart Power program in teaching young children the value of exercise needs further exploration but the obtained results support the program's potential effectiveness in this area.

**Hypothesis Four:** Students participating in the Heart Power curriculum were predicted to experience an increase in overall self-concept, as measured on the
Piers-Harris Children's Self Concept Scale. The results indicated no significant time by treatment effect for this measure, with no statistically significant change in scores associated with the treatment.

It is hypothesized that the treatment program may be too specific, and without practice and application of the concepts learned, unlikely to impact overall self-concept. This implementation of the Heart Power program took place over only four weeks, rather than the planned eight weeks, and lacked the complimentary walking program. Self-concept is a stable condition, and longer periods of intervention are generally required in order to change it to a significant degree.

Hypothesis Five: Students participating in the Heart Power curriculum were predicted to experience an increase in body-concept, as measured on the Physical Appearance and Attributes scale of the Piers-Harris. The results indicated a significant time by treatment effect for this measure, suggesting the presence of a true difference among the groups. Although the null hypothesis can be rejected, the practical significance of the observed difference may be questionable.

The obtained difference between the pre- and post-test mean scores for the experimental group was approximately two and one-half points (55.85 to 58.40) on an instrument with a score range of 23-69, a mean of 50, and a standard deviation of ten points (Piers, p. 38). While the obtained difference is
statistically significant, the practical significance of such a relatively small change is marginal. It is also noted that a small pre-existing difference occurred, with the control group scoring approximately one and one-half points higher than the experimental group, and then falling slightly on post-testing, creating a slightly stronger obtained difference approaching four points. Although the practical significance of the relatively small difference is questioned, the trend is as was hoped for and suggests that Heart Power may be associated with small, but perhaps important improvements in body-concept.

A significant between-subjects effect was also indicated: race by gender, with boys tending to score higher than girls, and African-American girls scoring higher than Caucasian girls. A gender difference is not unexpected, as the test author indicates: "This scale is more sensitive than the other scales to sex differences...in interpreting this scale, it is important to take into account the extent to which the score reflects low self-esteem in relation to body image and related attributes or simply reflects adherence to traditional sex role stereotypes" (Piers, p. 39). Additionally, race and gender differences in body-concept have been established in previous research, such as that cited above under hypothesis one (Parnell et al., 1996; Collins, 1990, and Thompson et al. 1997), and in the research of Jaffee and Lutter (1995), who surveyed girls and found that African-Americans had a more positive body-image and greater physical self-competence than did Caucasian girls. The obtained results in this study also suggest that Caucasian girls fall somewhat below boys and African-
American girls in body-concept.

A limitation of this result is that delayed post-testing was not conducted for this instrument due to classroom time constraints, and it is unknown whether the obtained difference, whether of practical significance or not, was maintained.

Parent Questionnaires

Parent questionnaires (see appendix E) were sent out to all parents (N = 199), with self-addressed stamped envelopes for return to the examiner. The purpose of the questionnaire was to determine exercise and eating habits of the students' parents, as well as to identify parental concerns about the weight of their child. Within four weeks, 49 questionnaires were returned, yielding a return rate of 25%. Although names were requested, more than half of the respondents chose not to include their names, which meant the parent questionnaires could not be matched to the student results. The responses from the questionnaires follow:

1. Do you have a regular exercise routine? Yes = 22 No = 26
   One did not respond. If not, why? Time = 13 Space/Equip. = 7 Unable = 3
   Four parents did not choose an explanation; two wrote in "lazy".

<table>
<thead>
<tr>
<th></th>
<th>&lt;1hr.</th>
<th>1-2 hr.</th>
<th>2-3hrs.</th>
<th>3+hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Est. of children's physical activity time:</td>
<td>8</td>
<td>22</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>3. Est. of children's sedentary activity time:</td>
<td>8</td>
<td>17</td>
<td>15</td>
<td>9</td>
</tr>
</tbody>
</table>
4. Are you currently dieting? Yes = 9 No = 40
   If yes, is child aware? Yes = 5 No = 4

5. Concerned about child's weight? Yes = 12 No = 36
   If concerned, encourage diet? Yes = 3 No = 9
   If concerned, encourage exercise? Yes = 11 No = 1

