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**The Effect of a Music Exercise and Healthy Eating Habits Program on Children's Weight Loss**

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THE EFFECT OF A MUSIC EXERCISE AND HEALTHY EATING HABITS PROGRAM ON CHILDREN’S WEIGHT LOSS

By

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I dedicate this work to my husband, Tomohiro and children, Ryuto, and Maria Inoue
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ABSTRACT

A low amount of physical activity paired with frequent consumption of fatty foods has been reported to increase childhood obesity in the United States to epidemic proportions. Researchers have further concluded that many of the problems associated with obesity continue into adulthood, leading to serious nationwide health problems. The purpose of this study was to determine the effect of a music exercise and educational program across 6 weeks on (a) BMI-for-age percentile, (b) waist circumference, and (c) attitudes about exercise in elementary school aged children in the normal, overweight and obese weight ranges. Changes in attitude about school, knowledge of nutritional education and off-task behavior were also explored. Blood pressure and heart rate were measured to aid monitoring for safety.

A music-based curriculum designed to increase children’s physical activities and to provide nutrition education was created for this study. The music intervention program met 3 times a week for 6 weeks. A pilot study was conducted to test the protocols for effectiveness. Upon completion of the pilot, twenty-nine 3rd and 4th grade students (Female=25 and Male=4) who attended a local elementary school consented to participate in the current study. The research used an ABA design and results were analyzed graphically. Dependent variables included: (a) physiological measures for BMI-for-age and waist circumference, (b) a researcher-created Likert-type scale assessing participant attitudes about school and the music intervention, (c) a researcher-created questionnaire assessing participants’ nutritional knowledge, and (d) behavioral observations of off-task behavior.

Graphic analysis suggested that some changes in the children’s physiological measurements occurred. Overall, the mean BMI-for-age percentile from baseline to the music intervention decreased 1.7 percentile. Analysis of mean BMI-for-age percentile by category from baseline to the music intervention indicated that obese children’s BMI percentile decreased 0.3 percentile, while children in the overweight category showed a mean decrease of 1.8 percentile and normal range children showed a mean decrease of 3.6 percentile. Given that majority of participants were female, these were considered moderately successful short-term results since children are still growing and CDC growth charts for females aged 9 to 11 show a 6-week mean BMI percentile increase of 0.07 percentile. Results for mean waist circumference showed no change between baseline and treatment. However, analysis of mean waist circumference by
category showed a slight decrease for normal and overweight children. The children’s mean attitude toward school increased 0.33 points in a negative direction, however the children consistently expressed a positive view of the music intervention. Additionally, the results for participants’ eating habits showed a mean improvement toward healthy eating habits of 0.16 points and an increase of 0.83 points for information on food taught in the intervention. Finally, the behavior analysis indicated a mean decrease in off-task behavior of 2.1% during the intervention.

These results suggest that the music intervention was helpful in improving physical health for participants with overweight issues. Additionally, the results suggest that the program was helpful for all participants in terms of improving behavior and attitudes toward exercise and eating healthy foods (nutritional information components). Finally, results suggest that it is essential for future school curricula to consider conducting the program a minimum of 3 times a week in order to effectively address weight and health issues.

The results of this study suggest that music therapy has the potential to be an effective intervention to combat childhood obesity. Adults often experience difficulty maintaining motivation for continuous physical fitness and proper diet. This difficulty has resulted in the creation of different exercise and dietary education approaches across many decades. For children, it may be even harder to understand physical changes and maintain motivation to exercise. Music therapy may be effective in combating weight issues because it is non-threatening and supportive, and can serve to motivate children. Music therapy is designed to meet needs using music, and it may function to help children develop healthy habits for the future. More research is warranted in the use of music therapy, exercise, and healthy diet choices. Implication for music therapy practice and suggestions for future research are discussed.
CHAPTER 1
INTRODUCTION

According to the (Federal Centers for Disease Control and Prevention [CDC], 2009a), adult obesity rates in the U.S increased from 25.6% to 26.1% between 2007 and 2008. The definitions of “overweight” and “obesity” are similar; both involve an unbalanced measurement between weight and height. When one’s weight is greater than the weight range considered healthy for a given height, the individual is considered to be overweight or obese (CDC, 2009b). Furthermore, the conditions of “overweight” and “obesity” are correlated with increased risk for certain diseases and other health issues.

Consistent with the latest statistics released by the Center for Disease Control Division of Media Relations (2009c), serious issues continue to rise related to weight. The Behavioral Risk Factor Surveillance System (BRFSS) (CDC, 2009c), a state-based phone survey, collected health information from individuals over 18 years of age. Results indicated that six states had an adult obesity rate of 30% or more; also, 26 out of 50 states had an obesity prevalence of 25% or more. These statistics indicate that over half of the states in this country are dealing with obesity-related problems. CDC (2009d) epidemiologist Liping Pan, lead author of the 2008 BRFSS obesity map analysis, explained, “The latest BRFSS survey data show that the obesity problem in this country is getting worse each year. If this trend continues we will likely see increases in health care costs for obesity-related diseases” (p.1).

Data for school-aged children and adolescents show large increases in numbers of overweight and obese individuals. Statistics from the Federal Centers for Disease Control and Prevention (2010) reported that the number of children aged 6 to 11 years old and adolescents’ aged 12 to 19 who are overweight or obese during the past 20 years tripled (Ogden et al., 2006; Ogden, Flegal, Carroll, & Johnson, 2002). Additionally, a survey conducted by the National Health and Nutrition Examination Surveys (NHANES) (CDC, 2009e) compared the number of children who were overweight and obese in the years of 1976-1989 to 2003-2006. Results indicated that the prevalence of overweight children increased from approximately 4.0% to 17.0% among children between the ages of 6 and to 11, and the number of overweight/obese adolescents aged 12 to 19 increased from 6.1% to 17.6%. These numbers represent a significant
portion of an entire generation that will continue to face weight related problems as they reach adulthood.

According to the American Academy of Child and Adolescent Psychiatry (2008), obesity is one of the easiest medical conditions to recognize but the most difficult to treat. Obesity, which is caused by unhealthy weight gain due to poor diet and lack of exercise, results in 300,000 deaths each year. The estimated annual cost to society for obesity related issues is nearly 100 billion dollars. The psychiatry group also stressed that obese and overweight children will become obese and overweight adults if they do not learn healthier eating habits and exercise to maintain a healthy weight.

Poussaint (2010) wrote in *FamilyEducation* that children spend five to six hours a day watching television, using the computer, and playing video games and do not participate in any physical exercise activities. The author states that fewer physical activities are to blame for the obesity epidemic. Poussaint (2010) also pointed out that fast-food chain advertisements and high-fat, high-sugar meals and snacks do not help children choose healthier food products. This author further warned society about the early development of Type 2 diabetes, especially in children with a family history of the disease. Type 2 diabetes can lead to heart disease, high blood pressure, kidney disease, stroke, limb amputations, and blindness. However, both obesity and diabetes are preventable with regular, routine exercise to burn excess calories, healthier food choices, and learning better eating habits.

In response to the obesity epidemic, the U.S. Department of Health and Human Service’s (2007) Office of the Surgeon General made a clear statement calling for serious action to prevent and decrease overweight and obesity problems in children. Prevention suggestions included physical activity and healthy eating, as well as general suggestions such as family support and encouragement from parents. According to the Surgeon General, these elements are the key components to weight loss and the prevention of obesity and overweight problems in children.

Additionally, in a recent edition of *Time magazine*, Park (2010) suggested that families who adapted more than one behavior such as changing to nutritious eating habits, reducing television time, increasing exercising, and getting a good night sleep were much more effective in maintaining their weight than families who tried to change only one behavior at the time. Likewise, Anderson (2010) described that having routines such as eating with the family six or seven times a week, limiting television time to less than two hours per day, and getting enough
sleep (at least 10.5 hours each night) helped not only children to lose or maintain their weight, but improved family health overall.

Past research on children who are obese has shown the effectiveness of physical activities, especially the benefits of exercise, on burning calories and body fat, reducing appetite, and keeping current weight under control. Wechsler, McKenna, Lee, and Dietz (2004) stated the important role of schools in controlling this problem. Many other elements of society also play a role in influencing children, including families, communities, health care organizations, religion, business, government, and the media. However, children spend most of their time in school. Research shows that schools can effectively promote physical education and healthy eating habits (Gortmaker et al., 1999; Robinson, 1999).

According to the American Music Therapy Association (2009a), music can motivate adults and children to participate in physical activity (Abrams, 2008). Music can be used in multiple ways to promote exercise. Hanser (1999) stated that music can be used to: (a) cue or prompt certain behaviors, (b) maintain positive behaviors, (c) transfer positive effects to other behaviors, (d) provide positive reinforcement and serve as a group contingency, and (e) shape new behaviors by reinforcing successive approximations. As yet, there has been no research on using music therapy to effect weight loss, either with adults or children. Therefore, the purpose of this study was to investigate whether or not children responded positively to musical activities especially designed for weight loss and/or maintenance and to determine if the children exhibited positive effects physiologically, psychologically, socially, and behaviorally.
CHAPTER 2
LITERATURE REVIEW

Obesity Research

Finkelstein, Ruhm, and Kosa, (2005) reviewed the societal impact of the obesity epidemic. Obesity is a modern disease affecting one’s overall health; however, the authors examined the economic and not health problems related to obesity. The authors raised an alarm about issues related to the obesity epidemic such as the high cost of obesity prevention programs and treatment. The majority of unpaid medical costs are paid by taxpayers. This overview of the problem alerted readers to the great need to find interventions to reduce obesity and its costs.

Kant, Graubard, and Kumanvika (2007) discussed trends in energy intake and amount of food intake in adults between the years of 1971 and 2002. The overall conclusion from these authors was that the quantity of food, total energy intake, energy from carbohydrates, and energy density increased among all race and gender groups across time. The authors also suggested that trends of food intake among African American and Caucasian have not differed. Overall, the study stressed the importance of understanding racial and cultural differences in weight loss, as these will be critical factors when creating new interventions.

Williams, Grow, Freedman, Ryan, and Deci (1996) conducted a study on motivation and weight loss. There are many weight loss programs for patients who are severely or morbidly obese, and the authors examined the psychological and environmental variables that produce the most changes in participants across time. Motivation was measured using four different predictors: (a) patients' attendance at weekly meetings during the 6-month, clinic-based program, (b) weight loss during the 6-month period, (c) exercise, and (d) maintained weight loss at a 23-month follow-up. The authors concluded that participants showed great autonomous behavior over the course of the programs, and that a variety of programs impacted physiological changes like BMI over the 23 months. The findings illustrated that independent motivational behaviors were an important factor for success in weight-loss programs.

Palmira et al. (2007) conducted a study to predict the effectiveness of a short-term weight loss program for overweight and obese women participating in a 16-week university-based weight control program. This program used health and behavior change theories like social cognitive theory (Bandura, 1997), the transtheoretical model (Prochaska & Velicer, 1997), the
theory of planned behavior (Ajzen, 1991), and self-determination theory (Ryan, & Deci, 2000). The results indicated that self-efficacy such as weight management and constructive eating habits resulted in greater weight change than the exercise model. The exercise model showed some weight change; however the authors explained that as a short-term predictor for weight change, the self-efficacy model had more of an impact on adult participants. Furthermore, variables such as gender, age, and racial background differentially affected the long-term prediction of weight loss results.

**Children and Obesity**

Research indicates that approximately 30% of school children are now overweight or obese (Lyznicki, Young, Riggs & Davis, 2001; Ogden et al., 2002). Small, Anderson and Melnyk (2007) wrote a critical review and appraisal citing evidence of the necessity of prevention and early treatment for this problem. These authors stated, “The national prevalence of overweight and obese school-age children between 8 to 12-year-olds has nearly quadrupled in the last 25 years” (p. 1). Possible causes of the epidemic problems with overweight and obesity are thought to be due in part to the prevalence in America of fast food and the attraction of multiple video games published in the past two decades. Additionally, economic difficulties may have caused Americans to eat more processed food or to participate in fewer leisure activities. It is predicted that since adults are also having more weight problems, it will be harder for children to change their lifestyle given their parents’ lifestyle. Life habits such as lowered physical activities and ingestion of high-fat and/or high-cholesterol foods will result in more adults who suffer from weight-related health problems (Benjamin, Cradock, Walker, Slining, & Gillman, 2008).

Reilly (2007) provided a clear definition of obesity in children and adolescents using the body mass index (BMI). The BMI for children versus adolescents is measured differently according to gender and age differences. Children and adolescents (aged 2-19 years) are charted on CDC growth charts, which are then used to determine the percentile of the child’s BMI for his or her age. A BMI at $\geq 85^{\text{th}}$ percentile and $\leq 95^{\text{th}}$ percentile is defined as overweight for children. A BMI $\geq 95^{\text{th}}$ percentile for children of the same age and sex is defined as obese (CDC, 2009g) (See Growth charts in Appendix N). Research suggests that physical and psychological problems occur as hidden health issues for children and adults who were obese as a child.
Many children who are overweight and obese exhibit a much less active lifestyle and have an imbalanced food intake. Urrutia-Rojas et al. (2008) conducted a cross-sectional study of African American, Hispanic and Caucasian children to determine specific risk factors connected with obesity. The comparison of overweight children indicated that African American (32.8%) children and Hispanic (31.9%) children were much more overweight than Caucasian (23.5%) children. According to this study, risk factors vary among cultures; for example, African American children tended to have more sugar-sweetened drinks, Caucasian children tended to have high fat content snacks, and Hispanic children tended to participate in fewer activities and consumed more fruit. The authors noted that eating more fruit is considered healthy, but eating massive amounts can lead to obesity.

Janssen et al. (2005) conducted a cross-cultural study on the prevalence of school-aged youth who were overweight and obese, and compared the physical activity and dietary patterns of children in 34 countries. The results indicated that industrial countries had more children who were overweight or obese. Included were areas such as North America, Great Britain, and the southern portion of Western Europe. Moreover, the relationship between physical activities and television viewing appeared to be associated with children’s weight issues.

Delisle, Werch, Wong, Bian, and Weiler (2010) conducted an interesting study on the relationship between the frequency and intensity of physical activity and health behavior of adolescents. Typically, children who participated in various activities exhibited a healthier lifestyle because of the combined impact of social atmosphere and physical fitness. Results indicated that adolescents who participated in intense physical activity such as running, jogging, football, soccer, basketball, rollerblading, skateboarding, and vigorous swimming demonstrated healthier behaviors in relation to alcohol, cigarette, and marijuana consumption. They also had better dietary habits, stress management, and sleeping patterns than children who participated in moderate physical activities such as fast walking, baseball, tennis, slow bicycling, volleyball, badminton, and easy swimming. However, the authors pointed out the need for more intense experimental methodologies and physical health measures, as well as longitudinal research designs to determine the effect of school-based interventions targeting the health behavior in children.

The national survey was conducted to focus on the relationship between childhood obesity and school type, specifically on schools that offered the national lunch program and
school breakfast programs (Li & Hooker, 2010). The results indicated that children who attended public school and were enrolled in the reduced or free lunch or breakfast program had higher BMI scores than children who attended private schools. These results led to a warning to government and school officials to change their policies on school lunch and breakfast, regardless of socioeconomic status. Eating habits in all households need to be changed in order to reduce childhood obesity.

A variety of weight loss interventions for children has been studied by different researchers. Robinson (1999) wrote a review of studies regarding the effect of behavioral treatment on childhood and adolescent obesity. The author suggested the most effective short-term treatments include good structure and organization, as well as other behavior treatment factors such as group intervention with individual support and counseling. Additionally, a list of effective behavioral change treatment factors were listed in this review: (a) parent participation, (b) frequency of intervention sessions, (c) longer treatment duration, (d) a simple dietary education (e) clear definition of diet and calorie intake, (f) a physical activity program to enhance motivation to exercise (g) choice making to reduce the passive behaviors, (h) changes in home and family environment, (i) self-monitoring, (j) goal setting, and (k) contracting. Moreover, the author concluded that parent skill training and prevention for relapse and maintenance treatment are needed for long-term effectiveness of behavioral treatments for childhood obesity prevention program.

Spence (1986) wrote an article focused on behavioral treatment of childhood obesity. This article discussed the increase of childhood obesity in the 1980s and anticipated the current increase of obesity in the general population. The author linked childhood obesity to different types of health problems such as hypercholesterolemia, hypertension, endocrine disturbance and orthopedic disorders etc. In addition, the author stated that appearance and negative self-image can lead to unpleasant psychological consequences. Spence (1986) suggested that behavioral treatment using techniques such as behavior modification and modeling, as well as techniques to help participants cognitively understand the treatment would help children overcome problems such as being overweight and obese.

