Feasibility and Evaluation of an After-School Jump Rope Program

A Dissertation
SUBMITTED TO THE FACULTY OF
UNIVERSITY OF MINNESOTA
BY

Jessica Alana Albers

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

Dr. Beth Lewis

July 2015

Acknowledgements

I am incredibly grateful for all of the people who have offered guidance and support through this process. First, I would like to thank my advisor Dr. Beth Lewis for seeing how passionate I was in proposing this project and helping me make it possible. You are an amazing role model, both in your professional and personal life, and I am so glad I had the opportunity to work with you. I want to also thank Dr. Daheia Barr-Anderson for bringing me to the University of Minnesota and teaching me so much about fearlessly diving into large intervention research. Also, thank you to Dr. Diane Wiese-Bjornstal, Dr. Stacy Ingraham, and Dr. Zan Gao for serving on my committee.

It is impossible to thank my family for all they have done. Ty, you are a caring person and a loving husband. You make me smile everyday, and I am so grateful that you are in my life. Mom and Dad, your support is unfailing. Thank you for pushing me and always believing that I can do anything. Raquel, your intelligence and whit are inspiring and Martina, I love seeing the world through your eyes. I am lucky I have you both to laugh with. To the Albers family, thank you for truly bringing me into your family and loving me like one of your own.

Thank you to all of my friends who made graduate school fun and full of adventure. Specifically Hayley, Julia, and Jenni who were always there to laugh, cry, run, eat, and talk at a moments notice.

Last but not least, thank you to the schools and educators who allowed me to bring jump rope to their after-school programs and the children who make it all worthwhile.

Dedication

This work is completely and whole-heartedly dedicated to my parents, Ana and Al Galvan. Mom, you are the strongest and most selfless person I know and Dad, your resilience and faith have truly made an impact on my life. My work is a direct reflection of what you have taught me and how much you both have accomplished.

Abstract

Childhood obesity has increased significantly in the U.S. over the past two decades. After-school programs can provide opportunities for increasing moderate to vigorous physical (MVAP) activity among children, which could potentially decrease the incidence of obesity. After-school jump rope programs may be one ideal setting to help increase physical activity among children; however, few studies have evaluated these programs. The purpose of this study was to examine the feasibility of an after-school jump rope program for children and to evaluate the time and intensity of activity. Additionally, psychological variable were assessed. Students ages 8-12 years old from two elementary schools (n=28) participated in a 12-week after-school jump rope program that met twice a week for 90 minutes each session. Participants practiced individual and group jump rope skills and learned a team routine that they performed at the end of the 12 weeks. In the 90-minutes session, participants spent 17.3 minutes (19.2%) in vigorous activity, 28.0 minutes (31.2%) in moderate activity, 8.0 minutes (8.9%) in light activity, and 36.7 (40.7%) in sedentary behavior. No changes were observed in perceptions of competence, physical activity enjoyment, or goal orientation from pre- to post-test. Overall weekly physical activity, $F(1, 27)=53.1$, $p<.001$, $\eta^2=.663$, and METs, $F(1, 27)=82.1$, $p<.001$, $\eta^2=.753$, increased from pre- to post-test. These findings suggest that additional research is needed to better understand the effect of jump rope programs on psychological variables. Additionally, it appears that jump rope programs may be an effective venue for helping children achieve the recommended 60 minutes of physical activity per day.

Table of Contents

List of Tables

CHAPTER ONE

Introduction

The prevalence of overweight and obesity has increased significantly among the U.S. youth populations over the past two decades (Ogden, Carroll, Kit, & Flegal, 2012; Wang, Orleans, & Gortmaker, 2012). In the United States, 16.9% of children and adolescents (2-19 years old) are obese (Ogden et al., 2012). The positive energy balance created from caloric intake exceeding caloric expenditure has led to increased adiposity (i.e., adipose tissue accumulation). Among children and adolescents, ages 2-18 years old, being overweight is defined as having a BMI between the 85th and 95th percentile based on CDC growth charts and obesity is a BMI above the 95th percentile (Barlow & Committee, 2007).

In children and adolescent populations, it is important to examine physical activity levels when discussing possible intervention strategies that target youth who are overweight or obese (Gutin, 2008). Physical activity is inversely related to percent body fat, while inactivity is directly related to percent body fat in adolescent females (Must et al., 2007). Research indicates that interventions targeting moderate to vigorous physical activity (MVPA) leads to decreased adiposity. However, programs that focused on light physical activity and/or did not provide time for MVPA were not efficacious (Connelly, Duaso, & Butler, 2007). Regarding vigorous physical activity (VPA), children ages eight to ten years old who participate in less than five minutes of VPA per day are 5.2 times more likely to be classified as overweight than children who participants in more than five minutes of VPA (Wittmeier, Mollard, & Kriellaars, 2008).