6. Buy fresh fruits and vegetables? Yes = 45 No = 4
   If not, why? Preference = 2 Expense = 2

7. Buy snack foods? Yes = 39 No = 10
   Three parents who do not buy snacks have concerns about their children's weight.

8. Adult smokers in house? Yes = 18 No = 31
   2 smokers specified that they do not smoke in the home.

9. Child has health problems? Yes = 13 No = 36
   If yes, what? asthma/allergies = 10 other = 3

Of the parents who responded to the questionnaire, the majority do not have a regular exercise routine, although 44 percent do. The primary reason given for not having a routine is the lack of time. This factor is of particular interest when one considers that the children in the treatment program also had
teachers who were unable to find time to implement the walking program. Taken together with the estimates made of their children's sedentary time, where 18% of the respondents estimated that their children are sedentary for more than three hours every day, there is a clear need for parents and teachers to work together to establish for themselves, and for their children/students, the importance of physical activity, and to demonstrate to children how to prioritize their activities. Also of interest in the parent questionnaires, 24% of the respondents had concerns about their child's weight, and while most of those parents did not encourage their child to diet, all but one parent encouraged their child to exercise.

Although the issue of smoking was not relevant to this research project, one of the four themes of the Heart Power program is "living smoke free". For this reason, parents were asked about smoking and one particularly interesting result was found. Of the respondents, 37% indicated there was an adult in the household who smokes and 20% of the respondents had children with health concerns. Of the ten children who have asthma or allergies, five live in a household with an adult who smokes.

**Teacher Questionnaires**

The four teachers who participated in the treatment program completed informal questionnaires regarding their experiences with the curriculum. They rated their overall assessment of the program as "good" or "very good", and
three indicated that they would "definitely" recommend the program to other teachers. One teacher indicated she or he would recommend the program "with reservations", indicating difficulty with scheduling. Three of four teachers found the program to be well-organized, the materials to be of good quality and interesting, and the teacher guide to be easy to follow and implement. One teacher was less enthusiastic, saying it was "sometimes" well-organized, and "some" materials were of good quality and easy to follow. All teachers reported that they had to combine lessons at times because of scheduling conflicts, and three of the four reported spending between 17 and 22 hours delivering the 16 lessons. One teacher reported completing the program in 11 to 16 hours.

Overall, the teachers liked the program and preferred it to the existing health curriculum. They unanimously stated that because health is not currently included among the state-mandated SOL testing, and with the pressure on teachers to prepare students for state testing, finding time to implement a health program is difficult. The teachers liked the layout of the curriculum, which gives an overview of concepts to be presented through lecture and then supports these concepts with activities, reading materials and experiments. Among the practical suggestions the teachers offered is that the program could give more precise estimates of the length of time activities should take. On occasion teachers found that it took two classes to present a lesson, while others were completed in less than the amount of time expected. More accurate time estimates would help to make the program more "user friendly".
The diversity among the teachers, and the possible impact of their varied interest in the program may also have influenced the effectiveness of the curriculum. While all four teachers were initially enthusiastic, it was noted that as the program progressed one teacher had difficulty making time to present the lessons, while another teacher put extra effort into finding supportive materials to add to her lessons. Implementing the program was more cumbersome than at least one teacher anticipated, and his/her engagement in the program subsided over time, leading to possible problems with treatment fidelity, which is discussed in more detail as a limitation, below. The teachers in both schools were offered technical support throughout the program, but did not get additional planning time, alleviation of other duties, or other administrative incentives for their effort, which may have assured better consistency.

Implications

The results of this research project suggest that the Heart Power program may be associated with improvements in exercise awareness, dietary self-efficacy and possibly body-concept in fourth and fifth grade children. Several of the statistically significant results obtained were of small magnitude, but it is noted that in working with children small gains can have a great impact over time. That a program which was fairly easily adopted into the classroom setting and presented over four weeks appears to be related to positive changes in children's beliefs and knowledge, and which teachers prefer to the existing health curriculum, is promising. With the addition of planned, consistent
physical activity and other supports, discussed below, it may be feasible to foster
the development of important behavioral patterns which will result in long-term
health.

Limitations

An obvious limitation of this research project is the absence of delayed post-
test results for all participants and the omission of the Piers-Harris for the
treatment groups who did complete delayed post-testing. This limits the value of
the results in several ways: there is no assurance that the obtained
positive results were not related to some other source, including possibly a
different school program, and may have emerged in delayed post-testing with
the control groups.

Further, there may have been an indirect influence from the state-
mandated SOL testing program, which was aggressively implemented for the
first time during the current school year. All teachers reported that they had
difficulty finding time for health instruction, and although the control group
classes did have health instruction, it may have been of less intensity or of
shorter duration than was previously allocated. This factor may have negatively
impacted the effectiveness of the usual health curriculum being provided.