Gately et al. (2005) conducted a study on the effect of a children’s summer residential 6-week (maximum) weight-loss program. The program included a daily schedule of skill-based, fun physical activity, moderate dietary restriction, and group-based educational sessions. The
results indicated that there were changes in participants’ weight, BMI units, and BMI SD scores; however, fat mass showed no change. The authors concluded that the short-term effects of children’s weight loss residential camps were good; however cost-effectiveness and long-term effects on children’s weight change needed to be studied further. Generalized use of the program was questioned because the use of multi-component programs made it difficult to identify the most effective intervention. On the other hand, it was an effective intervention program as a whole, with the potential of transferring or adapting the residential program to a nonresidential setting or during school activity as a healthy children’s intervention.

Ussher, Owen, Cook, and Whincup (2007) conducted a study on the relationship between physical activity and psychological well-being among adolescents. The authors concluded that an increase in sedentary behaviors and activities like television, video games, and computer use, correlated with lower psychological well-being. It is important to note that these authors used participants’ self-report. The authors suggested the use of more objective measurements for physical activities, such as use of an accelerometer. Even though this study was based on a questionnaire, it provides important information to connect adolescents’ mental health to physical activity.

Kirkcaldy, Shephard, and Siegen (2002) conducted a study on the relationship between intensive physical activity and self-image, in addition to problem behaviors in adolescents. Results suggested there was a strong association between regular endurance exercise, physical activity, and better positive self-image. The results indicated that participating in sports was associated with reduced adolescent problematic behaviors such as drug and alcohol addiction. Furthermore, participating in physical activities led to a higher rating in individuals’ physical and psychological well-being. The authors concluded that physical exercise, including recreational activities, gives additional rewards such as getting in better shape and reducing body mass that can lead to positive social interactions among peers and recognition in social settings.

Valverde, Patin, Oliveira, Lopez, and Vitolo (1998) conducted a study to evaluate the influence of a multidisciplinary health program including a nutritionist, pediatrician and psychologist on obese children and adolescents. This study took place in an outpatient setting, and the results indicated that participants exhibited reduced weight outcomes. The outcomes were especially positive for participants who visited six times or more, and girls who visited the clinic frequently showed better BMI, body fat mass, and body shape. The authors concluded that
nutrition education impacted eating habits and helped participants avoid extra energy intake. Additionally, the most important aspect of this study was that frequent visits and positive relationships helped participants have the support needed for weight control.

**Families and Childhood Obesity**

Kitzmann, William, Dalton, and Buscemi (2008) conducted a correlational research study on past literature to explore the relationship between family dynamics, children’s weight problems and children’s progress in treatment. The authors suggested that overweight children had non-authoritative parents and experienced more conflict in the family context. However, the authors added that the research outcomes were not consistent across the study. Another finding suggested by these authors were the possible need for extra support for overweight children to manage their weight and to improve their health awareness. Furthermore, the evidence reviewed from a small number of studies suggested that success in the treatment of childhood obesity relied on low family stress and high quality family support as key components for positive outcomes. These authors recommended that programs be tailored to meet the needs of various families.

Fabricatore et al. (2009) did a study on parents’ BMI and their weight changes as a predictor of children’s weight loss. Their findings were consistent with Golan and Crow (2004), and suggested that parental involvement was an important factor on children’s weight loss. However, results were inconclusive when including adolescents (Jelalian & Saelens, 1999). The results indicated that parents appeared to be supportive of their adolescents, but not involved with their weight loss. Eighteen percent of the participants failed to complete the program. Findings suggested that parents with higher BMI engaged in more activities to reduce their own weight, which may have motivated their teen to participate in the intervention. Additionally, male participants had better results on BMI scores than female participants; however, these results may correlate with the growth of boys during adolescence. Furthermore, ethnicity was highly associated with this study; non-Hispanic whites lost more than ethnic minorities. These results suggest the importance of creating interventions that adhere to participants’ cultural, ethnic, and racial backgrounds.
Exercise Needs of Children

The American College of Sports Medicine (ACSM) first published guidelines for certification programs for exercise professionals in 1975. As a companion to these guidelines, ACSM published a manual called *ACSM’s Resource Manual for Guidelines for Exercise Testing and Prescription* (1988). Both the guideline and manual serve as excellent resources for the wide variety of professionals who work with exercise. Chapter 7 of *ACSM’s Guidelines for Exercise Testing and Prescription* (2000) provides instructions on creating the best prescriptive training or exercise program for each individual. “Exercise prescriptions are designed to enhance physical fitness, promote health by reducing risk factors for chronic disease (e.g., high blood pressure, Glucose intolerance), and ensure safety during exercise participation” (p.139).

An important characteristic of athletic performance, VO2 max, is often emphasized in exercise research. VO2 max is defined as Maximal Oxygen Uptake during the performance of an exercise task requiring maximal effort. Better health and an active lifestyle are much more realistic goals for most people than is reaching a high VO2max, a goal of professional athletes. Moffatt (2009) identified an important aspect of VO2 max as a key element of physical fitness. According to Moffat, the VO2 max value can be increased by engaging in intense physical training such as endurance competition (running, swimming, and cycling etc.). This enhances the oxygen uptake to blood flow and the hemoglobin intake to tissue. Results are related to an individual’s maximum capacity for sustained work. In addition, VO2 max can be defined as a physiological variable that acceptably expresses the cardiovascular and respiratory system, described as “cardiorespiratory fitness.” The author explained “cardiorespiratory fitness” can be influenced by training, genetics, gender, lung capacity, hemoglobin level, age (muscle mass) and body weight are the most valid measures of general physical fitness. However, this measure of fitness is not appropriate for children.

In *ACSM’s Guidelines for Exercise Testing and Prescription* (2000) contains a chapter on “Exercise Testing and Perception for Children, the Elderly, and Pregnant Women.” The earlier information in Chapter 7 was applicable to all adults. However, this chapter breaks down the important elements of exercise prescription for children. According to the authors the best amounts or types of exercise recommendations are not yet finalized. It is known that exercise should be individualized based on (a) maturity level, (b) medical status, (c) skill level, and (d) prior exercise experience. Additionally, the authors suggest that children aged 7, 11, and 12 years
should have 20 to 30 minutes of dynamic exercise at least 3 times a week to produce the greatest benefit to their health.

Fredette (2001) described the vital element of “flexibility” as another key element of an effective exercise program. “Flexibility is characterized by a ready capability to adapt to new and different or changing requirements and is applied more specifically to the range of motion (ROM), which occurs at a single joint or series of joints” (Morris, 1984, p. 468). Fredette (2001) also emphasized the importance of “stretch” and its mechanism. It is essential to stretch before exercise. The author recommends stretching regardless of age or initial flexibility, stating that everyone can learn to stretch.

Malina (2000) described the influence of regular physical activity and training for sport on growth and maturation in the book, Pediatric Exercise Science and Medicine. Physical activity involves four major components: (a) energy, such as Metabolic Equivalent of Task (METS), the specific activities performed in various settings, (B) biomechanical, such as body mass bearing activities, (c) ground reaction forces and strength, such as static vs. dynamic movements, and (d) motor skill, such as economy and accuracy of movement (p. 96). Additionally, Malina (2000) concluded that physical activities influence children’s growth and maturity in positive ways, especially in the regulation of body mass, particularly fatness and skeletal mineralization.

The mechanism of children’s growth with exercise is not yet fully understood. Many researchers suggest comparing the data for children individually to determine the most effective exercise routines and solutions to achieve a healthier lifestyle. Additionally, understanding developmental milestone of children and matching children’s capability to participate in particular exercise is an important factor for creating a new program, especially children with weight issues.

**Food and Dietary Issues**

A balanced diet with a variety of foods from the food groups recommended by the United States Department of Agriculture’s (USDA) MyPyramid (2009) is crucial for healthy living. MyPyramid outlines the six different food groups: (a) grain, (b) vegetables, (C) fruits, (d) dairy, (e) oil, and (f) meat and beans. Eating high quality foods can help individuals grow strong; however, realistically, it can be very difficult to choose good quality foods if the children are not
interested in or familiar with the nutritional outline. The Dietary Guidelines for Americans (2005) published by both the USDA and Health and Human Services (HHS) provide dependable advice on good dietary habits which promote good health and reduce the possibility of future chronic diseases for children aged two years and older. According to the guidelines, a healthy diet emphasizes fruits, vegetables, whole grains, and fat-free or low-fat milk and milk products. In addition, the guidelines suggest including lean meats, poultry, fish, beans, eggs, and nuts, as well as foods low in saturated fats, trans fats, cholesterol, and salt (sodium).

The USDA’s MyPyramid.gov website (2010) has a children’s section created separately for children and educators. Specifically, MyFood-a-Pedia contains a search engine that provides an easy calculation for different food items. Besides the information, there are many activities for children to learn about healthy choices. All the key components of food and dietary issue are included within the MyFood-a-Pedia.

Sanchez et al. (2007) conducted a study with adolescents’ aged 11 to 15 years using a cross-sectional design to assess: (a) physical activity using accelerometers, (b) television viewing time via self-report, (c) caloric intake from fat, and (d) servings of fruits and vegetables using food journal. Participants were presented with multiple 24-hour recall opportunities, and parents’ health behaviors were assessed via self-report measures. The results suggested that approximately 80% of the children demonstrated health risk behaviors such as minimal physical activity and extra sedentary behavior. Only 2% of children met the guidelines for appropriate daily physical activities and proper nutrition; which were (a) 60 minutes/day of physical activity, (b) less than 2 hours/day of passive activity, (c) < 30% total fat intake, and (d) 5 or more servings of fruits and vegetables. The results indicated that boys were more active than girls. Overall, the majority of the adolescents did not meet the dietary guidelines. Furthermore, parents’ health risk behaviors were correlated with adolescents’ weight and age. Parents’ with more risk factors also had children who exhibited more risk factors. Additionally, parents’ smoking history seemed to be associated with less fruit and vegetable intake.

Roblin (2007) gave a good explanation of the relationship between food intake, eating habits, and nutrients to childhood obesity. Growing children need better food intake, but often demonstrate poor eating habits, such as consumption of high-calorie and low-nutrient foods and beverages. Though nutritionists have recommended healthy food choices, the childhood obesity
The epidemic is still growing. The author alerted the fact that food marketing and media influence poor food choices by younger children.

The amount of food intake is important in dietary intervention, especially the intake of fruits and vegetables. Alexander et al. (2010) conducted a study investigating the use of (a) an online untailored program, (b) a tailored behavioral intervention, and (c) a tailored behavioral intervention with interview-based counseling via e-mail. These authors used a web-based MENU program that incorporated principles from the Social Cognitive Theory (Bandura, 2001), the Transtheoretical Model (Prochaska, & Velicer, 1997), and the Health Belief Model (Janz & Becker, 1984). The results indicated that the tailored behavioral intervention with interaction via e-mail had a more positive outcome on proper amount of food intake behavior than any of the other approaches. The author concluded that web-based teaching programs can serve an unlimited number of individuals for a fairly low cost. However, it is important that individual interactions such as communication and interview-based counseling through the e-mail helped to change the intake of fruits and vegetables.

**School-Based Weight-Loss Interventions**

The American Dietetic Association (ADA, 2006) issued a clear statement about interventions for overweight children. They recommended the use of family and school-based multi-component programs, the promotion of physical activities, and the promotion of nutritional education. They also suggested parent training and modeling, and the use of behavioral counseling.

Becerra, Kan ters, Casper, and Forrester (2008) addressed the importance of school-based extracurricular initiatives. According to the authors, various sports related physical activities have been developed and examined that show immediate and long-term effects on children with obesity problems and their subsequent health issues. For example, interscholastic and intramural sports positively affect children’s activity levels. Children who participate in these sports are more active and show long-time commitments to sports. Additionally, the authors expressed the belief that public schools across the United States are in the best position to stress the importance of physical activities to children. In conclusion, the authors strongly suggested that schools offer a combination of intramural activities and encourage the activities to become a routine.
Maione (1989), an exercise physiologist and a physical educator, designed a program to help children with weight problems. Her program combined good nutrition, exercise, education, and guidance to control children’s weight and improve their fitness as well as to increase positive attitudes. Her book explained many tips for weight control and provided food information including the Recommended Dietary Allowances (RDA). Several sample menus and calorie counter tables were included. Additionally, different types of fitness exercise evaluations and assessments for children were explained, with the components of the program introduced in great detail. Unfortunately, these types of outreach programs have been eliminated due to decreased funding and increased focus on improving academic achievement (Murray et al., 2007).

Shaya, Flores, Gbarayor, and Wang (2008) conducted a literature review on school-based obesity interventions. The 52 studies reviewed were divided into three different categories of intervention; 15 studies were solely based on physical activity programs, 16 studies were based on educational models and behavior modification strategies, and 20 studies were based on both. In addition to intervention differences, different types of effect measurements were reviewed. Thirty-one studies contained quantitative variables such as body mass index and body measurements like waist-to hip ratios; twenty studies used both quantitative and qualitative measures like self-report, attitude, knowledge of nutrition, and cardiovascular health and fitness to determine the efficiency of the interventions. The results indicated that the length of interventions ranged from four weeks to as long as eight continuing years. Furthermore, results indicated a positive aspect to the physical activities. Surprisingly, these authors concluded that no reduction in obesity in school age children was observed.

A number of researches have investigated various school based weight loss interventions for children. Brown and Summerbell (2009) did a systematic review of school-based interventions that focused on changing dietary intake and physical activity levels to prevent childhood obesity. Thirty-eight studies from MEDLINE and EMBASE were searched between January 2006 and September 2007; only studies with a minimum duration of 12 weeks were evaluated. The dietary interventions and physical activities were described and explained in this study, and overall implications were discussed. The findings suggested that gender, age, and length of interventions varied across the individual studies. The findings also suggested that combined diet and physical activity in school-based interventions may help prevent children
from becoming overweight. The authors further concluded that physical activity in the primary schools appeared to especially benefit girls, preventing them from becoming overweight.

Another research review of school-based obesity prevention programs conducted by Budd and Volpe (2006) proposed challenges and recommendations for future research for using behavior modification. There were many similarities between the Budd and Volpe (2006) findings and the Brown and Summerbell (2009) findings, especially in terms of the importance of behavior modification and cognitive approaches in imparting health-related information.

Planet Health (Gortmaker, et al., 1999) and Dance for Health (Flores, 1995) focused on classroom education and behavior modification. These studies sought to (a) decrease television viewing and computer time to less than 2 hours/day, (b) increase overall moderate to vigorous physical activity (MVPA) through behavior choice techniques of self-assessment, goal setting, and fitness testing, (c) reduce the consumption of high-fat foods, and (d) increase overall fruit and vegetable intake. Results indicated that gender and age affected BMI reduction when examining moderate to vigorous physical activity (MVPA).

An integrative research review of effective school-based childhood over-weight interventions by Cole, Waldrop, Auria, and Garner (2006) described 10 studies that used the Stetler, et al. (1998) model. According to Cole et al., (2006) “Stetler’s model includes five phases: preparation, validation, comparative evaluation/decision making, translation/application, and evaluation” (p.168). Results of the review indicated that a combination of three components of healthy lifestyle education, dietary habits, and physical activity were common. All three approaches contained important aspects for weight loss intervention: (a) healthy lifestyle education that teaches students about the lifelong benefits of nutrition usually taught at classroom lessons, discussions, and printable materials, (b) dietary education that includes close monitoring by a dietitian to maintain the restricted caloric intake of 1,200-1,400/day, (c) other restrictions like holding lunch box inspections, providing supplements, and controlling availability of foods, and (d) the incorporation of physical activity like simple walking, non competitive sports, and choreographed dance routines. Studies included parents and peers as participants to provide a social cognitive perspective, as well as incorporated fun physical activity curricula. The authors concluded that social cognitive theory was one of the most powerful and successful intervention techniques. Social cognitive theory is based on observational learning and modeling to change human behavior through the impact of social and
peer acceptance (Bandura, 1986). Additionally, modeling is a highly recommended technique for
designing interventions for children in school settings. Demonstration and opportunity for
success, self-monitoring, self-reflection, and self-evaluation are important aspects for behavioral
changes.