Eighteen percent of school-aged children (10.2 million) in the U.S. participate in after-school programs (Afterschool Alliance, 2014). Twenty percent of children are unsupervised after school and 34% of children would participate in an after-school program if it were available (Afterschool Alliance, 2014). After-school programs offer classes in a variety of areas including academic, music, art, and sport disciplines. These after-school programs are an ideal setting to provide physical activity programs; however, most programs do not provide opportunities to obtain the recommended amount of daily physical activity (Ajja et al., 2014; Bailey et al., 2012; Beets et sl., 2010; Trost, Rosekranz, & Dzewaltowski, 2008). Given the high number of children attending after-school programs and the high demand for after-school programs, these programs may be an ideal setting to promote physical activity participation.

After-school jump rope programs in particular may provide children with opportunities for physical activity. Jumping rope is a vigorous intensity physical activity (Quirk & Sinning, 1982) that creates positive aerobic capacity change in adults (Baker, 1966). Jumping for 40 minutes a day, five days a week, can decrease hip circumference, weight, BMI, and fat mass in adolescents (Kim et al., 2007). High volume rope jumping can also increase bone stiffness in high school students (Arnett & Lutz, 2002). Unfortunately, jumping rope can be monotonous and too physically intense for children when jumping at a regular cadence. Children may be more likely to adhere to jumping rope if they participate in it as part of a jump rope program. This program involves learning single, partner, and large group tricks involving footwork, rope movement, and coordination. The integration of skills and routines can increase enjoyment of physical

activity, which allows participants to participate in the exercise for longer periods of time.

Jump rope programs are different from traditional sports in that the group is working toward a common goal and individuals do not compete against each other. Additionally, jumping rope may increase competence motivation by providing optimal challenges for children to master in a supportive environment. Participants learn different skills every day while continuing to improve on mastered skills. It involves teammates working closely together, demonstrating and explaining learned skills to each other. For these reasons, jump rope may create a high task/low ego motivational climate, where participants may increase their self-competence and physical activity enjoyment.

Rationale

The purpose of this dissertation was to examine the feasibility of a jump rope program for children, to evaluate the intensity and time of jump rope and other physical activity, and to examine the influence of a jump rope program on psychological variables. Several studies have examined how physical activity programs impact psychological variables including self-efficacy, self-perceptions, and physical activity enjoyment; however, few studies have examined how youth jump rope programs in particular influence these psychological variables. Physical activity programs have been found to positively influence several psychological variables among boys and girls including athletic and social competence (Stein, Fisher, Berkey, & Colditz, 2007), self-efficacy (Sabiston & Crocker, 2008; Strauss et al., 2001), and physical activity enjoyment in teens (Ernst & Pangrazi, 1999) and young girls (Story et al., 2003).

This dissertation aims to address gaps in the current literature on the psychological and physiological benefits of youth jump rope programs. Only two published studies have used a pre to post-test design to examine psychological changes among children participating in a jump rope program (Ha et al., 2015; Hatfield, Vaccaro, & Benedict, 1985). One study used a "precision jump rope program" and did not include any information regarding how the program was administered. It appears that the program focused on jumping rope for fitness and not for the purpose of learning skills and developing a routine. The study used two scales to measure self-concept and found that based on one of the scales, self-concept improved from pre- to post-test during the eight- week program (Hatfield et al., 1985). The second study implemented a four-week jump rope program into physical education classes and recess. This study compared daily physical activity and measures of well-being of the jump rope group to a wait-list control group (Ha et al., 2015). Contrary to their hypotheses, the control group exhibited an increase in MVPA during school hours and the jump rope group showed no change. The jump rope group exhibited an increase in autonomy and parent relationships, but not in physical well-being, psychological well-being, or school environment (Ha et al., 2015). Perceptions of competence offer five domains that describe how children perceive their abilities compared to their peers (Harter, 1982), and may provide a better insight into the psychological change from participating in a jump rope program.

A few studies have examined jump rope programs in adolescents and adults. Men who jumped rope for 10 minutes, five days a week, and men who jogged for 30 minutes, five days a week, both showed positive cardiovascular changes as measured by the

Harvard Step Test (Baker, 1966). Men and women jumping rope at 120 turns per minute worked at high intensity levels ranging from 11.1-12.0 metabolic equivalents (Quirk & Sinning, 1982). Another study examined fitness levels among female jump rope athletes (Pettersson, Nordstro, & Alfredson, 2000). There were no differences between the jump rope athletes and female soccer players on body fat percentage and bone density. Both groups of athletes had lower body fat percentage and higher bone density than a sedentary population (Pettersson et al., 2000). This data indicated that jump rope and soccer athletes exhibit the same effects of regular and intense activity; however, the amount and intensity of activity during their practices was not reported in this study. Psychological variables were not assessed in these studies. Additionally, jumping rope for fitness was the focus rather than routines and learning new jump rope skills.