An unfortunate limitation in the current study was the treatment-group
teachers' inability to implement the walking routine. There were several reasons
for including this in the design of the program. One reason is that the practice of
establishing and maintaining a routine of physical activity would, from the social/
cognitive perspective, contribute to the students' development of self-efficacy and perhaps influence body-concept and weight concerns. Instead, by suggesting to students that they would be involved in routine walking, then not fulfilling this expectation, the teachers may have inadvertently modeled the inability to overcome obstacles. Secondly, previous research (Biddle and Goudas, 1996) has indicated that the addition of teacher encouragement to parent encouragement was more predictive of student intent and participation in exercise activity. Furthermore, the previous research with the Heart Power program (Harrell et al., 1996 and 1998) found positive results for physiological factors when Heart Power and walking programs were combined, and it was hoped that this research project would provide comparable independent variables while measuring different dependent variables.

An common obstacle in conducting research in a naturalistic environment is the difficulty of maintaining standardized conditions. This project was carried out in two schools, with two experimental classes and two control classes in each. There were factors that occurred within classes, however, that may have influenced the effectiveness of the treatment program. For example, one teacher was absent for two weeks during the period when the program was to be implemented, and the substitute teacher did not carry out the Heart Power lessons. This two-week interruption in the presentation of the curriculum may have effected the results of that class, although the teacher did make an effort to review the major concepts which had been presented prior to her absence.
before she continued with new lessons. Interruptions also occurred within one school or the other on certain days when special presentations or assemblies took place, which caused the teachers to restructure their lesson plans, generally postponing health class until the following day.

Furthermore, the variability with which different teachers presented the treatment program is a possible source of bias. Borg and Gall (1989) point out that treatment fidelity is an issue in educational research that is frequently overlooked. The teachers in the treatment groups in this investigation did have an extensive, written guide to use in implementing the Heart Power program, but there was no assessment of how specifically each teacher followed the teacher guides, or how thoroughly the lessons were presented. Ideally, in-depth teacher training could have been conducted prior to the implementation phase, and observations of the lessons, and measures of treatment fidelity, could have been made.

The time span over which the program was implemented may also have limited its effectiveness. While the anticipated time spent presenting the 16 lessons was not apparently altered, it was condensed over four weeks rather than being taught over the originally planned eight-week period of presentation. The shorter duration of the program and omission of the walking component limited the students' opportunities to implement the concepts they were learning, which may have altered their internalization of the principles.

Lastly, the parent questionnaires were faulty in several ways. The
questions were not structured such that parents could clearly differentiate between school time and time spent outside of school. Although one of the two questions asking parents to estimate their children's activity and sedentary time specified "outside of school", several parents wrote in separate estimates for weekdays versus weekends, or summers versus school days, which convoluted the analysis of the responses. It was also expected that the parent questionnaires could be matched to their children's test results, but because so few gave their names this was not valuable. It is possible that if the space for the name had been more prominent, or if the value of matching parent/child results was explained, a higher percentage of respondents may have identified themselves. A repeated mailing may have been useful in eliciting additional responses.

Recommendations

The inclusion of an effective health promotion curriculum into health education programs in elementary schools may well have an impact on the development of lifestyles which result in better health for future generations. Much has been learned over that past several decades regarding the importance of physical activity and lower fat / higher fiber diets to our health, and imparting this information to children is essential to the development of health-promoting behaviors, and is therefore a reasonable societal goal.

Educators have an opportunity and currently a role in health education of children. Communities and their schools need to determine if health education
continues to be a valuable educational priority, and if so appropriate allocations
of time and support to teachers will be necessary to assure that this priority is
accommodated. Additional empirical support of the effectiveness of educational
strategies to the health of children will justify its place in the educational
programs of our schools. Integrating health instruction with reading and math
objectives may be a more efficient way to combine instructional goals, and
teachers will require the time and materials to do so, as well as support to alter
their current instructional practices and implement more effective methods.
Incentives for teachers to commit to expanding their current practices, and
planning time to learn new programs and strategies will be necessary to assure
consistent and effective instructional practices. The commitment of a school
team to provide assistance with the delivery of the lessons is suggested, as was
done in one instance when a teacher involved in this program had the physical
education teacher present a lesson on physical activity. Other lessons in this
curriculum could easily be delivered by the school guidance counselor as part of
classroom guidance activities. The school nurse may also be able to deliver
several lessons, such as the activity which involves the students listening to their
heart through a stethoscope. The involvement of support staff and time currently
allocated to physical education, recess, and guidance activities would reduce
the classroom time required to deliver a thorough program such as Heart Power.
An integration of educational services will assure that all the time available
during the school day can be employed to achieve shared goals, which include
health education.