Danielzik, Pust, and Müller (2007) conducted a cross-sectional, longitudinal eight year
study. Results indicated that children increased good nutritional knowledge because of societal
changes toward healthier conscience in 2004. Furthermore, parents became more aware of
nutritional facts through the media, which also had some effect on the nutritional knowledge of
children. However, the increase of nutritional knowledge alone did not change the prevalence of
obesity. In contrast, high intensive interventions with key messages, such as teaching children
aged 7 to 11 years old to reduce the consumption of carbonated drinks, were highly successful.
Additionally, measurements of overweight factors in children were discussed and the authors
highly recommended BMI for measuring subcutaneous fat mass. By comparison, skinfold
thickness and waist circumference were found to be a more predictable measurement for
abdominal adiposity. The authors concluded that the use of different parameters to define
“overweight” may change the prevalence of individuals classified as overweight and impact the
presentation of different interventions. Additional results indicated that girls who had
participated in the intervention were more influenced by and had a better outcome with waist
circumference.

According to Foster et al. (2008) wrote an article in *pediatrics* and current news in the
prevent children from being overweight. In a 2008 issue, the authors presented intervention
program from the *School Nutrition Policy Initiative*. These authors focused on examining
program reducing overweight cases in children, and introduced a program used by 10 schools in
Philadelphia. According to these authors, the program focused on teaching the importance of
good nutrition and improving school food. The results of this program indicated that the
percentage of children who were overweight decreased 50% when they were involved in
interventions at their schools. The authors suggests that key components of the success of this
school-based weight loss program were communicating with children and parents, teaching
children nutrition education, changing school food policies, changing the concept of social
marketing, and collaborating with the community.
A study conducted by Rosenbaum et al. (2007) involved the use of nutrition, education, and dietary modification. It also incorporated exercise activities such as dance, non-contact kickboxing and gym class three times a week. The results showed significant reductions in adolescents’ body fat, insulin resistance, and circulating concentration of C-reactive protein (CRP) and interleukin (IL-6). The authors concluded that short-term (3 to 4 months) school-based nutrition education and exercise intervention was highly effective for students who have diabetes risk factors.

Nichol, Pickett, and Janssen (2009) analyzed a cross-sectional survey of students’ perceptions regarding their involvement in the school recreational program and physical activity. Results suggested that the school recreational program (varsity and intramural athletics, the condition of the fields, and the condition of the gymnasiums) was important for students to have more physical activities during school. Additionally, physical activity was related to gender, age, and family background. High school boys had more physical activities during class-time, and this was associated with school characteristics. An interesting finding about the school environment showed, when comparing better physical activity among boys and girls, also the condition of the field and the condition of the gymnasium were rated differently. Also, free-time and physical activity among elementary school children was important factors that increased physical activity during play. Overall, there was an association between school environment and children’s physical activity.

Natta, Byrne, and Wesley (2009) surveyed school nurses to determine their knowledge of childhood obesity and nutritional practices. The results indicated that more than 99% of school nurses were aware of the childhood obesity epidemic. However, 35% of school nurses reported a lack of confidence when recommending weight-loss programs. Furthermore, more than 65% of school nurses did not use appropriate tools for calculating the proper age-specific BMI. The authors concluded that school nurses were knowledgeable about childhood obesity information, but their confidence levels were low for promoting better lifestyle choices for their students.

An article by Miller, Gilman, and Martens (2008) examined school-based topics such as (a) hope and optimism, (b) structured extracurricular activities, and (c) sports and exercise on students’ mental and physical health. Hope and optimism in school settings related to both physical and mental health. The authors were suggested that people who are positive and have hope in life could function better in many different areas, such as athletics, academics, and social
settings, etc. Additionally, “self-reported physical health, related to a positive response to medical intervention, immunologic robustness, and health-promoting behaviors, etc.” (p.6). The inclusion of these ideas in school-based interventions was suggested as necessary for successful interventions and better outcomes for overweight and obese children’s psychological well being.

Byrne (2003) stated that current research outlines no satisfactory treatment for childhood obesity, because indentifying factors such as life style, genetic, and behavioral issues in childhood obesity have not been clearly studied and stated. Over the past 20 years, various studies have looked at randomized controlled trials to examine the efficiency of interventions like behavioral modification programs. However, those studies have only shown short-term effects and not long-term effects. Furthermore, post-treatment outcomes 5 to 10 years later are relatively poor.

**MUSIC THERAPY**

In 1950, music therapy became a degreed profession in the United States (Davis, Gfeller, & Thaut, 1992). Music therapists used music in the rehabilitation of veterans who needed psychological help after World War II. Today, the profession has grown, and the (American Music Therapy Association [AMTA], 2009b) describes the field as a psychotherapy that can benefit many different clients including: children, adolescents, adults, and the elderly, those with mental health needs, individuals with developmental and learning disabilities, individuals with Alzheimer’s disease and other aging related conditions, individuals with substance abuse problems, individuals with brain injuries, those with physical disabilities, those experiencing acute and chronic pain, and pregnant women during labor.

Music therapy is “a systematic process of intervention wherein the therapist helps the client to achieve health, using musical experiences and the relationships that develop through them as dynamic forces of change” (Bruscia, 1989, p. 47). Music therapy uses diverse styles of music to meet client, student, and patient needs. Interventions include: (a) active music making, (b) active listening and/or discussion about music, (c) composing, and (d) music as a distraction from environmental stressors or painful procedures. Adaptive music techniques for singing or playing musical instruments are also used to prevent deterioration of physical or cognitive functioning. Thus, singing, playing instruments, and enjoying musical experiences in-group or
individual settings are the primary activities used in conjunction with cognitive behavior counseling techniques (Hanser, 1999).

In music therapy, the intent is not for clients to perform; rather, it is to enjoy the process of music participation with others while addressing a therapeutic goal. Within this framework, people engaging in musical experiences can strengthen areas of physical and cognitive deficits, maintain the best possible level of functioning, and stay engaged physically, mentally, socially, and culturally with their own environment, friends, and family.

Music Therapy in School Settings

According to AMTA (2009b), music has a tremendous influence on human behavior, both psychologically and physiologically, and is often used in educational settings. Teachers and other professionals sometimes use music to alter the atmosphere in the classroom without having a complete understanding of the effects of music. Teachers usually intend to maximize learning and may wish to choose the “best” music for children. Rauscher and colleagues (1993) attributed IQ gains to playing Mozart during academic tests and created the popular notion of “the Mozart effect.” This Mozart study was very popular in society and using classical music became a trend. However, Hui’s study (2006) suggested that there were no significant differences between Mozart's compositions and other music on children’s IQ (a series of pencil-and-paper maze tests).

Standley (1996) conducted a meta-analysis evaluating 208 variables obtained from 98 studies. Included in the analysis was the use of music as a contingency for education and therapeutic objectives. Variables were converted to effect sizes and compared in terms of the reinforcement value of music. Results indicated that music is a powerful contingency in educational and therapeutic settings, with no evidence of negative effects on students’ academic performance or motivation. The use of contingent music can be creatively designed and is applicable for a wide variety of educational and clinical settings. The author noted that within the educational setting, music as reinforcement for “other” subject matter such as math and reading was both highly acceptable and a desired use of music by teachers. However, the use of music by teachers for academic objectives may not be conducted in the same manner in which music therapists use music, which often confounds results or leads to a reluctance to generalize results. Furthermore, the meta-analysis provided a clear definition of the effect of music in this study.
Harding and Ballard (1982) investigated the use of music as a stimulus and contingent reward in promoting spontaneous speech for physically challenged preschool children. Music interventions were given to participants and four different variables were observed. Data were collected on: (a) appropriate verbal response, (b) initiation of verbal interaction, (c) proper verbalization during story retelling, and (d) on-task behavior. Results indicated that music interventions led to greater success in children’s verbal responses.

There has been much study on the use of music with children with special needs, especially in the school setting. Adamek and Darrow (2005) assert that music therapy can help children to: (a) cognitively, (b) socially, (c) physically, and (d) behaviorally function well in school. In addition, music therapy can be incorporated into the Individual Educational Plan (IEP) as part of a multidisciplinary array of services in the public school setting.

Smith and Hairston (1999) gathered important information on music therapy in school settings. These authors stated that since the course of the Individuals with Disabilities Education Act (IDEA) in 1990, public trends shifted toward inclusion, which led to many changes in the public school system. The authors also stated that mainstreaming was strongly suggested by P.L. 94-142, which was passed in 1975. This law resulted in normalization; however, the concept of inclusion and practice of educating children with special needs in an environment as normal as possible became a framework of mainstreaming with many parents and educators. Results of the Smith and Hairston (1999) investigation indicated that 60% of music therapists were employed full-time and worked for the school system. Music therapists spent a considerable amount of time in direct service delivery each week (62%). Eighty percent of music therapists worked with students with special needs like developmental delays, and had not been employed long in their current position. Additionally, 40% of music therapists worked at the school setting for more than 8 years, and many of them needed to have a valid teaching certificate for employment. Furthermore, the authors discussed employer impact and the impact of the inclusion movement on professional practice (i.e., qualification and demands in the school settings).

Familiar music and simple folk-like melodies can facilitate children’s learning ability (Wallace, 1994; Rainey & Larsen, 2002). Sausser and Waller (2006) described a music therapy model for students with emotional and behavioral disorders (EBD). These authors described effective music therapy activities in a psychoeducational setting, adapted to a 9-week school
setting. The results indicated that music therapy could be effective with proper planning, structured environment, and diverse activities using music.

Additionally, Pellitteri (2000) wrote a comprehensive article in *Music Therapy in Special Education*. This author described the use of music therapy for diverse areas of children’s functional development. Music therapists in these settings work as clinicians and also as consultants for teachers, children, and parents. Music therapy provides unique clinical interventions and is a central foundation of treatment.

Davis (1990) addressed the use of music therapy for preschool children with physical disabilities or language delays. Discussed in his article were: (a) music therapy program development, (b) providing a model music therapy program in the classroom, (c) participating in an interdisciplinary team, and (d) considerations for working with specific disabilities. The author concluded that many children become distracted in the classroom; however music therapy can focus attention on the music experience and shows great success in rewarding feelings in children.

Ford (1984) discussed the use of music therapy for cerebral palsied children. Cerebral palsy (CP) symptoms include paralysis, muscle weakness, and involuntary muscle movement. Different forms of CP include spastic, athetoid, tremor, and rigid. The author explained that music can be of great value for teaching and showing different experiences. Also, structured music can facilitate children’s cognitive, physical, emotional, expressive, and social development. Taking support from past literature, the author concluded that tailored music therapy interventions can enhance specific experiences and meet the needs of cerebral palsied children.

Josepha (1964) presented a paper on the important aspects of instrument performance and the therapeutic values of music and music education at the 1964 Music Educators National Conference in Philadelphia. The author outlined the fundamentals of music education and the music therapy theoretical framework. In this paper, author stated that music experiences could teach emotional, aesthetic, and creative expression. Music can help satisfy the need for self-accomplishment and social acceptance. Additionally, music can contribute towards physical, social, emotional, intellectual, aesthetic, and spiritual growth. The author concluded the paper by discussing that instrumental performance can provide therapeutic value for severely challenged children as a type of physical therapy. Additionally, Josepha (1964) further stated that instrument
playing can help increase muscular strength, joint motion, and restore physical function. Also, instrument playing helped resolve social-emotional conflicts, aided in personal adjustment, and formed a kind of communication and social interaction with others. Furthermore, different levels of social interaction can promote social development for children.

Howell, Flower, and Wheeler (1995) conducted a study on the effect of music instruction using keyboard experiences on the rhythmic responses of physically challenged elementary school children. Results indicated that the majority of students showed improvement on tempo with the music instruction. Also, the authors recommended that physically challenged children should work to increase rhythmic consistency, because the ability to keep a consistent tempo increases opportunities for group participation. Additionally, the authors noted that some children may not be able to perform the proper tempo required by the melody; however, the use of simple modifications and adaptations in the music arrangement allow for group participation.

Peer acceptance is an important component of children’s school life. Cassity (1981) conducted a study on the influence of a socially valuable skill such as music playing on peer acceptance in a music therapy group. The author asked a piano performer to attend a music therapy group without telling group members that this person could play the piano. Music therapy group members were asked to rate this person using a simple questionnaire. After the fifth session, the pianist was asked to share a piano performance with the group and the same questionnaire was again given. Results indicated that music therapy group members rated the person much higher after the piano performance in terms of social acceptance. The author discussed that having socially valuable skills like music skills may improve peer acceptance.

The music is a powerful tool, especially for children to learn specific objectives in school. Passed researches indicated that music can enhance children’s capability to work and to convey the positive results to children’s school life. Humpal and Colwell (2006) edited a book entitled “Effective Clinical Practices in Music Therapy: Early Childhood and School Age, Educational Settings-Using Music to Maximize Learning” from the AMTA Monograph Series. This book contains current information on effective clinical practice in music therapy in early childhood and school age educational settings. Additional information based on research provides clear implications for music therapy and the use of music to enhance children’s learning. The authors stated that developing effective clinical practices is an ongoing process, which will never be complete. Constant investigation and examination is critical for better practice. These authors
also added that understanding the existing public laws is important for creating new clinical protocols, which need to be developed through clinical trials and research.

**Music Preference of Children:**

Music preference is a critical element in effectiveness studies. Chalmers, Olson, and Zurkowski (1999) offered suggestions about using music as a tool in education in their study on the effects of playing music in an elementary school lunchroom. They described the implications of using music and its physiological and psychological effect on humans. While many teachers can relate to the general idea of using music in the school setting, few realize that children’s musical preferences affect their learning behaviors.

Radocy and Boyle (2003) stated that music preference evolves from a combination of musical, personal, and environmental traits. Research indicates that the most effective clinical intervention involves the use of the clients’ preferred music. Individual preference and past associations with music affect cognition and perception (Wagner, 1994).

LeBlanc (1979) conducted a study on the effect of music style and music preference on 5th grade students. Behavioral observation was employed. Results indicated that easy-listening pop-music was the most preferred style for individuals from various socioeconomic statuses and ethnic backgrounds in classrooms in the St. Louis area. Further, LeBlanc (1981) conducted a study on elementary school students’ music listening preferences by measuring the effects of musical style, tempo, and performing medium. Musical style, tempo, and performing standard preferences were interpreted based on participants’ behavior across time. Results indicated a preference for popular styles. Additionally, researchers found that there was a strong interaction among the three categories connected to music preference.

LeBlanc and Cote (1983) conducted a study measuring the effects of tempo and performing medium on children’s music preference. The authors focused on 5th and 6th grade students’ preference for traditional Jazz music listening examples. This study was one of a series of studies to test and refine a theory of music preference (LeBlanc, 1979). Preference in the LeBlanc & Cote (1983) study was evaluated via observation of student behavior during the test and using free response data. The results indicated a significant interaction for music tempo and performing medium. The authors concluded that students showed a consistent preference for faster tempos and for performances in the instrumental medium.
Another study by LeBlanc and McCrary (1983) examined the effect of four levels of tempo on the music preference of 5th and 6th grade students using traditional jazz music examples. Results suggested that the faster tempo example was preferred over the slower example. Students rated excerpts higher as the tempo reached faster levels. The authors concluded that there was a strong correlation and positive relationship between the increase in tempo and greater preference scores.

LeBlanc, Sims, Siivola, and Obert (1996) conducted a study on music style preferences of different aged listeners. This study was a continuation in the LeBlanc series of preference studies. These authors focused on preference changes in different age groups included were; individuals from grade one through college, as well as adult groups who were not in college and seniors. Results indicated that individuals in grade one showed a high level of music style preference for art music, traditional jazz, and rock, which rose till grade five, then declined at grade six. From grade seven through the college years, individuals continuously rose in their preference of all genres, with rock consistently increasing. After reaching the expressed highest preference for art music during the first year of college, art music individuals soon showed a decline again in all styles. The authors noted that the adult population included senior citizens up to 91 years old, which may have affected the results.

There are many studies on children’s musical preference; generally these studies examine music preference by the categories of: (a) the physical characteristics of the music, (b) the cultural and learning environment of the listener, and (c) the personal characteristics of the listener (Montgomery, 1996). In the framework of music preference, Montgomery (1996) conducted a study examining the effect of tempo on music preference in elementary and middle school aged children. The Author stated which tempo was considered a physical characteristic of the music. Excerpts of orchestral music from early Romantic opera were used to identify the musical preference of children. The results indicated that children in grades three to eight preferred faster tempo music. Furthermore, tempo became a more important role for music preference as children moved into the 2nd to 3rd grade.