The present study will make a contribution to the literature by evaluating the duration and intensity of physical activity during an after-school jump rope program as well as examining the pre- to post-test changes on self-perceptions, physical activity enjoyment, and goal orientations. This study also administered group-based interviews to assess perceptions of the program in order to improve the quality of future studies and jump rope programs.

Specific Aims and Hypotheses

Specific Aim 1: To examine the number of minutes and intensity of physical activity the participants receive during the jump rope sessions.

Specific Aim 2: To examine the impact of participating in a jump rope program on weekly physical activity minutes and accumulated metabolic equivalents (METs).

H2: There will be an increase in overall weekly physical activity minutes and METs among the Rope Power participants from pre- to post-test.

Specific Aim 3: To examine the effect of an after-school jump rope on psychological variables including self-perceptions, physical activity enjoyment, and goal orientations.

H3: Participants in the jump rope program will show positive increases in self-perceptions, physical activity enjoyment, and goal orientation from pre- to post-test.

Exploratory Aim 1: To examine the effect of gender and minority status on self-perceptions, physical activity enjoyment, and goal orientation at post-test controlling for pre-test.

Exploratory Aim 2: To examine the participants' perceptions of the after-school jump rope program including what they liked/disliked about the program, added/adapted materials, and jump rope program showcase.

CHAPTER TWO

Literature Review

Childhood Overweight and Obesity

Childhood obesity has become a major health concern throughout pediatric health, exercise, and education based communities (Barnes, 2010; Lytle, 2012). Overweight and obesity refer to the excessive accumulation of adipose tissue in relation to bone, muscle, water, and organ tissue composition (i.e., adiposity) throughout the lifespan. Body mass index (BMI) is a common measure used to quantify a person's mass by examining the relationship between the height and weight of the individual. BMI is assessed by calculating weight in kilograms divided by height in meters squared (kg/m^2). Among children and adolescents (ages 2-18 years old), percentiles from growth charts are used to create the weight status categories of underweight (less than the 5^{th} percentile), healthy weight (5^{th} to 85^{th} percentile), overweight (85^{th} to 95 percentile), and obese (greater than the 95^{th} percentile; Barlow & Committee, 2007).

There has been debate regarding the merit of BMI as a valid measure of obesity. However, the BMI is a simple calculation, which allows for census data to be collected worldwide over long periods of time. Alternate body mass assessment are frequently invasive and/or expensive. Examples of other body mass assessment measures include bioelectrical impedence analysis (BIA), dual energy x-ray absorptomitry (DEXA), and hydrostatic weighing (Franks, Morrow, & Plowman, 1988; Morrow, Jackson, Disch, & Mood, 2001; Morrow, Zhu, Franks, Don, Meredith, & Spain, 2009).

The accumulation of adipose tissue is unhealthy and is associated with an increased risk of cardiovascular disease (Berenson, 2012; Zalesin, Franklin, Miller, Peterson, & McCullough, 2011), hypertension (Nguyen & Lau, 2012), diabetes (Nguyen, Nguyen, Lane, & Wang, 2011), and different types of cancers (Vucenik & Stains, 2012). Biomechanically, high body mass can strain the joints, specifically the vertebral column, hips, and knees, as well as alter the optimally efficient gait (Handrigan, Plamondon, Teasdale, & Corbeil, 2013; Huang, Chen, Zhuang, Zhang, & Walt, 2013). Psychologically, obesity and decreased body satisfaction can lead to lower perceptions of self-esteem and self-worth (Harriger & Thompson, 2012; Taylor, Forhan, Vigod, McIntyre, & Morrison, 2013).

The obesity epidemic. In the United States, 34.1% of adults are obese (Ogden et al., 2012). In children and young adults ages two to 19, 31.8% are overweight and 16.9% are obese (Ogden et al., 2012). The average BMI of U.S. youth, ages 2-19 years old, has increased from 1971-2008 (Wang et al., 2012). Specifically, the National Health and Nutrition Examination Surveys (NHANES) data indicate that BMI among youth has increased 0.55 kg/m2 at an average of 1.54kg (3.4lbs) every ten years. National weight averages are expected to continue to increase (Wang et al., 2012).

Childhood to adult obesity. Obesity during adolescence drastically increases the likelihood of adult obesity and its related health concerns and decreased life expectancy (Daniels et al., 2005; Wille, Erhart, Petersen, & Ravens-Sieberer, 2008). It is estimated that 70% to 80% of obese children will become obese adults (Dietz, 2004; Reilly, 2006).

Accordingly, health education and policy to combat childhood obesity has become an important public health concern in the United States.