An additional suggestion for implementing such a program within the school setting is to make an effort to engage parents in the process of improving their children's understanding and practice of behaviors which are important to their health. Providing informational brochures to parents about important dietary and activity concepts may help to educate parents who are unaware. Engaging other community services, such as the health department and cooperative extension agency, to assist in an outreach effort to educate where necessary and support parents and teachers in their joint efforts to promote the development of healthy behavioral patterns may be fruitful. Encouraging students through extra-credit homework assignments to record their daily activity rates and consumption of desirable foods such as fruits and vegetables may also engage the parents and other family members in supporting the students efforts to record, monitor and improve such behaviors.

Suggestions for Future Research

The results of this study lend support to the results of previous research which suggests that health programs which can be easily incorporated into the classroom can be effective in supporting the development of appropriate expectations in students regarding their ability to impact their physical health in positive ways. While there were not positive results for all areas assessed in this study, there is reason for optimism that the Heart Power curriculum may be
associated with improvements in dietary self-efficacy, body-concept and exercise awareness in elementary children. Especially in concert with the research conducted by Harrell et al. (1996, 1998), these results suggest that the American Heart Association's Heart Power program shows promise as a tool for educators.

Additional research is needed to confirm the current findings, and to further investigate other possible psychological outcomes of the Heart Power program. Determining specifically which aspects of the program are effective may contribute to the development of more efficient and effective curricula. Additionally, the use of the Heart Power program in conjunction with other methods merits further exploration. The combination of Heart Power and a walking program was explored by Harrell et al. (1996 and 1998), the use of other activity programs could also be examined. It would also be a worthwhile endeavor to determine the effectiveness of techniques used to sensitize children to inappropriate media messages and images, and to examine which are effective at helping children become more wary consumers of advertising. Incorporating methods which counteract media pressures into the curriculum of programs such as Heart Power may increase the desired impact of health promotion efforts. Lastly, the Heart Power program has another version for early elementary school use, and its effectiveness should be evaluated.

Future research may include the refinement of measures of weight concerns, self-efficacy relating to diet and exercise, and body-image. There are
few measures of weight concern, exercise and nutritional awareness, and self-efficacy available for children of elementary school age, and as this appears to be the developmental period when prevention programs are crucial, measures to determine the effectiveness of prevention efforts are needed.

While school-based applications of health promotion programs have been well researched, one potential area of school involvement was not found among the literature reviewed. After-school programs have become increasingly popular as a means for providing children with productive, supervised activity in the hours between school dismissal and their parents' return from work. This may be an opportune way of providing a health curriculum, in combination with physical activities and learning to prepare healthy snacks, to children who are considered "at risk", or to the general population. Other community agencies with a commitment to outreach such as the health departments, parks and recreation, the extension offices, could be engaged in such a program to alleviate the strain on the school resources. Such a program has the potential to be more intensive than could be offered in school, and may prove to be more effective.

Furthermore, continued exploration of race and gender differences in body-concept and weight concerns is warranted. Determining more specifically what factors contribute to these differences is essential to providing those advantages to girls, especially Caucasian girls, who currently are more likely to experience poor body-image. Of equal importance is to better our understanding of the complexities regarding African-American children, who experience a more
positive body-image, but as adults are more likely to experience obesity and related health problems. The goal for this population appears to be to sustain positive body-images, while educating children about the importance of properly caring for their bodies, and fostering the development of appropriate food and activity choices for long-term health.

Finally, ongoing research designed to investigate the possible impact of health programs being offered in schools is needed to assure that materials and curricula are accurate, efficient and effective. Replication and extension of studies which identify promising programs will be necessary to assure that the best possible products are made available to schools. The importance of good school health programs cannot be understated, particularly at a time when educators are being pressured to return to the "three r's" and when time and support for health education may falter. The development of accurate expectations in students regarding food and activity choices may lead to the development of healthier life styles, which will prevent the development of refractory health problems related to obesity and eating disorders.
REFERENCES


APPENDIX

Appendix A............Informing letters to parents
Appendix B.............Weight Concerns test
Appendix C..............Child Dietary Self-Efficacy Scale
Appendix D..............Activity IQ test
Appendix E..............Parent Questionnaire and letter
Appendix F..............Teacher Questionnaire
Appendix A - Informing letter to parents