Droe (2008) conducted a study to investigate the effect of teacher approval and disproval on the music preferences of students in middle school band. The results indicated that students preferred music played during teacher approval. The results indicated that music preference was
affected by the learning environment in the classroom, which also increased student’s knowledge. During the students’ preferred music, on-task behavior also improved.

In 1992, Moskovitz conducted an interesting study on children’s music preference using repetition. Especially, this author examined the effect of repetition of slow and fast art music on tempo preference in 4th graders. Selected excerpts were given repeatedly to students and they were asked to rate their preference. Excerpts were selected from the Western European styles of baroque, classical, romantic, and atonal. The results indicated that the experimental group, which heard the music several times, rated the slower music higher. The author suggested that use of repetition may facilitate the appreciation of slow art music. The author also noted that students’ attitude and mood may have also influenced preference, and that the art music may have also influenced emotional levels.

More specific to children’s music preference, Karageorghis, Jones, and Low (2006) conducted a study on the relationship between music tempo preference and exercise heart rate. An initial survey was conducted to choose three favorite artists as the music preference of the participants for use during exercise. The results indicated that there was a significant two-way interaction between exercise intensity and music tempo. Higher intensity exercises at 75% maximum heart rate and fast tempo around 140 beats per minute were preferred. During moderate (up to 60% maximum heart rate) intensity exercise, the preferred music tempo was in the 120 to 140 beats per minute ranges. Karageorghis, Jones, and Stuart (2008) also conducted a study on effects of music tempi during exercise and found that medium tempi music was most preferred when walking at 70% of maximum heart rate.

**Music and Exercise**

Music has been used for rehabilitation and development of motor skills in those with disabilities. Staum (1983) conducted an exploratory study to investigate the application of rhythmic auditory stimuli as a structure to facilitate a productive rhythmic gait in patients with gait disorders. Twenty-five participants listened to music and rhythmic percussive sounds and were challenged to match their footsteps to the stimuli. The music was faded to promote internalization and independence in the patients’ motor patterns. The results indicated that all subjects demonstrated an increase in rhythmic and even walking, and consistency in walking speed. The author suggested that rhythmic walking can facilitate gait training for hemiparetic
stroke and spastic disorders patients, and for painful arthritic or scoliosis patients.

Caouette and Reid (1985) conducted a study on the effect of increasing workout levels for severely delayed adult individuals using a bicycle ergometer. Eighteen minutes of activity were given to six participants with auditory stimulation or visual stimulation. Four of six participants showed an increased workout with auditory stimuli. Because the sample was so small in this study, the authors could only speculate that auditory stimulation had an impact on severely delayed adults’ workout levels.

Holliday (1987) examined the effect of music therapy and physical therapy on habilitation of children with various physical disabilities in elementary school. Each participants’ individual objective was addressed during music and non-music conditions. Behaviors were observed for analysis. An ABAB design was conducted for comparison across time. The results indicated that each individual showed higher scores on their objectives during the music condition. The author concluded that music was effective to enhance individual objectives in children with physical disabilities.

Boldt (1996) conducted a study to evaluate the effect of music therapy on exercise endurance, motivation, psychological well-being, and physical comfort with bone marrow transplant patients. Music and non-music conditions and were used to assess the effectiveness of five different independent variables: (a) live and recorded music for participation, (b) relaxation and imagery, (c) progressive relaxation exercises, (d) range of motion exercises, (e) and aerobic exercise. Dependent variables included (a) an observational behavior scale (b) subject self report of relaxation, (c) comfort, (d) pain and nausea levels, (e) exercise endurance, and (f) an end-of-study effectiveness questionnaire. The results indicated that the music intervention increased subjects’ self-reported relaxation and comfort levels. Patients cooperated more and participated in various activities with better mood with music. However, the author did not find an increase in endurance in either condition; this was perhaps the result of the small sample size and short intervention time.

Since Staum’s innovative research in 1983, music to improve gait has been widely studied. Gouvier et al. (1985) examined to improve ambulation skills using behavior modification techniques like reward and desensitization procedures in people with physical disabilities. The treatment involved both contingent music for being quiet and a contingent aversive auditory reaction for yelling. The results indicated that patients showed considerable
behavior changes over the course of their treatment. Music had a great impact on the behavioral interventions.

Thaut, McIntosh, and Rice (1997) conducted a study on the effect of rhythmic auditory stimulation for hemiparetic stroke patient’s rehabilitation of gait training. The authors used rhythmic auditory stimulation to synchronize step patterns and steadily lead to a more frequent striding pace. Additionally, an auditory stimulus was used as a timekeeper for the patients’ gait training. Overall results indicated that the rhythmic auditory stimulation group increased in velocity and stride length. Furthermore, EMG amplitude variability of the gastrocnemius muscle was reduced. From these data, the authors concluded that the use of a rhythmic auditory stimulus is a valuable tool to enhance rehabilitative gait training for stroke patients.

Music, especially rhythmic cuing, has been suggested for use in gait training for neurological disorders such as Parkinson’s disease (Olmo & Cudeiro, 2005). The results indicated that patients increased their maximal speed with rhythmic auditory stimuli and the use of a faster cadence produced longer strides during gait trials. Additionally, a similar study conducted by McIntosh, Brown, Rice, and Thaut (1997) suggested that rhythmic auditory cues and stimulation could assist locomotive movements in patients with Parkinson’s disease.

Schauer and Mautriz (2003) conducted a study on the effect of rhythmic auditory stimuli for hemiparetic stroke patients’ gait training. This study used music to stimulate the patients as they walked with heel-strikes; this is called musical motor feedback (MMF). The results indicated that the experimental group who received rhythmic auditory stimuli showed more improvement in stride length, symmetry deviation (decrease), walking speed, and rollover path length. The authors concluded that MMF helped patients to memorize the song and timing, and that the music beats may have helped to improve their gait without the presence of an external pace making device like a treadmill.

Hurt, Rice, McIntosh, and Thaut (1998) examined the effect of rhythmic auditory stimulation (RAS) as a therapeutic stimulus on gait training for traumatically brain injured individuals. The results indicated that daily RAS treatment over the course of 5 weeks led to improvement in stride length and cadence. Those receiving RAS also accelerated 5% or more in walking step rate and demonstrated a higher step frequency. The authors concluded that RAS treatments were effective in cuing gait pattern in patients with traumatic brain injury who were not showing any progress with physical therapy goals.
Wong (2004) wrote a book called the *Clinical Guide to Music Therapy in Adult Physical Rehabilitation Settings* to guide music therapists working with clients with physical disabilities. This book focused on general topics applicable to adult patients in rehabilitation hospital settings. Information on certain disabilities like stroke and traumatic brain injury were discussed. Implementation strategies for the use of music and music therapy activities were introduced for physical and speech goals.

Music has also been used in facilitating athletic endeavors. There have been many studies examining how repetitive tempos and music can affect exercise performance and biological functions such as heart rate. Edworthy and Waring (2006) conducted a study on the effect of background music tempo and loudness during treadmill exercise. Five different conditions were presented: (a) fast/loud, (b) fast/quiet, (c) slow/loud, (d) slow/quiet, and (e) no music. The results indicated that there was an interaction between running speed and heart rate, also different music tempos and loudness. Furthermore, a comparison between music and non-music condition showed differences in the participants’ exercise performance and physical condition. The authors concluded that there is a relationship between music tempo, music volume and exercise. In particular, fast and loud music seemed to enhance physical activities.

Thaut (1985) explained that auditory rhythmic speech is a clinical technique that enables children to learn certain actions or movements by talking while moving. The author conducted a study to examine the effect of auditory rhythmic speech to aid sequential muscle control in order to help children with gross motor disabilities. Participants were taught to perform several different gross motor activities using music and non-music (visual modeling) intervention settings. A rhythmic stimulus using four constant percussive beats was applied with a metronome at the speed of 58 beats per minute. Results indicated that participants who used auditory rhythmic speech and auditory rhythms showed much higher motor accuracy than the control group.

Understanding the effects of sounds such as auditory rhythms on muscular activity is important for the use of music in therapeutic settings. Safranek, Koshland, and Raymond (1982) examined the relationship of rhythm and muscle activity during various motor tasks. The results of the study demonstrated that participants’ muscle activity was different during rhythm and non-rhythm conditions. Additionally, even-rhythm and uneven-rhythm patterns were examined and showed different results in terms of muscular activity levels. Furthermore, participants in the
music activity group showed faster changes in their biceps muscle activity than non-music group participants. These results indicated that changing the auditory rhythm can help participants learn new skills that produce longer durations of muscle activities in order to increase contraction and strengthen the surrounding joint muscle.

Hume and Crossman (1992) conducted a study using music as a reinforcer for increasing productive and nonproductive practice behaviors in six competitive swimmers’ dry-land portions of their practice. The results showed that there was an instantaneous increase in productive practice with the use of contingent music. Also, there was a large decrease in nonproductive practice behavior. Additionally, the participants highly recommended the musical reinforcement as a means to continue to have productive practice.

Beckett (1990) examined the effect of music stimuli on exercise. Three conditions were used to compare the physiological recovery of heart rates and traveled distance. The three conditions were: (a) 30 minutes of walking at an aerobic speed to no music, (b) 30 minutes of walking at an aerobic speed to continuous music, and (c) 30 minutes of walking at an aerobic speed to intermittent music. Participants were divided into experimental and control groups to determine the effect of the music and non-music conditions. The results indicated that the music group had a greater recovery in terms of heart rate and walked further. Furthermore, results showed music had an effect on aerobic exercise, and the intermittent music setting was slightly more effective than the continuous music.

Gfeller (1988) examined the influence of musical structure and style during motor activities like aerobic fitness on young adult participants’ perceptions and attitudes. Seventy college students enrolled in an aerobic dance class were interviewed about the effect of the music used in the class. Overall, the results indicated that 97% of the students believed that music made a difference in their dance class. Specifically, music style, tempo, rhythm, and extra musical association (inspiration thoughts and image) evoked by the music appeared to be most influential. Furthermore, study results suggested that music improved mental attitude toward the activity, and aided in pacing, strength, and endurance.

Gray (1997) conducted a study on the effect of music verses no music on college students’ responses to aerobic activities. Heart rate was taken three times; before, during and after the exercise in both music and non-music classes to compare exercise intensity levels. Additionally, participants were asked to self-report their intensity level and the dropout rate was
observed using behavior analysis. The results indicated that participants’ self-rated their workout higher during the music condition and that more on-task behavior was observed during the music condition (less drop-out rate). Furthermore, heart rates showed much more intensity during the music condition.

Greig (1996) examined the responses of college athletes to music during weight training. Individual preferred music was played during individual exercise, and each individual’s on-task behavior was calculated using behavior observation rating scores. The results indicated that participants were more on-task during strenuous exercise when listening to Jazz music, however group preference for music type indicated that fast songs were more preferred for exercise.

**Purpose**

This literature review suggests that music enhances exercise and participants’ performance levels. The purpose of this study was to investigate the effect of music exercise and a song-based educational program for enhancing children’s exercise levels and learning abilities to understand food, nutrition, and dietary information. The program protocol was carefully created to facilitate weight loss and change children’s eating habits through music. Specifically, this study attempted to ascertain the effects of music-structured exercise and educational songs on BMI-for-age percentile, waist circumference and participants’ nutritional knowledge. Behavioral observations of off-task behaviors were also recorded weekly.
Pilot Study

In the fall semester of the school year, a pilot study was conducted. Participants were recruited from a public elementary school located in a small rural community. Voluntary participation from 3rd and 4th grade children was requested and 63 responded. A total of 42 children returned consent forms from their parents (see Appendix C). These children were screened by weight and height, and scheduled for participation in an inclusive music exercise for weight loss program. Of the 42 participating, 71.4% were African American, 7.1% were Latino/Hispanic, and 21.4% were Caucasian, with the frequency of weight problems varying by gender. Of the 10 boys involved, 20% were overweight, 30% were obese and 50% were in the normal range for weight. For the 32 girls involved, 28% were overweight, 44% were obese and 28% were in the normal range for weight.

Early in the fall semester, a baseline was taken of children’s weight, height and waist circumference. A week later, the music exercise program began. Children attended music exercise class 3 times a week for 6 weeks. Music exercise activities were developed weekly, on-task participation was observed, weight and height measurement were collected weekly, and input was solicited from the children via questionnaires.

After 3 weeks, results indicated that children attended regularly, but off-task levels were high. Activities were adapted to raise interest levels and a token program was implemented for the remainder of the 6 weeks to increase compliance. Height and weight measures were found to be erratic due to the large number of children to be measured each week. So, measurement procedures were revised and clarified. Overall, results showed gains in knowledge and attitude about weight loss, but weight and height measures were inconclusive.

Over the winter holidays, a formal study was designed for implementation in the spring school semester. The specific purpose of this study was to determine if a 6-week music exercise and educational program would impact the BMI measures, nutritional awareness, and attitudes of children with weight problems.
CHAPTER 3
METHODS AND MATERIALS

Participants

Participants from the pilot study who had demonstrated acceptable behavior were recruited to voluntarily re-enroll in this study. A total of 30 children returned consent. This group of 3rd and 4th graders was inclusive of all weight types (overweight, obese, and normal range) at the request of the school. During the course of the study, one child moved into the underweight category and was dropped from further participation. Therefore, a total of 29 participants completed the study.

Participant demographics by race indicated that more than 75% were African American (see Table 1). More than 69% of the participants were overweight (≥ 85 percentile with BMI-for-age) or Obese (≥ 95 percentile with BMI-for-age) (see Table 2). In terms of gender differences, an average of 7% more boys were overweight (≥ 85 percentile with BMI-for-age) or Obese (≥ 95 percentile with BMI-for-age), but this is probably due to the small number of male in the study (see Figure 1). Demographic information was used to help determine musical preferences in order to provide the most therapeutic applications when working with the participants.

Table 1
Participant Demographics by Race

<table>
<thead>
<tr>
<th>Race</th>
<th>Participants</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>22</td>
<td>75.9</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>2</td>
<td>6.9</td>
</tr>
<tr>
<td>Caucasian</td>
<td>5</td>
<td>17.2</td>
</tr>
<tr>
<td>Asian</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>29</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
Table 2  
*Summary of Children’s BMI for Age*

<table>
<thead>
<tr>
<th></th>
<th>Boys</th>
<th>Girls</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Children Assessed</td>
<td>4</td>
<td>25</td>
<td>29</td>
</tr>
<tr>
<td>Under weight (&lt;5(^{th}) percentile)</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Normal BMI (5(^{th})-85(^{th}) percentile)</td>
<td>25%</td>
<td>32%</td>
<td>31%</td>
</tr>
<tr>
<td>Over weight (85(^{th})-95(^{th}) percentile) or Obese (≥ 95(^{th}) percentile)</td>
<td>75%</td>
<td>68%</td>
<td>69%</td>
</tr>
<tr>
<td>Obese (≥ 95(^{th}) percentile)</td>
<td>50%</td>
<td>44%</td>
<td>45%</td>
</tr>
</tbody>
</table>

*Figure 1:* Prevalence of Overweight and Obesity by Gender (N=29)
Design

This study utilized an ABA design with participants as their own control. The baseline condition (A) began in January for 1 week and was followed by (B) a music exercise intervention of 6 weeks duration. The final measurement of all dependent variables was made in week 8 of the spring semester after a 1-week return to baseline condition (A).

Dependent Variables

Four different dependent variables were analyzed in this study: (a) physiological measurements of height and weight for calculating BMI percentile, (b) waist circumference, (c) behavior analysis of off-task participation, and (d) an attitude measurement about school and a questionnaire on nutritional information and eating habits. Blood pressure (BP) and heart rate (HR) were also taken at the beginning, mid-point, and end of the 6-week treatment condition. However, these data were used only to maintain the safety of the participants.

The same trained person obtained the participants’ physiological measurements once per week. Each child was asked to take off his shoes and jacket during the measurements to help prevent inaccuracies in weight and height measurements. The measurement routine was as follows: weight one and two, height, and waist measurement.

Weight

Weight was measured using a Health-O-Meter Scale (Model BFM883DQ-1). The participants were weighed twice for agreement at each weigh-in. If, at any weigh-in, a child exhibited a difference of more than three pounds from the prior weigh-in, the participant was re-weighed until measurement was consistent.

Height

Height was obtained by using a steel measurement tool (Swanson 72 inch, AE144) marked in increments of 1/16 inch glued to a solid piece of wood with feet marks indicating the place to stand for measurement. The equipment was built by the investigator to reduce errors in height measurement. The investigator used a triangular speed square with a torpedo level
equalizer (Swanson Speedlite Level Square) placed on top of each child’s head to intersect with the measurement stick for an exact height reading.