Physical Activity and Sedentary Behavior among Children

Physical activity is defined as "any bodily movement produced by skeletal muscled that results in energy expenditure (Caspersen, Powell, & Christenson, 1985, p.126)." The term "physical activity" is often used instead of "exercise" with youth populations for several reasons. First, exercise is sometimes viewed as difficult, not enjoyable, or even painful. Second, exercise involves "planned, structured, and repetitive bodily movement" and a clear objective to increase fitness (Caspersen et al., 1985, p. 127). With the exception of sports participation, exercise may not an optimal term for the youth population given they frequently engage in physical activity through unstructured play.

In 2012, the U.S. Department of Health and Human Services released their Healthy People 2020 initiative, which included goals and recommendations for combating childhood obesity (*Healthy People 2020*, 2012). The physical activity recommendation for children is 60 minutes of moderate-to-vigorous intensity per day, every day of the week. This should include aerobic, muscle building, and bone strengthening activities. Aerobic activity, including running, biking, and swimming, should be done at the moderate level every day with bouts of vigorous physical activity at least three days per week. Muscle building activities, including movements using weights and/or body resistance, should be incorporated three days a week. Bone

strengthening activities such as jumping should also be incorporated at least three days per week (*PAGA*, 2008).

Approximately, 11% of children in the United States are completely sedentary and another 66% do not meet the national physical activity recommendations (Mears, 2008). One study reported that among 11-12 year old girls, 55.4% of their day is spent in sedentary behaviors. Additionally, 41.7%, 2.2%, and 0.7% of their day is spent in light, moderate, and vigorous activity respectively (Treuth et al., 2007).

For children who are in school, a majority of their day is spent in sedentary activities (Bailey et al., 2012). However, research indicates that there is an expectation that minutes of physical activity should be accumulated during school through physical education classes and recess (Pate, Neill, & Mclver, 2011; Simons-Morton, Taylor, Snider, & Huang, 1993). Schools are viewed as a good setting for physical activity interventions due to the access to large populations of children (Pate et al., 2011; Tassitano et al., 2010).

Young girls participate in more moderate-to-vigorous physical activity (MVPA) during the weekdays than on the weekend (Treuth et al., 2007). This suggests that physical education classes and recess in elementary, middle, and high schools play important roles in providing moderate-to-vigorous physical activity for children. Unfortunately, there has been a significant decrease in physical education classes and the intensity of these classes in recent years (Sallis et al., 2012). Interestingly, girls participate in less MVPA and more sedentary activity than boys. This has been observed in physical education classes (Matthews-Ewald, Moore, Harris, Bradlyn, & Frost, 2013;

Nettlefold et al., 2011), recess (Nettlefold et al., 2011; Ridgers, Fairclough, & Stratton, 2010), after-school programs (Taverno Ross, Dowda, Colabianchi, Saunders, & Pate, 2012; Trost et al., 2008), and total daily activity (Colley et al., 2011; Nettlefold et al., 2011; Verloigne et al., 2012).

It is important for children to participate in physical activity in early childhood in order to increase lifelong physical activity. For both males and females, physical activity rates decrease with age (Hallal, Anderson, Bull, Guthold, & Haskell, 2012; Tucker, Welk, & Beyler, 2001). Specifically, physical activity levels decrease by an average of 7.0% per year (Dumith, Gigante, Domingues, & Kohl, 2011). The decline is greater in girls at younger ages (9-12 years old) and in boys at slightly older ages (13-16 years old; Dumith et al., 2011). Activity levels continue to decline into adulthood and then level off starting at age 23 (Kjonniksen, Torsheim, & Wold, 2008). In adulthood, the decline is greater in males than females. Some activities like jogging, cycling, ball type team games, and recreational activities such as skiing and hiking are more likely to continue into adulthood than other types of activities (Kjonniksen et al., 2008). Additionally, youth who participate in organized sports have higher levels of leisure time physical activity as adults compared to youth who did not participate in sports (Wichstrom, Von Soest, & Kvalem, 2012).

Physical activity in schools. There has been a significant decrease in physical education and recess in public schools due to a reported increase in time, budget, and staff allocation on language arts and mathematics (Eyler et al., 2010; Eyler, Nguyen, Kong, Yan, & Brownson, 2012; Ramstetter, Murray, & Garner, 2010). Some researchers

have attributed the pressure on school districts to increase the focus on academic studies to the *No Child Left Behind Act 2001* legislation (Bocarro et al., 2011; Mears, 2008). The length of physical education classes have decreased 25-49 minutes on average per week and it is no longer a core education class (Eyler et al., 2010; Mears, 2008). Only 3.8% of elementary schools provide daily physical education classes and one-third of schools do not provide daily recess (McKenzie, Crespo, Baquero, & Elder, 2010). Additionally, only 6% of middle and high schools provide enough physical education to meet the physical activity recommendations (Mears, 2008). Children may not be participating in long durations of MVPA during their physical education classes and recess (Matthews-Ewald et al., 2013; Nettlefold et al., 2011). In a traditional PE class, girls and boys spend 13 - 27.2% and 11.4- 27.9% of their time in MVPA, respectively (Matthews-Ewald et al., 2013; Nettlefold et al., 2011).