Dear Parents;

I am pleased to inform you that our 4th and 5th grade students will have the opportunity to participate in a 6 week supplemental health program this winter. The health program will cover important SOL objectives and add to the current health curriculum being used by the classroom teachers. Ms. Grace Stay, an Accomack County school psychologist, will be collecting data from several classes to help us evaluate the effectiveness of the new materials, and this is part of a project which will be supervised by faculty at the College of William and Mary. The evaluations will consist of short assessments given in several classes on several occasions, and all information collected will be coded and kept confidential. These assessments will not count toward your child’s class grade. Student participation in this program is strictly voluntary, and please feel free to contact myself or Ms. Stay (787-7765) if you have any questions or would like to exempt your child from this supplemental program.

Sincerely,

Principal
Appendix B - The Body-Image and Eating Questionnaire

16. Have you ever gone on a diet to lose weight? YES NO

17. How many times have you gone on a diet?
   NEVER 1 TIME 2 or 3 TIMES 4 or 5 TIMES MORE THAN 5

18. Are you trying to lose weight now? YES NO

WEIGHT CONCERNS PORTION

19. Have you ever thought that you needed to lose weight? YES NO

20. Do you think you are fat? YES NO

21. Have you ever been afraid of becoming fat or fatter? YES NO

22. Do you feel fat after eating a small amount of food?
   NEVER SOMETIMES A LOT ALL THE TIME

23. I am bothered by how my body looks.
   NEVER SOMETIMES A LOT ALL THE TIME

24. Do you think you are:
   Very Underweight A little underweight About the right weight A little overweight Very overweight

25. I am bothered because I think I'm too fat.
   NEVER SOMETIMES A LOT ALL THE TIME

26. Do you wish you were thinner? YES NO

27. Do you feel badly about yourself if you eat too much?
   NEVER SOMETIMES A LOT ALL THE TIME

28. Do you worry about eating foods that might make you gain weight?
   NEVER SOMETIMES A LOT ALL THE TIME

29. I try not to eat when I am hungry.
   NEVER SOMETIMES A LOT ALL THE TIME
Appendix C  The Child Dietary Self-Efficacy Scale

1. How sure are you that you can eat food without adding salt?
   A. not sure   B. a little sure   C. very sure

2. How sure are you that you can eat fresh or frozen vegetables instead of canned vegetables?
   A. not sure   B. a little sure   C. very sure

3. How sure are you that you can ask your parents for popcorn without salt or butter?
   A. not sure   B. a little sure   C. very sure

4. How sure are you that you can ask for lettuce and tomato instead of pickles on your hamburger?
   A. not sure   B. a little sure   C. very sure

5. How sure are you that you can drink low-fat white milk instead of regular white milk?
   A. not sure   B. a little sure   C. very sure

6. How sure are you that you can eat cereal instead of a donut?
   A. not sure   B. a little sure   C. very sure

7. How sure are you that you can eat fresh fruit instead of a candy bar?
   A. not sure   B. a little sure   C. very sure

8. How sure are you that you can eat toast with margarine instead of real butter?
   A. not sure   B. a little sure   C. very sure

9. How sure are you that you can take off and not eat the skin of your chicken?
   A. not sure   B. a little sure   C. very sure

10. How sure are you that you can ask for frozen yogurt instead of ice cream?
    A. not sure   B. a little sure   C. very sure

11. How sure are you that you can ask your parents to buy bread sticks instead of salted crackers?
    A. not sure   B. a little sure   C. very sure

12. How sure are you that you can eat a baked potato instead of french fries?
    A. not sure   B. a little sure   C. very sure

13. How sure are you that you can drink fruit juice instead of a soft drink or soda?
    A. not sure   B. a little sure   C. very sure

14. How sure are you that you can eat cooked vegetables without adding real butter to them?
    A. not sure   B. a little sure   C. very sure

15. How sure are you that you can eat a salad from the salad bar at a fast food restaurant instead of ordering a hamburger and fries?
    A. not sure   B. a little sure   C. very sure
Appendix D - The Exercise IQ Test

30. Which of the following is an aerobic activity?
   - Bicycling
   - Fishing
   - Racing your sister to the telephone

31. How much total time in a day do you need to participate in an aerobic activity to keep your heart healthy?
   - At least 5 minutes
   - At least 30 minutes
   - At least 2 hours

32. How many times each week should you do an aerobic activity to have a healthy heart?
   - At least 7
   - At least 1
   - At least 3