Directions for height measurement were:
1. Place student on the feet marks on the flat board.
2. Make sure the student stands straight against the measurement ruler.
3. Place the built-in level triangle ruler on the top of the student’s head.
4. Make sure the torpedo level lies straight across the student’s head.
5. Read the measurement without making the ruler incline because of the student’s hair or hairpieces.

**Waist Circumference**

Directions for a waist measurement were as below:
1. With the right hand take the tape, on the side with more detail.
2. Make sure to have the measurement with the smallest numbers in your left hand.
3. Make sure each student has removed jacket or extra layers of clothing before measuring.
4. Put the tape around the student, falling at their navel (belly button).
5. Pull the tape snugly, and read the measurement where the metal end of the tape meets the opposite side.
6. Do not put your finger inside the two pieces of tape at any point.

Reliability on all measures was checked with two different people measuring 10 different participants for comparison until agreement of 98.96% was reached (see Appendix D).

**Behavioral Observation**

The children’s non-participatory off-task behaviors were measured weekly using behavior observation (see Appendix E). One trained, live observer viewed the sessions each week. The observer was trained to observe off-task behaviors in 15-second observe intervals followed by 5-second record intervals throughout the session.
Definitions of on-task and off-task behaviors:

*On-task behavior, which was not recorded,* was defined as demonstration of *any* of the following behaviors:

- Active listening (looking at person directing exercise)
- Following directions for specific activity (participating specific movements during exercise)
- Actively participating in activity (moving correctly in exercise)
- Demonstrating impulse control
- Demonstrating appropriate nonverbal communication for the given situation (makes eye contact, uses appropriate personal space for situation, uses appropriate facial expressions/gestures, uses appropriate tone of voice)

*Off-task behavior* (recorded) was defined as demonstration of *any* of the following:

- Ignoring or talking over others
- Deliberately breaking rules or not following directions
- Refusing to participate in activity
- Lack of impulse control
- Misusing or misreading elements of nonverbal communication

Participants engaging in one or more the off-task behaviors were counted and recorded at each interval. The mean percentage of off-task behavior was calculated for each session. In the first week, reliability was established with two independent observers whose observations were compared. Agreements were divided by agreement plus disagreement according to the Madsen & Madsen (2000) protocol; reliability averaged 81%.

**Attitudes**

The participants’ attitudes were assessed using questionnaires created by the investigator (see Appendix F). Due to low reading levels and pressures of timing, a simple questionnaire was given after each session that measured the children’s attitudes about school and the music exercise program with questions about eating habits. The questionnaire about nutritional information was given pre and post intervention.
Additional Measures

Blood pressure and heart rate were measured using an Omron Advanced Blood Pressure Monitor (Model HEM-711AC). Each child was asked to come to a desk located in the corner of the classroom to take blood pressure (BP) and heart rate (HR) measurements. Two different cuffs (child size and adult size) were used to accommodate different arm sizes. Usually children with a normal BMI percentile had smaller arm diameters and children who were overweight or obese needed adult sized cuffs. The correct cuff size was important for accurate blood pressure and heart rate measurement. While the cuff was being set up correctly on each child’s arm, the investigator explained the procedure; i.e., air will blow through the cuff and tighten around the arm until it gets really tight. Then, in a few seconds, the cuff will reduce pressure as soon as the numbers are revealed on the monitor. After the brief explanation the investigator pressed the start button to begin measuring. The same trained person measured HR and BP at the beginning, mid-point, and end of the 6-week exercise period. These measures were not dependent variables but were assessed for safety in order to screen for any adverse reactions to the exercise.

Music Exercise and Healthy Kids Curriculum

The weight loss program was named “Music Exercise & Healthy Kids.” The participants created this name during the course of the study. This program was culturally and developmentally relevant for children with weight issues. It was also designed to address self-esteem and self-satisfaction issues children with weight problems experience. The program was created to overcome these issues and help participants understand the value of healthy bodies and minds through exercise and healthy eating habits. The main objective for this program was to provide and promote healthy exercise without forcing an aversive workout on students. Cognitive-behavioral strategies were used to teach the participants to think and make better choices, as well as to modify their behavior through activities that served to structure and/or reinforce learning new information.

A token-economy system (Madsen & Madsen, 2000) was used to structure participants’ attention behaviors; this system used positive feedback and positive reinforcement (small prize such as stickers, large educational materials such as football, books, and water bottles etc.) combined with successful experiences. Additionally, as suggested by Madsen and Madsen
(2000) the program used self-selected “pleasurable activities,” as they usually brought a large amount of reinforcement through the activities themselves.

Music Activities

The intervention was created to last approximately 45 minutes to conform to class schedules. The program was divided into two sections, physical exercise and learning dietary/healthy eating information. The first component of physical exercise was designed to include 20 minutes of continuous physical activities. This 20-minute segment of music was carefully programmed by the investigator to provide a maximum physical workout that included cardio and muscle building (see Table 3).

The music activities (playing drums, instruments and singing) combined with exercise (walking, running, jumping, and skipping, push-ups, and sit-up etc.) matched the children’s developmental levels. The research program was designed to supplement the students’ enrichment class schedule (i.e., function like physical education (P.E), media, and music), and participants attended the class in lieu of P.E class. The investigator used highly structured techniques to reduce confusion and eliminate talking at the onset of the intervention. Music was played as participants entered, and the participants were encouraged to walk or run as soon as they entered the classroom. Immediately after all participants had entered the classroom, the next music selection was played to enhance stretching, a very important element for starting physical activity. Slower music was planned for this section with consideration for the demographics of race and gender.

The music activities were structured into levels, moving from warm-up, to strenuous activity, to cool down. Music for the exercise activities was programmed by the investigator on a Yamaha E-413 to enhance metabolism by increasing tempo and repetition of movement across time up to a maximum tempo of 180 beats per minute (see Appendix G). Drums were used to help participants focus their attention for the activity. A variety of ways to play the drum using large motion exercise movements were included. With drums as a base station, participants placed their legs in a squat position to play the drum; this position gave them good quality exercise for their thighs. Remo, Inc provided all the instruments (see Appendix H).

Following the modeling of the various drum exercises, the investigator used popular/participant preferred recorded music. For instance, pop, rap, R&B, and contemporary
music with dance rhythms were very popular among the participants. R&B was culturally accepted among the African American population and dance movements were created to nourish the students’ interests in moving to the beat. In addition, commercial exercise music like “Power Music” (Biggest Loser Workout Mix- Sports Stadium Power Music Workout, 2009), and “My Fitness Music” (Best of the 90’s, Vol. 2: Non-stop Continuous Music, 2009) were introduced for motivational purposes. Current popular music from the radio was also used to enhance children’s aerobic exercise and for burning calories.

In addition to preferred music choices, new selections were added from other cultures. Salsa dancing was introduced as a vigorous, but simple dance to learn. Salsa dancing used repetitious movement with the legs. Turning with the rhythm assisted the participants in maintaining focus on both the music and movements (see Appendix I). Additionally, Asian music was introduced to incorporate Eastern culture. Karate movements and meditation were added for muscle building and relaxation in the cool down phase.

**Educational Program**

Immediately after the physical exercise, learning activities were introduced through song. The learning activities were intended to increase the children’s information about nutrition and dietary issues. The investigator composed songs for teaching the participants about healthy food choices and better eating habits (see Appendix K) for copies of the songs. The information about food was selected from the MyPyramid (see Appendix L) for Kids (MyPyramid.gov, 2009). All of the types of food information were coded by color and category and included in the lyrics. Familiar children’s tunes like “You Are My Sunshine” and “If You’re Happy and You Know It” were used to facilitate success when singing. Egg shakers and hand drums were used to create accompaniment during singing. Rap styles were used for some songs since this population favored them. The investigator prerecorded the songs to provide familiarity. The investigator created the “Music Exercise & Healthy Kids” song book to promote repetition singing and repetition singing gave more awareness of better eating habits.
Procedure

The investigator went to the school three times a week to conduct the music therapy intervention program using the designed curriculum. This study was based on the minimum length of physical exercise shown to affect physical appearances. Due to school activities and holidays, the investigator could provide only 17 interventions across 6 weeks.

Once the investigator entered the school, she signed in at the front office and prepared for the activities in the P.E room. There were two separate classes given, following the school’s class schedule; 4th grade in the morning and 3rd grade in afternoon. The 4th graders from four separate classes came in led by their teacher to the P.E room located in a separate section of the school. The participants were monitored for their safety by the classroom teachers or school aides at all times. The investigator had five music therapy students assisting the study, including observers and measurement personnel. The second class of 3rd graders occurred in the afternoon. Since these participants were at recess, the investigator went to meet them for their activities and brought them into the P.E room.

As soon as the participants entered the classroom, they were asked to take off their jackets and shoes for measurement purposes. As the children entered, music played and the participants were encouraged to walk around the drums. The measurement personnel called participants one by one for their physical measurements in the order in which their names were listed on the attendance sheet.

Once the participants entered the classroom, continuous programmed music and activities occurred in the following order: (a) warm-up with walking (Approximately 5 minutes), (b) stretching individual muscles from head to toe using elementary school physical education guidelines (Maione, 1989; Fredette, 2001) (3 to 4 minutes), (c) drumming activity in a squat position, (d) kicking above and running around the drum while keeping the beat (7 minutes), and (e) vigorous exercise such as Tae-bo®, weight, and sit-up and push-up (7 minutes), and (f) relaxation (2 minutes).

The activity used elements of the Tae-bo® workout created by Billi Blanks (2010). This is a combination of exercise, kickboxing and martial arts that originally came from Korea. Gradually, Tae-bo® was combined with using one to two pound weights. Additionally, participants were asked to do the sit-ups and push-ups lying down on the floor facing the drum
(20 sets twice). The final activities gradually slowed down for the cool down period. Participants lay on the floor and closed their eyes, and relaxation techniques were used. After cool down, the attitude and eating habit questionnaire was given. The investigator read the questions aloud in order to help participants maintain their focus. Each participant filled out a form in response to the questions.

Immediately after this questionnaire, educational singing activities were implemented for the purpose of learning nutrition, dietary, and healthy eating habits information. All songs were composed and initially performed live by the investigator and assistants. The children preferred pre-recorded music using rap rhythms, so songs were recorded for subsequent use. Participants learned one to two songs each week. As soon as they learned the tune, the investigator encouraged them to sing in front of their classmates for strengthening self-esteem. Table 3 shows a detailed outline for the lesson.

Finally, at the end of all the activities, participants with positive behaviors were chosen to become assistants (passing out the pencil and papers to classmates, collecting the papers and pencils etc.), and also were praised as a “winner of the day” at the end of the class period. After the music exercise activities, the 4th graders were escorted by each classroom teacher to lunch. The 3rd grade participants went to either the school bus or parent pickup as soon as their intervention ended. Table 4 shows the semester long schedule the researcher used for measurement of dependent variables and exercise sessions.
### Table 3

**Music Exercise and Education Activity Sequence (Sample)**

<table>
<thead>
<tr>
<th>Objective</th>
<th>Material</th>
<th>Music</th>
<th>Desired Behavior</th>
<th>Time</th>
</tr>
</thead>
</table>
| 1 Establish rapport with the group/Iso-principal | Drums in Circle Formation | Up tempo/ R&B songs (Children’s preferred music selection) | 1. Run or walk = Iso-Principal  
Everyone will walk or run around the drum to burn some energy first. | 5 min |
| 2 Stretch                          | Drums in Circle formation | Day 1:  
1. I Gotta Feeling-Black Eyed Peas  
2. Jamaican Garageband mix  
3. Remember The Time-Michael Jackson  
4. Pump It-Black Eyed Peas  
5. Jump- Flo Ride ft. Nelly Furtado  
6. Love Garageband mix  
Created by investigator | 2. Exercise –  
• Stretch  
• Drumming  
• Weight training  
• Sit ups and push ups  
• Tae Bo type of endurance and muscle building  
• Running  
3. Lie down on the floor without talking. Close eyes and relax. | 3 min |
| 3 Gradually moving faster          | Drums in Circle formation | 7 min | 7 min |
| 4 Faster                           | Drums and small instruments | Cool Down  
Lie down on the floor and relax | Total time: 17. 9 Minutes | 2 min |
| 5 Questionnaire                    | Guitar and drums          | Food and eating habits song (composed by therapist) | Participants will learn a song as they learn the new material | 1 min |
| 6 Learn a new song about food      | iPod/ sound system         | Songs we have already learned                   | Sing with Karaoke about Food and eating habits | 8 min |
| 7 Sing along                       | Guitar and drums          | Quiet music/ help participants to look back at their behavior | Student will quietly sit down and listen | 5 min |
| 8 Behavior talk                    | Guitar and drums          | Good bye                                        | As teachers come to the class, participants go to lunch | 2 min |

Total Lesson time: 45 minutes
## Table 4

**Schedule for Interventions**

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Dates</th>
<th>Monday</th>
<th>Wednesday</th>
<th>Friday</th>
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<tbody>
<tr>
<td>1</td>
<td>2010</td>
<td>Only measurement</td>
<td>Only measurement</td>
<td>Only measurement</td>
</tr>
<tr>
<td></td>
<td>1/6/</td>
<td>• Weight/Height</td>
<td>• Weight/Height</td>
<td>• Blood Pressure/HR</td>
</tr>
<tr>
<td></td>
<td>1/8</td>
<td>• Waist</td>
<td>• Waist</td>
<td>If we see hypotension, talk to the school nurse</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Questionnaire (All- 1/2/3)</td>
<td>• Questionnaire 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Behavior observation</td>
<td>• Behavior observation</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1/11</td>
<td>Only measurement</td>
<td>Start intervention 1</td>
<td>Intervention 2</td>
</tr>
<tr>
<td></td>
<td>1/13</td>
<td></td>
<td>Measurement</td>
<td>Measurement</td>
</tr>
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<td></td>
<td>1/15</td>
<td></td>
<td>• Weight/Height</td>
<td>• Blood Pressure/HR</td>
</tr>
<tr>
<td></td>
<td></td>
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CHAPTER 4
RESULTS

Twenty nine children consistently participated in this research study. An ABA design was used and the data were subjected to graphic analysis.

**Weight**

The average BMI-for-age for each child was calculated using the CDC-BMI Calculator for Child and Teens (2009g) and then converted to BMI percentile. Unlike adults, children are still growing, therefore BMI percentile is the standard assessment of weight since it is specific to age, gender, and average growth. The mean BMI-for-age percentile was graphed by week; these figures are shown in Figure 2. A healthy weight and height BMI occurs between the 5\(^{th}\) and 85\(^{th}\) percentiles. Overweight children fall between the 85\(^{th}\) and 95\(^{th}\) percentile. Obese children are equal to or greater than the 95\(^{th}\) percentile. As seen in Figure 2, study results indicated a systematic decrease during the music intervention until the last week. The last week of music intervention (3/1/10), six participants were absent due to their academic needs and these data points reflect the smaller n used to compute the mean. Additionally, the last two weeks of the intervention were only scheduled twice a week due to the other school related events such as national and school holidays (see Table 4). The results suggest that sessions 3 times a week were more effective in relation to weight and health issues and therefore should be an essential consideration for future development of school curricula.

![Mean BMI Percentile Changes Across Time](image)

*Figure 2: Mean BMI Percentile Changes Across Time (N=29)*
The mean data for BMI-for-age percentile by category (see Figure 3) indicated that obese children’s BMI percentile decreased 0.3 percentile from baseline to treatment; the overweight group showed a decrease of 1.8 percentile, and the normal range showed a decrease of 3.6 percentile. These results suggest that the music exercise and learning about healthy eating intervention positively impacted weight for those children who were considered to be in the normal or overweight range.

![Mean BMI Percentile by Category](image)

*Figure 3: Mean BMI Percentile by Category Across Time (N=29)*

The standard deviation (SD) for baseline and treatment data are shown in Table 5. Results indicated that the treatment data showed a wider spread from the mean on BMI percentile than did the baseline measure.

<table>
<thead>
<tr>
<th>Date</th>
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<th>Treatment</th>
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<tr>
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Table 5

*Standard Deviation (SD) Results for Children’s BMI Percentile for Baseline and Treatment (N=29)*

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<tr>
<th>Standard Deviation (SD)</th>
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<td>0.71</td>
<td>1.36</td>
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</table>
These BMI percentile reductions are considered moderately successful for short-term results. The CDC charts for growth (see Appendix N) for females aged 9 to 11 show a 6-week mean BMI percentile increase of 0.07 percentile.