In response to these findings, *Healthy People 2020* has created health-related goals pertaining to physical education that include increasing the following: (1) Percentage of schools that require physical education; (2) proportion of students who participate in physical education; and 3) time in physical education class spent on physical activity (*Healthy People 2020*, 2012).

Lifelong physical activity. Research indicates that introducing children to physical activity early likely instills lifelong healthy living habit and improved future health status (Eyler et al., 2010; Tassitano et al., 2010). Participation in organized physical activity in youth can decrease stress and depression, and promote continuing these healthy behaviors into adulthood (Tassitano et al., 2010). Increasing physical

activity during childhood can also lead to positive attitudes towards physical activity in the future by decreasing body-image related physical activity barriers, especially for young girls (Zabinski, Saelens, Stein, Hayden-Wade, & Wilfley, 2003).

A 20-year longitudinal study followed a group of boys and girls who had participated in a physical education (PE) intervention program. The program implemented PE five hours a week, which was compared to the control group that included one 40-minute session of PE per week. They found that the men who had participated in the intervention exhibited fewer signs of cardiovascular disease relative to the control 20 years later. Additionally, the women who had participated in the intervention reported high levels of physical activity 20 years later relative to the control (Trudeau & Shephard, 2005; Trudeau et al., 2000; Trudeau, Laurencelle, & Shephard, 2004). A more recent longitudinal study found that participating in a sport club from ages 12-19 was positively associated with higher levels of leisure-time physical activity in adulthood 13 years later (Wichstrøm et al., 2012).

Finally, lack of physical activity can lead to obesity and its associated health-related conditions (Wittmeier et al., 2008). One study used accelerometers to monitor physical activity among eight to ten year-olds and found that accumulating 45 minutes of moderate physical activity and 15 minutes of vigorous physical activity per day was related to reduced body fat mass and BMI (Wittmeier et al., 2008). A longitudinal study among girls found that that high physical activity was inversely related to increased body fat over time (Must et al., 2007). Research also indicates that vigorous intensity physical activity is a more effective strategy for reducing obesity among children than calorie

restriction (Gutin, 2008). The author postulated that physical activity participation led to an overall healthy body through bone and muscle development, which led to more adaptive body image ideals (Gutin, 2008).

After-School Programs

After-school programs offered at schools and community centers are ideal settings for physical activity programs. After-school programs differ from day care in that they focus on education with varying degrees of curriculum and development planning (Alliance, 2014; Beighle & Moore, 2012). After-school programs provide valuable resources to working parents with elementary age children. Students in after-school programs are more likely to have parents who are employed and/or from minority populations (Parsad & Lewis, 2009; Taverno Ross et al., 2012). After-school programs provide children with engaging activities to continue their school-based learning (Alliance, 2014; Trost et al., 2008). Research indicates that participation in after-school programs results in better school attendance, test scores, and grades (Alliance, 2014). These programs can also help in decreasing the incidence of inappropriate or unhealthy activities; students at greatest risk show the greatest gains (Alliance, 2014; Beighle & Moore, 2012; Taverno Ross et al., 2012; Weaver, Beets, Webster, Beighle, & Huberty, 2012).

America After 3PM is a national survey that was conducted in 2004, 2009, and 2014 by the Afterschool Alliance (Alliance, 2014). This survey asked parents across the U.S. what their children did after school and their thoughts regarding after-school programs in their communities. In 2014, 10.2 million K-12 students (18%) in the U.S.

participated in after-school programs and 11.3 million students (20%) were alone or unsupervised after school. The remaining 35.2 million students (62%) were supervised by friends, family, or daycare providers. The number of students in after-school programs has increased each year for the 2004, 2009, and 2014 studies. Furthermore, 41% of parents who did not have their children enrolled in an after-school program reported that they would enroll them if a program were available (Alliance, 2014). This suggests an increasing need for well-developed after-school programs.

After-school physical activity. Several studies have used accelerometers to examine physical activity during after-school programs (Ajja et al., 2014; Bailey et al., 2012; Taverno Ross et al., 2012; Trost et al., 2008). Physical activity among third through sixth graders attending a normal, non-intervened after-school programs was assessed (Trost et al., 2008). The programs consisted of academic time, snack break, and recreation time. Activities were placed into categories ranging from high MVPA to low MVPA, which included: Free play outdoors, free play indoors, organized physical activity indoors, organized physical activity outdoors, snack time, and academic time. In total, the students participated in approximately 20 minutes of MVPA, which is one third of the recommended physical activity amount per day. The authors concluded that after-school programs can be an important contributor to weekly physical activity but significant improvements are needed (Trost et al., 2008).