33. Before you do a physical activity you should
   - Take your pulse
   - Warm up
   - Blow your nose

34. Physical activity does which of the following?
   - Improves your breathing
   - Makes the blood rush to your head
   - Makes your hair grow faster

35. A good activity for strengthening your leg muscles is:
   - Push ups
   - Curl ups
   - Climbing

36. Which is the best reason for choosing a physical activity?
   - All your friends do it
   - You enjoy doing it
   - You might become a professional and make a lot of money doing it

37. Which of these household chores is also an aerobic activity?
   - Cleaning your room
   - Washing the dishes
   - Mowing the lawn
Appendix E  Please circle your answer

1. Do you have a regular exercise routine?  Yes  No
   If not, please select or write in the reason:
   Unable to find time  Don’t have the equipment/Space
   Don’t consider it necessary  Physically Unable
   Other _________________________________

2. How many hours per day would you estimate that your child spends engaged in physical activity, such as walking, running, sports, riding bikes, etc., outside of school?
   0-1 hour  1-2 hours  2-3 hours  More than 3 hours

3. How many hours per day would you estimate that your child spends engaged in sedentary activities such as watching TV, playing video or computer games, or reading?
   0 -1 hour  1-2 hours  2-3 hours  More than 3 hours

4. Are you currently dieting?  Yes  No
   If yes, is your child aware that you diet?  Yes  No

5. Are you concerned about your child’s weight?  Yes  No
   If yes, do you encourage your child to diet?  Yes  No
   If yes, do you encourage your child to exercise?  Yes  No

6. Do you regularly buy fresh fruit & vegetables?  Yes  No
   If not, please select or write in the reason:
   Most family members don’t like it  Too expensive
   Prefer canned or frozen ______________________________

7. Do you regularly buy snack foods such as candy, chips, cookies, soda, cakes, ice cream?  Yes  No

8. Do you or other adults in household smoke?  Yes  No

9. Does your child have health problems?  Yes  No
   If yes, please describe ______________________________

Your Name________________________  Child attends Metompkin or Accawmacke?
   4th grade  Or  5th grade?

THANK YOU FOR YOUR TIME AND ASSISTANCE!
Dear Parent;

As you know, several classes of 4th and 5th grade students have participated in a new health program developed by the American Heart Association, called HEART POWER. This curriculum teaches children about the heart, and how the choices we make about food, smoking and physical activity affect our health. We are collecting information about your children to determine how they make choices about what foods they eat and how active they are. Enclosed you will find a questionnaire. I would appreciate if you could find time to complete the questionnaire and return it in the enclosed envelope. This is strictly voluntary, will not affect your child's grade in any way, and will be kept completely confidential. Please contact me if you have any questions, and thank you in advance for your cooperation.

Grace Stay, School Psychologist
787-7765
Dear Parent;

As you know, several classes of 4th and 5th grade students have participated in a new health program developed by the American Heart Association, called HEART POWER. This curriculum teaches children about the heart, and how the choices we make about food, smoking and physical activity affect our health. We are collecting information about your children to determine how they make choices about what foods they eat and how active they are. Enclosed you will find a questionnaire. I would appreciate if you could find time to complete the questionnaire and return it in the enclosed envelope. This is strictly voluntary, will not affect your child's grade in any way, and will be kept completely confidential. Please contact me if you have any questions, and thank you in advance for your cooperation.

Grace Stay, School Psychologist
787-7765
Appendix F Teacher Evaluation of Heart Power

1. What was your overall assessment of the American Heart Association’s Heart Power program?
   Excellent    Very Good    Good    Fair    Poor

2. Did you find the program to be well organized?  Yes    Sometimes    No

3. Were the materials of good quality and interesting?  Yes    Some    No

4. Were you able to present the program consistently, or were there interruptions which you felt lessened the impact of the program?

5. Was the teacher guide easy to follow and implement?  Yes    Some    No

6. Did you teach each of the 16 lessons?  Yes    Skipped some    Combined

7. How many total hours would you estimate you spent with your class on the Heart Power program?  5-10    11-16    17-22    More than 22

8. Would you recommend the program to other teachers?  Yes, definitely    Yes, with reservations    No    Uncertain

9. Any other comments or suggestions:

   Thanks again for your help!
Vita
Grace Elizabeth Stay

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1994-1999 The College of William and Mary
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Doctorate of Education in School Psychology/Counseling

1982-1985 The College of William and Mary
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