**Waist Circumference**

The mean group waist circumference was calculated and graphed by week. Figure 4 shows that the mean waist circumference slightly decreased during the music intervention until the final week, which showed an increase due to the absence of 6 participants.

![Mean Waist Circumference](image)

*Figure 4: Mean Waist Circumference*

The results of the waist circumference by category show that the children’s waist circumferences in the obese (+0.47 inches) groups increased; however, the normal (-0.64 inches) and overweight (-0.12 inches) groups’ means between baseline and treatment slightly decreased. Interestingly, all three categories of the BMI percentile showed a decrease in waist circumferences one-week post intervention (see Figure 5).
Behavior Analysis

An analysis of off-task behavior indicated that participants were less off-task during the music intervention (see Figure 6). The adaptations to the music curriculum implemented after the pilot study seemed to have functioned to increase on-task behavior. The investigator created a system for the children to take control and earn prizes by displaying positive behaviors. This system was based on the Madsen & Madsen (1983) Token-Economy System, and implementation of this system resulted in better behavior. This could have facilitated students’ concentration on their objectives and even made it more fun to participate in the activities appropriately. However, results indicated that students showed increased off-task behavior before week five and eight; this was perhaps due to the fact that a state-issued standardized exam was conducted during that week. It is apparent that participants showed more distress about school during this time.

Figure 5: Mean Waist Circumference by Category
Students’ Attitudes

Participants were asked questions related to their attitudes toward school and eating habits at the end of each exercise session. Nutrition information was assessed pre and post intervention. Results from these questions were scored separately according to a researcher-created rating system designed specifically for each category (see Appendix F) provides a breakdown of the rating systems used for all three categories.

The participants were asked, “How are you doing at school?” at the end of each week’s session. The participants rated themselves using a Likert-type scale from 1 (Great) to 5 (Awful) (see Appendix F). Figure 7 shows that the participants’ mean attitude toward their work at school was rated consistently between 1 and 2, with overall results showing a slight increase in participants’ perceptions about school performance. Results also showed that the children’s ratings were higher before the school related standardized tests conducted by the state.
Figure 7: Mean Attitude about School

In addition to attitudes about school, the participants were asked to rate how they felt about the music weight loss intervention using a Likert-type scale from 1 (Great) to 5 (Awful) (see Appendix F). Figure 8 shows results are similar to participants’ perception on how they were doing in school. Both graphs show participants’ distress increased when the standardized tests were given and this also affected attitudes about the music intervention.

Figure 8: Mean Attitude about the intervention
The participants’ attitude toward eating habits was collected after each session and was scored using the researcher-created rating system. For each correct, healthy answer, the participants received 1-point. Three points indicated “good / healthy eating habits” and six points indicated “not good / not so healthy eating habits” (see Appendix F).

The mean score was between four and five, with a slight decrease shown across the intervention (see Figure 9). The investigator suspects that the participants may have had few opportunities to choose healthier foods in their daily life. Therefore, they may have had difficulty answering the questions given their actual lifestyles.

![Mean Score for Eating Habits](image)

*Figure 9: Mean Score for Eating Habits*

A questionnaire regarding nutritional information was given pre and post intervention and also scored according to a researcher-created rating system. This system can be found in Appendix F along with the attitude rating system. The maximum possible score that participants could receive was nine. One point was added for each correct answer given. The mean score was between five and six, and the mean score increased from pre to posttest (see Figure 10). The children had some prior knowledge of the information because of the pilot study, and this may indicate why the pre-test score was relatively high.
Results of Blood Pressure and Heart Rate:

Blood Pressure (BP):

Blood pressure and heart rate were measured for the safety of the participants at the beginning, middle and end of the program. According to the U.S Department of Health & Human Services (2010), the normal range for systolic blood pressure (mmHg) for children aged 9 to 11 years is 96 to 131 and normal diastolic blood pressure range (mmHg) is 58 to 89, based on height. A few individuals from the obese group had higher than normal systolic blood pressure, and the investigator consulted with the school nurse to determine the appropriateness of their participation. The nurse suggested close monitoring for those participants who displayed high systolic blood pressure during the intervention. Diastolic blood pressure was in the normal range. All middle measurements took place during moderate exercise.
Heart Rate (HR):

According to the Cleveland Clinic (2010), normal heart rate at rest for children ages 6 to 15 should be between 70 to 100 beat per minutes. Also, predicting the maximum heart rate during exercise can be calculated by using this formula: 220-Age=Predicted maximum heart rate. For example, children who are 10-years-old would have a maximum heart rate of 210; this would be calculated 220-10=210 beats per minutes. Predicting the maximum heart rate for age 9 to 11 would be around 210 beats per minutes. The result of the heart rate measurements taken during the moderate activity phase of the session indicated that participants’ heart rates remained within normal limits, even during the exercise.
The purpose of this study was to investigate the effect of a music-based intervention program created for children with weight issues. The program was designed to facilitate physical changes in obese and overweight children and educate participants about healthy eating habits through the use of music and music therapy strategies. Music can enhance participation and produce positive effects physiologically, psychologically, socially and behaviorally. The results of this study indicate moderately successful positive body and mind changes as evidenced by both physiological measurements and attitude evaluations.

One important outcome from this study was the discovery that difficulties with behavior issues impacted the participants’ ability to increase their exercise level. Before the weight issues could be addressed, behavior issues had to be resolved. The investigator implemented a behavior modification system that was intended to help children take control of their actions. This was accomplished through a token-economy system in which the participants earned small prizes (interesting items like footballs or baseballs, playing cards, picture frames, and water bottles, etc.) for positive behavior during the intervention. The prizes were given to the participants for the following behaviors: (a) listening to the instructors’ directions, (b) following directions, (c) participating positively, and (d) respecting each other, etc. The participants themselves had to monitor their own behavior as they earned respect from others. The participants showed positive interactions such as helping peers and cooperating with therapists and peers as the intervention progressed across time. At the end of this program, the participants became more on-task without the use of tokens, due to the satisfaction of accomplishing their goals through the music therapy intervention. The participants’ increased on-task behaviors resulted in smoother activities.

From a behavioral and psychological point of view, the participants seemed to crave adult attention and it appeared that the children demonstrated negative behaviors to gain attention. The program implemented in this study taught the children to be positive and to be on-task in order to receive positive attention from adults. After learning positive manners, the participants actually started to enjoy respecting each other during the intervention. An example of the behavior changes seen during the intervention can be found in an interesting situation that happened during the intervention. Several children who still had behavior problems acted inappropriately...
one day; earlier in the intervention, the other children would simply have ignored the situation or acted out as well. However, because of the changes in the group dynamics and the increased support system among the students, appropriate participants modeled positive behavior to encourage the off-task children to participate.

From a physiological point of view, changes in BMI percentile indicated that normal weight children lost weight much faster than overweight and obese children who participated in the same amount of exercise. Clinically, children have to grow; thus normal weight children do not need this type of extended therapy for weight loss. However, some children within the normal range who attended the intervention needed behavior modification in school. Therefore, while normal weight range children may not need this type of program for weight loss, the behavior modification aspects of the program may be helpful for those students who are struggling to succeed in school because of their behaviors in the classroom. It seems that all the students benefitted from music therapy.

Results from this study suggest that this program was successful in terms of reducing BMI percentile for all three categories of participants. This can be seen as an indication of weight loss. For obese children, burning excess fat may take more time. Also, obese children’s metabolic changes occur differently from children in the overweight and normal weight ranges, therefore it may take longer for noticeable changes to occur. The obese children wanted to move with faster tempos, but it took longer for them to respond. These observations suggest that obese children may need more attention paid to their psychological and physiological needs earlier in the intervention in order to promote changes in their metabolism. However in addition to the weight issues, all of the participants seemed happier as the intervention difficulty progressed. The investigator concluded that as the participants progressed physically, the music and activities needed to change to match their physiological stage in order to increase the rate of burning body fat.

Results from the physiological measurements further suggest that the music intervention resulted in a slight decrease for participants’ waist circumferences in the overweight and normal weight ranges. This may suggest that decreasing waist circumference is a positive outcome for children in addition to losing weight. A new study in diabetic care conducted by Gauter et al. (2010) found increases in waist circumference and weight may predict the occurrence of
diabetes. The authors suggested that both waist circumference and weight had a strong relationship to diabetes and the obesity related problem of adults.

The music therapist used participants’ preferred music as a reinforcer for their physical activities. Over the course of the intervention, participants learned to keep steady beats first to maintain togetherness as a team, and then for advanced musical experiences. More complex rhythms were introduced to challenge the participants and to provide opportunities to express more complex choices with beats. Since the intervention was based on preferred music selections, the music itself became meaningful for the participants, and provided them an opportunity to progress in the exercise and dietary education. Music was used differently throughout the intervention; hands on activities like drumming and singing were used, as well as music to reinforce physical and learning activities.

The verbal interviews indicated that participants felt really tired after the first two weeks of exercise; however they stated that it got easier over time. On the other hand, some participants expressed boredom because of the repetition. Changing the music tempo and increasing the use of participant preferred music seemed to resolve this problem. Incorporating the Tubano (floor drum) allowed participants to identify a specific station and space for doing the exercises and seemed to increase focus of attention. Also, it appeared that many of the participants had difficulty stretching certain parts of the body during stretching activities. The investigator observed that some uncomfortable emotions were exhibited primarily by the obese and overweight children, perhaps because they were asked to use normally unused body parts such as stretching the arm, legs, back, and sides. However, the uncomfortable sensations seemed to disappear when moving with the music.

The singing activity that taught dietary information, better food choices and eating habits was also a favorite activity for the children. Singing a song helped the children to remember and store valuable information. Singing repeatedly aided memorization and provided opportunities for the children to perform for each other. At first, the participants did not desire to perform in front of their peers, especially the boys and shy children in the group. However, as the intervention progressed, all the participants became more comfortable sharing their information confidently. Many activities were designed to teach transfer skills (such as one situation relates to another situation); for example, the children were asked to transfer dietary information sung during the intervention to their daily lives.
Implications for Practice and Suggestions for Future Research

Each child is unique and different; therefore ideally, a program should be created to match each child’s body composition. Current statistic indicated on children’s growth such as weight issues, there will be many children who need to participate in this type of special program to maintain their current health and their future well-being. Children spend the majority of their time in school. Music therapy could be offered for children with weight and behavior issues as part of the school curriculum.

Results may have been impacted by the inclusion of children in normal weight range as requested by the school. The children who participated displayed a wide range of BMI percentiles. However, it was impossible to choose specific participants in the public school setting used in this study, even though the results suggested that participants may need to be selected based on the same BMI percentile for consistency in evaluating the effect of intervention. The issue of participation may be important in future studies.

Further implementation of this program in the school setting should be discussed. Research on the long term effects of this program is needed with consideration for individual approaches as well as group intervention. It would be more effective to work individually, especially for obese children who need special considerations. Also, it may be important to consider having special programs during long term holidays for maintaining weight.

The intervention only continued for eight weeks, two of which were pre and post measurements. The results indicated that BMI percentile slightly decreased and the music intervention had a positive effect on the children’s outcomes both physiologically and psychologically. Overall, the participant-therapist ratio was 20 to 4 for fourth graders and nine to three for third graders; however, this may not be realistic in the school setting. Volunteers collaborating with classroom teachers could improve the participant-adult ratio, while also providing teachers with an opportunity to exercise during school and thereby reducing stress in the daily work routine.

Another considerations need to be addressed in this program. The room size was also an important factor in this study. With this present study, the maximum number of participants was 20 (fourth graders), with a room size of approximately 650 square feet (38’ x 17’ ft.). The space worked well for this group; it accommodated the participants, the equipment and the research staff. However, if the room is too large, the participants may be distracted by other factors in the
space itself. If room is too small, then participants may not have enough space to accommodate the physical exercise needed to burn calories.

In addition to the room size, it is also important to consider the use of appropriate music equipment like a public address (PA) system (also known as electronic amplification system). The PA system used in this study contained a mixer, amplifier and loud speakers to reinforce sound. This allowed the researcher to provide music at the appropriate intensity level, which enhanced physical and singing activities. In addition to future consideration of sound equipment, quality sound instruments should also be considered. Drums and small instruments provided by Remo, Inc gave rich, warm sounds for the children to experience as well as provided durability. Both the quality of sound and durability of the musical equipment should be an essential consideration in future research.

The investigator concluded that participants’ ages and grade levels may not have matched their actual educational levels in the current study. In future research, information on participant verbal abilities and literacy skills are needed for creating a proper questionnaire and should be screened before research begins. Furthermore, the time frame for the intervention may have been appropriate for certain participants, but too short for others to follow the activities. Therefore, time should also be considered when planning future research.

Additionally, there are several other factors that may have influenced the results of the present study. The small sample size, participants’ low verbal abilities, poor literacy skills, and the short time frame for the intervention may have negatively contributed to the findings. These factors necessitated the use of graphic analysis to determine the effect of music exercise and music learning activities on weight loss and learning dietary information. For further study, a larger sample size and use of a control group for comparison should be incorporated and statistical analyses conducted.

Since the prevalence of obesity in American society is rising and childhood weight problems are a serious matter, this study focused on a weight loss program in the school setting. Elementary school children usually have limited control over food choices. Perhaps, as suggested by the results of this study, the children’s eating habits were impacted by factors outside of the study’s control. Therefore, while it is important to change children’s eating habits and activity levels, we may also need to educate the family. Collaborating with other professionals such as the school principal, classroom teachers, and school nurse may be important in implementing
programs. It is also important to collaborate with specialists such as dietitians, physiologists, psychologists, and family doctors to create the best programs for children’s weight loss.

New research in *Nature Neuroscience* 2010 looked at a link between obesity and the addiction mechanism. According to Johnson and Kenny (2010), obese rats had similar deficits in neural reward responses to those detected in human drug (cocaine or heroin) users. Specifically, obese rats exhibited lowered striatal dopamine D2 receptors (D2Rs). This created an addiction-like reward deficit. If obesity is related to addiction-like reward deficits, then using behavior modification techniques in music therapy may assist with obesity problems.

Further research in this area could explore additional uses of music. For instance, song lyrics could cue food choices, structure time for chewing each bite (15 to 20 seconds) or reinforce healthy eating behaviors. Other dependent variables could also be considered: journaling to record eating habits, contacting students periodically to ask what they are eating, or assessing knowledge about food intake and calorie content.

Based on the outcomes from this study, it appeared that children from lower socio-economic levels had fewer opportunities to change their food choices. If that is the case, parent training would be indicated to assist parents in selecting and preparing economical, healthy meals and to teach them to offer their children healthier choices. Obviously, more research is warranted in the use of music therapy, exercise, and healthy diet choices.
APPENDIX A
HUMAN SUBJECTS COMMITTEE APPROVAL LETTER

Office of the Vice President For Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8673 · FAX (850) 644-4392

APPROVAL MEMORANDUM (for change in research protocol)

Date: 7/30/2009

To: Satoko Mori-Inoue [sm07e@fsu.edu]

Address: 152 Bliss Dr. #4 Tallahassee, Fl 32310
Dept.: MUSIC SCHOOL

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research (Approval for Change in Protocol)
Project entitled: Music Exercises for Children’s Weight Loss

The form that you submitted to this office in regard to the requested change/amendment to your research protocol for the above-referenced project has been reviewed and approved.

Please be reminded that if the project has not been completed by 5/12/2010, you must request renewed approval for continuation of the project.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is IRB00000446.

Cc: Jayne Standley, Advisor [JStandley@music.fsu.edu]
HSC No. 2009.3075
APPENDIX B
JEFFERSON ELEMENTARY SCHOOL PERMISSION LETTER

February 8, 2010

Ms. Satoko Mori-Inoue
Doctoral candidate in Music Therapy
College of Music
Florida State University

Dear Ms. Mori-Inoue:

This letter is to give our support and permission for you to conduct the research study, “Music Exercises for Children’s Weight Loss” at the Jefferson Elementary School. As we discussed earlier in your research process, our school will be most interested in the outcomes provided by this study.

Should you need any further assistance with your research, please do not hesitate to contact me.