Data from the longitudinal Transitions and Activity Changes in Kids (TRACK) study examined physical activity and after school habits among fifth grade students (Taverno Ross et al., 2012). Results indicated that students who regularly attended after-

school programs accumulated fewer minutes of sedentary time and more minutes of MVPA time than students who went home after school. Children in after-school programs participated in 33.8 minutes of physical activity with 3.9 minutes in MVPA (Taverno Ross et al., 2012).

As a part of the Health and Physical Activity Promotion in Youth (HAPPY) study, the physical activity of 135 participants, ages 10-14 years old, was assessed (Bailey et al., 2012). Girls engaged in more sedentary behavior than boys during school transport, recess, and lunch. In the after-school programs, boys spent 92.9 minutes in sedentary behavior and 27.8 minutes in MVPA. Girls spent 95.0 minutes in sedentary behavior and 29.2 minutes in MVPA (Bailey et al., 2012).

Additionally, the physical activity of children attending 20 diverse after-school programs was assessed (Ajja et al., 2014). In total, 1,302 children, ages 5-12 years old, wore accelerometers of four non-consecutive weekdays. The children were at the after-school programs for approximately 130 minutes. Boys spent 64.6 minutes in sedentary behavior and 24.2 minutes in MVPA. Girls spent 69.8 minutes in sedentary behavior and 18.1 minutes in MVPA. Both boys and girls spent more time in MVPA when playing outdoors than when playing indoors (Ajja et al., 2014).

An intervention to promote physical activity and positive nutritional changes (i.e., The After-School Food and Fitness Project) was implemented at 16 YMCAs and targeted 5-11 year-old children who attended after-school programs (Gortmaker et al., 2012). Accelerometer data indicated an increase of 10.5 minutes of MVPA per day among children at intervention YMCAs with no change in MVPA among children at the 16

control YMCAs. Although after-school programs provide an environment for more education and activity opportunities, these results indicate that the environment alone is not enough to increase MVPA and that physical activity interventions are needed (Gortmaker et al., 2012).

After-school programs that focus on physical activity can improve fitness outcomes (Wiersma & Rubin, 2012; Yin, Moore, Johnson, Vernon, & Gutin, 2012). For example, third grade students (n=574) participated in an after-school program lasting three years (i.e., FitKid program) and consisted of participating in 80 minutes of MVPA appropriate for their age. A cluster randomization design matched urban to nonurban schools with similar demographics before assigning participants to either the FitKid or control group. The Active Kids program utilized park spaces to create a 15-week physical activity focused after-school program for 8-11 year old Hispanic children. Participants in the after-school program exhibited improved cardiorespiratory fitness and reduced adiposity relative to participants in the standard care group (Yin et al., 2012). Another after-school program provided game-based physical activity, twice a week for 15 weeks. The fourth and fifth grade participants showed an increase in cardiorespiratory fitness and no significant weight gain compared to their pre-intervention measures (Wiersma & Rubin, 2012).

Jumping Rope

Jumping rope as exercise. Jumping rope is one type of physical activity that could be integrated into after-school programs. Jumping rope has been used as a training tool in many different sports including boxing, football, volleyball, and tennis. Training

goals often include developing quicker feet and exhibiting bursts of aerobic exercise between weight training (Duzgun, Baltaci, Colakoglu, Tunay, & Ozer, 2010; Kalbfleisch, 2001).

In one of the first studies examining rope skipping, Baker (1966) completed experiments comparing the cardiovascular benefits from ten minutes of rope skipping to jogging for 30 minutes. Ninety-two male college students were randomly assigned to two groups. One group jumped rope for ten minutes a day, five days a week, for six weeks. The beginning jumping speed was set at 125 jumps per minute and the participants were allowed to gradually increase their speed to up to 170 jumps per minute. The second group of participants jogged for 30 minutes a day, five days a week, for six weeks. Similar to the first group, they were allowed to gradually increase their speed based on their fitness level. Participants completed a Harvard Step Test at pre- and post-test. Results indicated that both groups showed significant increases in cardiovascular endurance over the six weeks. There were no differences on the Harvard Step Test at post-test between the jogging and jump rope groups (Baker, 1966). This was an important study to validate jump roping as a formidable mode of cardiovascular exercise.

In another study, Myles and colleagues (1981) suggested that different combinations of jumps, leaps, and hops while jumping rope results in varying heart rate levels. Six participants (five males and one female) ages 22 to 40 years were asked to engage in rhythmic jumping (i.e., single jumping to a set cadence) and freestyle jumping (i.e., mixing single jumping, higher leaps, and one footed hops). The authors concluded that rhythm jumping led to a lower heart rate than freestyle jumping suggesting that

different movements while jumping rope are beneficial to increasing aerobic work (Myles, Dick & Jantti, 1981).