Sincerely

Melvin Roberts
Principal

"Every Child, Every Day, Whatever It Takes To Achieve Success"
APPENDIX C
CONSENT FORMS

Parental Consent

Dear Parents:

Background Information: I am a graduate student under the direction of Dr. Jayne Standley in the College of Music at Florida State University. The purpose of this study is to investigate whether or not children respond positively to musical activities especially designed for children with weight problems. Surveys gathered from 1999 to 2006 by the Federal Centers for Disease Control and Prevention and published in The Journal of the American Medical Association showed that 12% of American school children were overweight or obese. This represents an entire generation that will be growing up with weight related problems as they reach adulthood. Research has shown the benefits of exercise in burning calories and reducing body fat, reducing appetite, and keeping weight under control. With your permission, I would like to introduce music activities (playing drums, instruments and singing) combined with exercise (walking, running, jumping, and skipping etc.) matched to the child’s developmental level. I would like to document the children’s responses, and changes in the children’s physical well-being and attitudes about exercise.

Procedures: For this study, the children will attend music activities 3 times a week, continuing for 8 weeks during an after-school program. Each session will run for 45 minutes. Sessions will have a maximum of 10 students between 6-12 olds of age. All the instruments will be provided for participants. Music activities will be a combination of music performance and physical activities to enhance the metabolism by facilitating movement. Also, activities will be blended with social and counseling information on self-control eating and nutrition. In addition, children will learn a stress reduction technique using music as an alternative to eating. The investigator will introduce all the activities of the sessions. We will measure height, weight, blood pressure, heart rate, and attitudes. Data will also be collected on participants’ experiences; the investigator will engage in informal interviews, ask them to write about their experience and answer specific questions about their experience. Parents who sign a consent form will be welcome to observe during the program. Children who do not participate in the study will attend other activities planned by teacher.

Voluntary Nature of the study: Your child’s participation is voluntary. If you decide not to allow your child to participate or choose to withdraw from the study at any time, there will be no penalty. Non-participating children will be doing other activities and will be unaffected. Parents and guardian who sign this consent form are always welcome anytime during the program.

Compensation: No compensation will be provided for participation.

Risks and Benefits: There are Minimal Risks involved for your child’s participation in this study. All the activities will be carefully monitored and will not be presented at levels harmful to your child’s health. “Minimal Risk” means that the risks of harm anticipated in the proposed research are not greater considering probability and magnitude, than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests. Information gathered in this study may lead to future support for additional research and may impact future educational practices in the field of music therapy and childhood education.

Confidentiality: The results of the research study may be published, but no individual names will be used. Children are not subjects of this study, but are participants, and will not need to give individual information. All the data will be kept in a locked file cabinet at the investigator’s home. Your child’s information will remain confidential to the extent allowed by law.

Contacts and Questions: If you have any questions concerning this research study or your child’s participation in the study, please contact Satoko Mori-Inoue at 728-5478 or via email at sm07a@fsu.edu. You may also contact Professor Standley at JStandley@music.fsu.edu or 850-644-4564. Written correspondence can be addressed to 133 N. Copeland Ave, 042 EMI, College of Music, Tallahassee, FL 32306-1180. If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), you are encouraged to contact the FSU IRB at 2010 Levy St, Research Building B, Suite 276, Tallahassee, FL 32306-2742, or 850-644-8633, or by email at eharyer@fsu.edu.

Sincerely,
Satoko Mori-Inoue, MM, RMT
Doctoral student in Music Therapy

__________________________________________________________
Your Child’s Name: __________________________ Date of Birth: __________

________________________________________
Parents or guardian Signature: __________________________ (Date) __________

FSU Human Subjects Committee Approved on 8/19/09 VOID after 5/12/2010 HSC# 2009.3075
Dear children:

My name is Satoko Mori-Inoue; I am a music therapy student in the College of Music at the Florida State University.

I am doing a study combining physical exercise (walking, running, jumping, and skipping etc.) with music (playing drums, instruments and singing) and healthy eating habits helpful for you and your body. If you agree to be in my study, I will ask you some questions about your thoughts and feeling about the music exercise activities and healthy eating habits.

You will attend music activities 3 times a week, continuing for 8 weeks during a summer afterschool program. Each session will run for 45 minutes. You will participate in a group of 10 people. All musical instruments will be provided. I will measure your weight, blood pressure, heart rate, and attitudes. I will measure your blood pressure and heart rate before and after the activities, because these are very important to monitor the present stage of your health. If you do not feel well at the time of activities, you do not have to participate that day. I will ask you a few questions both verbally and in written form about what you learned in the activities, as well as your thoughts on the activities. You can ask questions about this study at any time. If you decide at any time not to finish, you can ask me to stop.

The questions I will ask are only about what you learn in the activities. This is not a test and there are no right or wrong answers.

If you sign this paper, it means that you have read this and that you want to be in the music exercise study.

Sincerely,

Satoko Mori-Inoue, MMT, RMT
Doctoral Student in Music Therapy

Your signature: ___________________________ Date ______________

Your printed name: ________________________ Date ______________

Signature of person obtaining consent: _________________________________________________________________________ Date ______________

Printed name of person obtaining consent: __________________________________________________________________________ Date ______________

FSU Human Subjects Committee Approved on 6/4/09 VOID After 5/12/10 HSC# 2009.2513
Dear Parent/Guardian:

I am pleased to inform you that your child’s participation in the Music Exercise program is a pleasure. Since it is going well, I would like to document their participation on video during our program. The videotapes involve both the teacher and students.

No student’s name will appear on any materials that are submitted and all materials will be kept confidential. The form below will be used to document your permission for this taping and use of videotape.

Permission Slip

Student Name: ____________________________________________

I am the parent/legal guardian of the child named above. I have received and read the letter regarding possible videotaping of my child.

_____ I DO give permission for you to include my child’s image on videotape as he or she participates in Music exercise program

_____ I DO NOT give permission for you to include my child’s image on videotape.

Signature ____________________________ Date __________

(Parent/Guardian)

Please return this with your child as soon as possible, because possible recording dates are Feb 12, Feb 17, Feb 19, and Feb 26. Thank you for your participation.

Sincerely,
Satoko Mori-Inoue
Florida State University, College of Music, Music Therapy PhD student
# Measurement Reliability Check Form

Measurement person 1 _______________________________________
Reliability Measurement person 2 _______________________________           Date______
Instructions: Measure 10 persons’ height and waist and write the numbers below.

<table>
<thead>
<tr>
<th></th>
<th>Height</th>
<th>Waist</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td></td>
<td></td>
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<tr>
<td>5</td>
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<td>6</td>
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<td>7</td>
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<td>8</td>
<td></td>
<td></td>
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<tr>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Direction for height measurement:
1. Place a student on the feet marks on the flat board.
2. Make sure the student stands straight against the measurement ruler.
3. Place the built-in level triangle ruler on the top of the student’s head.
4. Make sure the torpedo level shows straight against the student’s head.
5. Read the measurement without making the ruler incline because of the student’s hair or hairpieces.

Direction for waist measurement:
1. Take the tape, using the side with the more detail.
2. Make sure to have the tape end with the smallest numbers in your left hand.
3. Make sure each student has removed his/her jacket or extra layers of clothing before measuring.
4. Put the tape around the student, falling at their navel (belly button).
5. Pull the tape tight, and read the measurement where the metal end of the tape meets the opposite side.
**APENDIX E**

**BEHAVIOR OBSERVATION FORM**

**Group On-Task/Off Task Form**

<table>
<thead>
<tr>
<th>Observer ______________________________</th>
<th>Therapist __________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability Observer __________________</td>
<td>Group ____________________________</td>
</tr>
<tr>
<td>No. of group participants _____________</td>
<td>Time: Start __________</td>
</tr>
<tr>
<td>Activity _____________________________</td>
<td>Page ________ of ________________</td>
</tr>
</tbody>
</table>

**Observation Interval** 15 seconds  
**Record Interval** 5 seconds

**Behavior Recorded:** On-task __________ / Off-task ______________  
*(Circle one)*

**Behavior Defined:**_____________________________________________________________

**Instructions:** For each interval, circle the behavior observed (on or off-task) and write in the number of participants observed demonstrating the target behavior.

<table>
<thead>
<tr>
<th>Interval</th>
<th># participants</th>
<th>On-task</th>
<th>Off-task</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4</td>
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<td></td>
<td></td>
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<tr>
<td>5</td>
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<tr>
<td>6</td>
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<tr>
<td>7</td>
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<td>8</td>
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<td>9</td>
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<td>10</td>
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<tr>
<td>11</td>
<td></td>
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<tr>
<td>12</td>
<td></td>
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<td></td>
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<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Adapted from Form H: Group On-Task/Off-Task Teacher Response (Madsen & Madsen, 1998) Revised by Lori Gooding, PhD*
### Questionnaire: Attitude

1. **How are you doing at School?**
   - 1: Great
   - 2: Good
   - 3: Neutral
   - 4: Not Good
   - 5: Awful

2. **How do you feel about this program?**
   - 1: Great
   - 2: Good
   - 3: Neutral
   - 4: Not Good
   - 5: Awful

### Questionnaire: Eating Habits

1. **Circle all foods (Group) you ate for a snack.**
   - 1. Sweets like candy
   - 2. Salty like Potato Chips
   - 3. Soda
   - 4. Fruits or Vegetable sticks
   - 5. Fruits Juice
   - 6. Did not eat

2. **Did you eat any fruits this week?**
   - 1. Yes
   - 2. No

3. **Did you eat any fried food this week?**
   - 1. Yes
   - 2. No

### Questionnaire: Nutritional Information

1. **How many food groups are in the food pyramid?**
   - Groups

2. **Name as many of the food groups as you can.**

3. **Which food groups should you eat the most of each day?**

4. **Which food groups should you eat the least of each day?**
Rating System for Participants’ Attitudes Toward School, Educational Information and Eating Habits

**Attitude 1 and 2:** After participants answer the 2 questions, add up the total number of points. A lower score is better. Use the numbers below the picture as a grading scale. (1-5)

1. How are you doing at school?
2. How do you feel about this program?

**Eating Habits:** After participants answer the 3 questions, add up the total number of points. Minimum Score is 3 (good) and Maximum score is 6 (not good)

1. Circle all the foods (group) you ate for a snack.
   - 1: Answer 4 and 5 (Correct answer)
   - 2: Incorrect
2. Did you eat any Fruits this week? Scale from (1-5)
   - 1: Yes
   - 2: No
3. Did you eat any fried food this week?
   - 1: No
   - 2: Yes

**Nutritional Information:** After participants answer the 4 questions, add up the total number of points. Maximum Score is 9 (Given pre and post intervention)

1. How many food groups are in the food pyramid?
   Scale from (0-1)
   - 1: Correct answer only
   - 0: Not know, or no answer
2. Name as many of the food groups as you can.
   Scale from (0-6)
   - 6: All six-food groups
   - 5: Five food groups
   - 4: Four food groups
   - 3: Three food groups
   - 2: Two food groups
   - 1: One food group
   - 0: Not know, or none
3. Which food groups should you eat the most of each day?
   Scale from (0-1)
   - 1: Fruits and vegetables
   - 0: Other Groups: grains, meat, milk, oil, sweets, fatty foods
4. Which food groups should you eat the least of each day?
   Scale from (0-1)
   - 1: Sweets, fatty foods
   - 0: Other groups: grains, meat, milk, oil, fruits and Vegetables
**APPENDIX G**

**SAMPLE LESSON PLANS FOR MUSIC EXERCISE AND HEALTHY KIDS PROGRAM**

Music Exercise and Healthy Kids (Sample 1)

<table>
<thead>
<tr>
<th>Objective</th>
<th>Material</th>
<th>Music</th>
<th>Desired Behavior</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Establish rapport with the group/ follow steady beat</td>
<td>Drums in Circle Formation</td>
<td>Steady beat 📈=60</td>
<td>Everyone will keep the steady beat at the same place</td>
<td>5 min</td>
</tr>
<tr>
<td>2 Start moving slowly</td>
<td>Drums in Circle formation</td>
<td>Steady beat with moving cues 📈=100</td>
<td>With the leader’s cue students will start moving slowly around the drums while keeping a steady beat</td>
<td>2 min</td>
</tr>
<tr>
<td>3 Gradually moving faster</td>
<td>Drums in Circle formation</td>
<td>Steady beat, adding 8th notes. Faster tempo 📈=120-180</td>
<td>With leader's cue, students will start moving across the circle to alternate drums to give them more distance to run</td>
<td>8 min</td>
</tr>
<tr>
<td>Water Break</td>
<td></td>
<td></td>
<td></td>
<td>1 min</td>
</tr>
<tr>
<td>4 Faster</td>
<td>Drums and small instruments</td>
<td>Changing rhythm: use of students’ preferred recorded music 📈=120-100</td>
<td>Students will move freely with the instruments.</td>
<td>9 min</td>
</tr>
<tr>
<td>Cool Down</td>
<td></td>
<td>📈=60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Learn a song about food</td>
<td>Guitar and drums</td>
<td>Food pyramid song (composed by therapist)</td>
<td>Students will learn a song, while moving their feet and body</td>
<td>3 min</td>
</tr>
<tr>
<td>6 Sing along</td>
<td>IPod/ sound system</td>
<td>Songs we learned</td>
<td>Sing with Karaoke about Food</td>
<td>5 min</td>
</tr>
<tr>
<td>7 Quietly say goodbye</td>
<td>Guitar</td>
<td>Breathing and relaxing music created by therapist</td>
<td>Talk about good attitude and review food information.</td>
<td>2 min</td>
</tr>
<tr>
<td>Questionnaire Post)</td>
<td></td>
<td></td>
<td></td>
<td>5 min</td>
</tr>
</tbody>
</table>

*Music Therapist created a Total of 20 minutes of music sequence by using Garage Band Software (Apple, Inc).**Total Lesson Time: 1 hour*
## Music Exercise and Healthy Kids (Sample 2)

<table>
<thead>
<tr>
<th>Objective</th>
<th>Material</th>
<th>Music</th>
<th>Desired Behavior</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Establish rapport with the group/ Iso-principal</td>
<td>Drums in Circle Formation</td>
<td>Up tempo/ R&amp;B songs (Children’s preferred music selection)</td>
<td>3. Run= Iso-Principal Everyone will walk or run around the drum to burn some energy first.</td>
<td>5 min</td>
</tr>
<tr>
<td>3 Gradually moving faster</td>
<td>Drums in Circle formation</td>
<td>Total time: 17.9 Minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Faster</td>
<td>Drums and small instruments</td>
<td></td>
<td>7 min</td>
<td></td>
</tr>
<tr>
<td>5 Cool Down</td>
<td>Lie down on the floor and relax</td>
<td></td>
<td>2 min</td>
<td></td>
</tr>
<tr>
<td>6 Questionnaire</td>
<td>Food and eating habits song (composed by therapist)</td>
<td>Students will learn a song as they learn the new material</td>
<td></td>
<td>1 min</td>
</tr>
<tr>
<td>7 Learn a song about food</td>
<td>Guitar and drums</td>
<td>Songs we learn</td>
<td>Sing with Karaoke about Food and eating habits</td>
<td>8 min</td>
</tr>
<tr>
<td>8 Sing along</td>
<td>IPod/ sound system</td>
<td>Quiet music/ help students to look back with their behavior/ Instant winner</td>
<td>Student will quietly sit down and listen</td>
<td>5 min</td>
</tr>
<tr>
<td>9 Behavior talk</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Good bye</td>
<td></td>
<td></td>
<td>As teachers come to the class, students go to lunch</td>
<td>2 min</td>
</tr>
</tbody>
</table>

Total Lesson time: 45 minutes
APPENDIX H
DRUM CONFIGURATION

Provided instruments, sponsored by Remo, Inc.

Drum Formation: Remo, Inc “Kids Tubano” Floor drums.

Level 1 - Warm-up

- Children stay at each station (drum). Start with basic steady beat warm-up movements introduced by music therapist with drum beat at end of lowered arm/ knee

Level 2 - Increased Tempo/Strenuous Exercise

- Run outside the circle of drums, striking the drums on the beat as each drum is passed.

Level 3 - Increased Tempo/Alternated Strenuous Exercise

- Run between the drums to music therapist’s cued music and drum beat.
- 20 sets of sit ups and pushups timed with beat and length of music.