Quirk and Sinning (1982) and Town et al. (1980) examined oxygen consumption during five-minute jump roping sessions. College students (n=12) were asked to skip rope at either 120, 140, or 160 jumps per minute. Oxygen consumption was recorded while the participants were jumping rope. They concluded that jumping rope, even at five minutes, is a very strenuous activity with intensities reaching 12.5 metabolic equivalents (METS) for men and 11.7 METS for women. This level of intensity is equivalent to running on a treadmill at 7.0 to 8.0 miles/hour (Quirk & Sinning, 1982; Town, Sol, & Sinning, 1980).

More recently, energy expenditure of common physical activities was assessed in 18 children ages 11-13 years old (Park, Lee, Lee, & Son, 2014). The children wore a portable caloric monitoring system while they performed the common activities for ten minutes. It should be noted that some of the children needed to take a break while jumping rope. A break was not required for the other activities, which included running, walking, throwing a ball, planting transplants in a garden, and sowing seeds using a hand hoe. During the jump rope activity, the average heart rate was 162.3 beats per minute, maximal oxygen uptake was 30.6 mL/kg*min, and the participants worked at 8.8 METs. There were no differences between running and jumping rope and both activities were more strenuous than the other activities (Park et al., 2014).

In another study, a weighted jump rope program was implemented for 40 male, teenage basketball players (Orhan, 2013). The experimental group jumped with a 695-

gram rope, three days a week for eight weeks. The control group participated in technical basketball training for the same time period. Anaerobic power was measured using the Wingate Test protocol where participants cycled on a cycle ergometer, maintaining maximal pedal speed for 30 seconds as 7.5% of their body weight was progressively added to the cycle load. At the post-test measures, the experiment group significantly increased both their peak power output and average power output during the Wingate test. The control group significantly increased their peak power output but not their average power output suggesting that the weighted jump rope program effected anaerobic endurance (Orhan, 2013).

There are several limitations related to the previous studies. First, the study samples consisted mostly of college students or older individuals. Another limitation is that a majority of the studies only examined men and the sample sizes were small. Furthermore, the studies did not examine the long-term cardiorespiratory effect of jumping rope. Additional research is needed.

Jumping rope and body composition. Kim et al. (2007) examined the effect of a jump rope exercise program on body composition among 26 obese and 14 lean male adolescents. Participants in the exercise group were asked to jump rope for 40 minutes a day, five times a week, for six weeks. Results indicated that participants in the six week jump rope program significantly decreased their hip circumference, weight, BMI, and fat mass while the control group participants showed no significant changes (Kim et al., 2007).

In a 2000 study, Pettersson et al. (2000) compared athletes on an organized jump rope team to a control group who averaged 0.9-1.1 hours of physical activity per week. This is one of the only studies to include jump rope athletes who held regular practices and competed. The jump rope team consisted of ten Caucasian females whose average age was 18 years-old. The participants had been practicing the sport since age 12 on average and they practiced for about six hours a week. This amount of jumping is much higher than reported in previous studies (Pettersson et al., 2000). Results indicated that participants on an organized jump rope team had significantly lower body fat percentages compared to the control group.

Jump rope and bone density. Arnet and Lutz (2002) studied 37 high school females who completed a jump rope intervention. The intervention was conducted during the first ten minutes of their physical education classes and the participants were split into three groups: High-volume, low-volume, and control. The high-volume group jumped at 50 jumps per minute for the entire ten minutes. The low-volume group jumped at the same rate for five minutes and then rested for the remaining five minutes. The control group walked for five minutes and stretched for five minutes. The intervention was four months in duration. Ultrasound was used to measure the stiffness of the oscalcis (heel bone) as a rating of bone strength. The high-volume group had an increased ultrasound stiffness index and therefore, an increase in bone stiffness compared to the low-volume group and the control group at post-test measures (Arnett & Lutz, 2002). Pettersson et al. (2000), whose methods were previously discussed, found that a team of rope jumpers had the same bone mineral density as a competitive team of soccer players.

Both groups of rope skippers and soccer players had significantly higher bone mineral density than a control group of females of the same age (Pettersson et al., 2000).

Jump rope and joint health. Duzgun et al. (2010) studied a population of female adolescent volleyball players ages 13 to 16 years old. The purpose of this study was to examine the effect of weighted ropes on shoulder strength and flexibility. The weighted rope weighed 695 grams while the non-weighted rope weighed 160 grams. Group One trained with the weighted rope three times a week, for 12 weeks, increasing training time (from 30 seconds to 60 seconds) and number of training sets (from one to three). Group Two completed the same progressive training program with the non-weighted rope. Group Three was the control group, which only participated in the regular volleyball practice. Results indicated that training with a weighted jump rope improved shoulder strength, especially strength related to external rotation, relative to a non-weighted rope (Duzgun et al., 2010).