Level 4 - Cool Down

- Lie down on the floor and relax
APPENDIX I
SAMPLE MUSIC SEQUENCES AND SAMPLE EXERCISES

Sample Music Sequences: by Lydia Greaves (Music Therapy Practicum Student)

Day 2:
1. Down-Jay Sean ft. Lil' Wayne
2. Sweet Dreams- Beyonce
3. Union- Black Eyed Peas
4. Pump It - Black Eyed Peas
5. Let It Rock- Kevin Rudolf ft. Lil' Wayne
6. Halo (Instrumental)- Beyonce
7. Say Goodbye (Instrumental)- Chris Brown
   Total time: 29.5 Minutes

Day 3:
1. Just Dance- Lady GaGa ft. Akon
2. Sweet Dreams- Beyonce
3. All The Right Moves- One Republic
4. Replay- IYAZ
5. Tik Tok- Kesha
6. Halo (Instrumental)- Beyonce
7. Say Goodbye (Instrumental)- Chris Brown
   Total time: 26.9 Minutes

Day 4:
1. Please don't stop the music- Rihanna
2. Me love-Sean Kingston
3. Where is the love- Black Eyed Peas
4. krazy-pitbull ft. Lil Jon
5. Sugar- Flo Rida
6. Angel of Mine Instrumental- Monica
   Total time: 23.8 Minutes
Music Exercise Plan: “Welcome to the Caribbean!”

1. *Ella Es* (Ska) – Millo Torres y el Tercer Planeta {4:51}
   - Warm-up running round

2. *Sin Ti* (Reggae) – La Muza {3:32}
   - Stretches
     a. Neck
     b. Arms
     c. Torso
     d. Lower Back
     e. Legs standing
     f. Legs on floor

3. *Yo No Sé Mañana* (Salsa) – Luis Enrique {4:20}
   - Basic Step
   - Side Step
   - Right Turn
   - Left Turn

4. *Hot, Hot, Hot* (Calypso) – Buster Poindexter {4:11}
   - Jumping Jacks
   - Squats
   - Diagonal Pick-ups
   - Downward Abs
   - Ab Stretch

5. *Memorias De La Plaza* (Rock Ballad) – Fiel a la Vega {6:07}
   - Cool Down
Music Exercise Plan: Building muscle

1. *Oh Nana* (Ska) – Millo Torres y el Tercer Planeta {5:29}
   - Warm-up running round

2. *Bieké* (Reggae) – Cultura Profética {4:19}
   - Stretches
     g. Neck
     h. Arms
     i. Torso
     j. Lower Back
     k. Legs standing
     l. Legs on floor

3. *Vuela Muy Alto* (Salsa) – Jerry Rivera {4:41}
   - Basic Step
   - Side Step
   - Crossed Back Step
   - Right Turn

4. *Electric City* (R&B) – Black Eyed Peas {4:08}
   - Drumming
     • Single hand
     • Two hands
     • With vertical body movements
     • Jumping

5. *Hot, Hot, Hot* (Calypso) – Buster Poindexter {4:11}
   - Jumping Jacks
   - Squats
   - Diagonal Pick-ups
   - Abs Variations
   - Downward Abs
   - Abs Stretch

6. *Memorias De La Plaza* (Rock Ballad) – Fiel a la Vega {6:07}
   - Cool Down
APPENDIX J

EXERCISE/MOVEMENTS EXPLAINED

by Jazzy Simons (Music Therapy Practicum Student)

**Stretch**
- Arms over head
- Arms to right side
- Arms to left side
- x2
- Upper body hang

- Bend knees, hands on floor
- Straighten legs

**Lunge**
- Knee down
- Straighten front
- Repeat, other side

- Bend forward, hands on floor
- Bend knee, hands on floor
- Repeat, other side

**Jog**
- Normal jog
- Kick butt with feet
- Normal
- Knees high
- Normal
- Side shuffle
- Normal

**Stretch**
- Arms over head
- Arms to right side
- Arms to left side
- Upper body hang

- Bend knees, hands on floor
- Straighten legs

**Jog**
- Normal jog
- Kick butt with feet
- Normal
- Knees high
- Normal
- Side shuffle
- Normal

**Strength**
- Lunges
- Plank
- Mountain climbers

**Jog**
- Normal jog
- Kick butt with feet
- Normal
- Knees high
- Normal
- Side shuffle
- Normal

**Strength**
- Lunges
- Plank
- Mountain climbers
APENDIX K
SAMPLE SONGS: LEARNING ABOUT FOOD PYRAMID AND BETTER EATING HABITS

My Pyramid Song
(Tune with “You are my Sunshine”)
By Satoko Mori-Inoue

1. This is a pyramid with beautiful colors, it’s called MyPyramid. This pyramid tells me how we can eat right. Yes! This is a food pyramid.

2. There are six different colors that represent the different food groups: Orange, Green, Red, Yellow, Blue and Purple. Six different food groups.

3. Orange is Grains; like Bread, Rice, Macaroni, and cereals are also grains. “Whole wheat grain” is good. Let’s find it in Orange food group.

4. Green is Vegetables. Red is Fruits. Yellow is Oils. Blue is Milk. Purple is Meat and Beans. Let’s find them all in the food pyramid.

5. So, this is a pyramid we like to see when you decide what to eat. Color your plate with different food groups from MyPyramid.
Don’t eat super size
(Rap Style)
By Satoko Mori-Inoue

1. Don’t eat super size, super size, super size
   Don't eat super size, super size, super size
   Don't eat super size, supersize food.
   When you are full, it means stop.
   Don't eat super size, super size, super size food.

2. Don’t eat super size, super size, super size
   Don't eat super size, super size, super size
   Don't eat super size, supersize food.
   If you eat more than you need,
   Extra food can make you fat.
   Don't eat super size, super size, super size food.

3. Don’t eat super size, super size, super size
   Don't eat super size, super size, super size
   Don't eat super size, supersize food
   If you eat more than you need, and don’t burn calories
   You’ll be sorry.
   Do your exercise, exercise, exercise your body.

4. Don’t eat super size, super size, super size
   Don't eat super size, super size, super size
   Don't eat super size, supersize food.
   Heart burn, stomach ache, gas and diarrhea
   You won’t feel good, if you eat super size

Don’t eat super size, super size, super size
Don't eat super size, super size, super size
Don't eat super size, supersize food. (repeat x 3)
Just eat one

( D and A7)

By Satoko Mori-Inoue

D

1. Just eat one,
   D       A7
   Maybe two, Don't eat it all
   A7
   Just eat one,
   A7       D
   Maybe two, Don't eat it all

2. If you eat,
   Don't sit around, Burn the calories
   If you eat,
   Move around, Burn the calories,

3. Candy is good,
   Cake is sweet, Yum, Yum, Yum, Yum,
   Just eat one, Maybe two, Don't eat it all

4. When you eat,
   Move around, Burn the calories
   Exercise, Make you feel, Good all day

   Just eat one,
   Maybe two, Don't eat it all,
   Just eat one,
   Maybe two, Don't eat it all

   If you eat,
   Don't sit around, Burn the calories
   Exercise, Make you feel, Good all day
Rap Vegetable Song
By Satoko Mori-Inoue

Veggie, Veggie, Veggie WOW!
Veggie, Veggie, Veggie WOW!
Veggie, Veggie, Veggie WOW!
Veggie, Veggie, Veggie WOW!

Let’s learn different category of Vegetables.

The category of Dark Greens: like Broccoli, Spinach, Collard greens, Mustard greens and Turnip greens will give you energy. Yes! Pump up your Energy, Pump up your Energy, Pump up your Energy with Dark Green Vegetables.

The category of Orange Veggies: like Carrots, Butternut Squash, Pumpkin, and sweet potatoes will boost up your energy, Yes! Pump up your Energy, Pump up your Energy, Pump up your Energy with Orange Vegetables.

The category of Starches: Veggies like Corn, Potatoes, and Green peas will give you high energy Yes! Pump up your Energy, Pump up your Energy, Pump up your Energy with Starchy Vegetables.

Now, Let’s think about other vegetables you see at the store.

Let’s start from A to Z
Artichokes, asparagus, bean sprouts, beets, sprouts cabbage, cauliflower, celery, cucumbers, eggplant green beans, green or red peppers, head lettuce mushrooms, okra, onions, tomatoes, tomato juice vegetable juice, turnips, wax beans, zucchini
Let’s Read the Label
By Satoko Mori-Inoue

D A7 D
Let’s read the label, Label, Label.
D A7 D
Let’s read the Label on the Box.

G D A7 D G D E
This line tells me how many calories, this line tells me how
A7
much fat.

D A7 D
Let’s read the label, Label, Label.
D A7 D
Let’s read the Label on the Box.

G D A7 D G D E
High calorie foods may taste good, but they may have a lot of
A7
calories and fat.

D A7 D
Let’s read the label, Label, Label.
D A7 D
Let’s read the Label on the Box.

Calories and fat are very important to grow, but if you have too much, that will cause you
trouble.

Let’s read the label, Label, Label.

Let’s read the Label on the Box.
Meet the Meats
By: Antonio Milland-Santiago

Bb Major

Intro
Bb – Bb – Gm – Gm – Eb – Eb – F – F

Chorus 1
Bb
Meet the meats, yeah (come on let’s meet them)
Gm
Meet the meats, yeah (meeting them slow)

Verse 1
Bb
We are starting with lean cuts of meat
Gm
The ones I really love to eat
Bb
Like beef, ham, lamb, pork and veal
Gm
It’s awesome how they make me feel (I’ll explain why!)

Chorus

Bridge
Eb                                  Dm
It’s protein, Vitamin B (uh la la la la)
Eb                            Dm
Iron and vitamin E (uh la la la)
Eb                 Dm
Zinc, yeah, and some Magnesium (oh they make me strong)

Chorus 2
Meet the meats yeah (ta ra ra ra ra)
Meet the meats yeah

Verse 2
And poultry you can also eat
Some chicken, turkey, goose indeed
And remember that per day will be
5 ounces for once serving (don’t forget the fish!)

Chorus 1 and Finish
Digestion Song

(Tune with “I’m Yours” by Jason Mraz)

By Michelle Strutzel (Music Therapy Practicum Student)

Intro: C G am F

C
I just put food in my mouth; you can bet that I taste it
G
I chew it; I swallow after I masticate it
am          F
Down the esophagus, and into the stomach
C
Here it will sit for an hour or two,
G
‘Cause breaking up my food takes a while to do
am       F
Now the food will move, into the small intestine

C   G
   Here it stays for your body to take
   am       F
      All the nutrients it ate, whether healthy or not

C               G
Well after food moves through the small intestine,
   am
Then what’s left will move to the large intestine
   F
This is the last stop, in the digestive system
C                        G
All the nutrients that your body could not use
   am
Is turned to waste that your body will lose
   F
This is how food moves through a person’s body.

C               G
   It moves through the mouth, esophagus, stomach,
   Am          F          C
Small intestine, large intestine; that is digestion.
Uh-Oh Fiber
(Tune with “Me Love” by Sean Kingston)
By Lydia Greaves

Chrous

Uh uh uh oh oh Fiber
Why we gotta eat it
Good for your heart
You know

Uh uh uh oh oh Fiber
Why we gotta eat it
Good food your heat
You know

See a few weeks ago, my body just hurt
And I didn’t know why -didn’t know why
I felt tired, sluggish, constipated
And my stomach hurt so bad -hurt so bad
Maybe it something to do with
The way that I eat –that I eat
I need to change and find a way
To rejuvenate my body –my body

I feel like all I eat is fast food
Somebody come and show me the way

Chrous

Music Therapists came to my school
And taught me about healthy eating –healthy eating
We learned about the food pyramid
And its six categories –categories
Vegetables, fruits, legumes,
Barley, oats and oat bran –oat bran
Our body needs 20 to 35
Grams of fiber every day – every day

I feel like now I’ve learned the right way
Somebody finally showed me the way

Uh uh uh oh oh Fiber
Why we gotta eat it
Good for your heart
You know

Uh uh uh oh oh Fiber
Satisfies your hunger
Longer

Why we eat, wh-why we eat it
Please tell me, pl-please tell me
Why we eat, wh-why we eat it
Why we eat it

Why we eat, wh-why we eat it
Please tell me, pl-please tell me
Why we eat, wh-why we eat it
Why we eat it

I fell like now I’ve learned the right way
Somebody finally showed me the way

Uh uh uh oh oh Fiber
Why we gotta eat it
Moves food through intestines
Easier

Uh uh uh oh oh Fiber
Why we gotta eat it
Reduce diabetes
Beat it

Uh uh uh oh oh Fiber
Why we gotta eat it
Reduce heart disease
Research shows

Uh uh uh oh oh Fiber
Why we gotta eat it
Good for your heart
You know
The Nutrition Song
By: Tracey Kinnunen (Music Therapy Practicum Student)

A        D      A
Every morning when I wake up, I think about what I want to eat
A             D        A
I think about what my body needs, to make it through the day happily
A
Veggies and Fruits are always good
D
Milk, gains and meat do the body good
A
These are things that we all need
D
To keep our bodies living healthily

Chorus (2x)
E
Fruits, grains, meats, veggies and milk

D        A
Are what we need to make it through the day
E
Fruits, grains, meats, veggies and milk
D        A
Are what we need to be ok
What Choices Can I Make
By Michelle Strutzel

D
What am I going to eat today
A7         D
That’s good for me and tastes okay?
D             G
What am I going to eat today?
D       A7       D
What choices can I make?

“The Stretching Song”
By: Tracey Kinnunen

A
Before we exercise, we have to stretch
D
To make sure we don’t get hurt
A
We stretch our arms and legs and everything else
E
Before we get to work
A
We put our arms over our heads and reach up to the sky
D
Making sure we stretch real high
A
Then we bend over our bodies to touch the ground
E
Before we start to move around
A
We gotta stretch, stretch, stretch out our arms
D
And stretch, stretch, stretch out our legs
A
We gotta stretch, stretch, stretch out our bodies
D       E       A
Before we start to exercise
MyPyramid
Eat Right. Exercise. Have Fun.
MyPyramid.gov

Grains
Make half your grains whole.
Start smart with breakfast. Look for whole-grain cereals.

Vegetables
Vary your veggies.
Color your plate with all kinds of great tasting veggies.

Fruits
Focus on fruits.
Fruits are nature’s treats – sweet and delicious. Go easy on juice and make sure it’s 100%.

Milk
Get your calcium-rich foods.
Move to the milk group to get your calcium. Calcium builds strong bones.

Meat & Beans
Go lean with protein.
Eat lean or low-fat meat, chicken, turkey, and fish. Ask for it baked, broiled, or grilled — not fried. It’s nutty, but true. Nuts, seeds, peas, and beans are all great sources of protein, too.

For an 1800-calorie diet, you need the amounts below from each food group. To find the amounts that are right for you, go to MyPyramid.gov.

- Oils
  - Oils are not a food group, but you need some for good health. Get your oils from fish, nuts, and liquid oils such as corn oil, soybean oil, and canola oil.

Find your balance between food and fun.
- Move more: Aim for at least 60 minutes every day, or 5 days.
- Walk, dance, bike, rollerblade – it all counts. How great is that?

Fats and sugars — know your limits.
- Get your fat facts and sugar smart from the Nutrition Facts label.
- Limit solid fats as well as foods that contain them.
- Choose foods and beverages low in added sugars and other caloric sweeteners.

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APENDIX M
FOOD GROUP WORKSHEET

Underline the word in the group that does not fit with the other words.

Example: steak  chicken  pork  tomatoes  ham

1. Carrots  lettuce  broccoli  pears  tomatoes
2. Peaches  strawberries  bread  oranges  grapes
3. Banana  Steak  Chicken  Pork  sausage
4. Milk  Cream Cheese  yogurt  carrots  cheese
5. Bread  crackers  rice  noodles  strawberries

6. Which category would lettuce be in?
   a. Vegetables  b. fruit  c. meat  d. dairy

7. Which category would bread be in?
   a. Vegetables  b. fruit  c. grains  d. meat

8. Which category would milk be in?
   a. Vegetable  b. dairy  c. grains  d. fruit

9. Which category would strawberries be in?
   a. Vegetables  b. dairy  c. grains  d. fruit

10. Which category would chicken be in?
    a. Vegetables  b. meat  c. dairy  d. fruit
APENDIX N
GROWTH CHART

2 to 20 years: Boys
Stature-for-age and Weight-for-age percentiles

NAME ________________________
RECORD # ____________________

Mother’s Stature _________  Father’s Stature _________

Date  Age  Weight  Stature  BMI

*To Calculate BMI: Weight (kg) = Stature (cm) - Stature (cm) x 10,000
or  Weight (lb) = Stature (in) - Stature (in) x 703

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SOURCE: Developed by the National Center for Health Statistics in collaboration with
the National Center for Chronic Disease Prevention and Health Promotion, 2000.
http://www.cdc.gov/growthcharts

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