The Sport of Jump Rope

There have been several articles written on the fitness applications of jumping rope but mostly in training and fitness health publications such as *Men's Health* and *Shape*. Studies have used rope skipping as a mode of cardiovascular exercise and speed jumping has been studied for its aerobic training potential (Arnett & Lutz, 2002; Baker, 1966; Kim et al., 2007; Quirk & Sinning, 1982; Town et al., 1980). Few studies have evaluated participation on a jump rope team.

In the late 1970's, Jean Barkow of Milwaukee Riverside High School held the first "Rope-a-thon" for the local American Heart Association. After a demonstration and

meeting at the American Alliance of Physical Education Health Recreation and Dance (AAPEHRD) conference, Jump Rope for Heart (JRFH) began to work with the American Heart Association. Since 1978, this program has focused on educating people at a young age about heart health and has provided fund raising opportunities for the Heart and Stroke Foundation ("JRFH About this Program," n.d., "USA Jump Rope," n.d.; Kalbfleisch, 2001). Jump Rope for Heart has developed materials including instructional packets, posters of tricks, videos, and ropes for anyone to purchase. Currently the foundation focuses on heart health awareness and fundraising while sponsoring jump rope events.

To promote JRFH in the program's beginning stages, demonstration teams were formed. These groups of students learned skills and created jump rope routines to perform for their communities to showcase their jump rope skills and bring attention to cardiorespiratory fitness and JRFH. As the teams became more popular and competitive, more difficult skills and partner tricks were created.

Currently, there are several jump rope teams both in the U.S and across the world. The International Rope Skipping Organization (IRSO) was developed to oversee the sport and develop competitions. In 1994, USA Jump Rope became the governing body of the sport for the United States. The USA Jump Rope website offers information on teams, camps, training sessions, and competitions. There are 83 teams in 35 states registered with USA Jump Rope. The organization holds conventions and workshops for coaches and athletes to learn new techniques. They are always willing to help start a

team in any area and to provide ideas relating to fundraising and choreographing routines (USA Jump Rope, 2010).

Jump rope teams compete in individual and team events at national and international competitions. As an individual participant, competitions include freestyle single routines and individual speed competitions. Groups can compete in freestyle partner routines, paired double dutch, paired Chinese wheel, and partner double dutch speed. Double dutch consists of two rope turners spinning two ropes inward with a jumper in the middle. Chinese wheel consists of two jumpers sharing ropes so that they are turning one rope for them and one for their partner. There are all male, all female, and co-ed categories for the double dutch competitions. Organizations have recently begun campaigning for jump rope to become an Olympic sport ("Internaltional Rope Skipping Federation," 2015).

Given the cardiovascular, muscle strength, endurance, and flexibility related to the sport of jumping rope, it is important to examine the effect of jumping rope on psychological and physical health. Implementing a program that utilizes jumping rope can be an effective strategy for increasing physical activity and aerobic fitness (Baker, 1966; Duzgun et al., 2010; Quirk & Sinning, 1982). The team aspect of jumping rope may be important for increasing physical enjoyment, creating friendships, and increasing lifelong activity. In order to better understand the potential psychological effects of jumping rope, it is important to review the relevant psychological theories related to physical activity promotion.

Competence Motivation Theory

When examining the psychological aspects of physical activity, it is crucial to utilize theoretical frameworks in order to describe the pathways for increased physical activity and improved psychological well-being (Creswell, 2009; Nigg & Paxton, 2008). In studying physical activity behaviors, theory is used to either predict physical activity behaviors or examine the antecedents as a result of physical activity. Theories used for youth physical activity have almost exclusively been adapted from adult-centered theories. When using these theories with youth populations, it is important to consider developmental factors within each theory (Nigg & Paxton, 2008).

Competence Motivation Theory (CMT) describes how competence evaluations and self-worth influence motivation thorough indirect influences from emotional states including positive affect, socializer's approval, and self-reward (Harter, 1978; Weinberg & Gould, 2011). CMT originally began as a revised version of White's Global Construct of Effectance Motivation Model (1959). Harter developed five extensions and specifications from White's (1959) model, creating a multidimensional model for youth populations (Harter, 1978; Weiss & Amorose, 2008).

The first extension was to specify that competence motivation in children vary depending on the achievement domain of the skills they are mastering (Weiss & Amorose, 2008). This distinguishes skills in the cognitive, affective, and psychomotor domains and allows for variation between the domains. Second, Harter (1978) discusses how competence is influenced by both the success and failures at tasks and how optimal challenges, which are challenging yet achievable, are fundamental. White (1959) had

only addressed the impact of being successful at mastery attempts. Third, the influential role of socializing agents, including adults and peers, on a child's perceived competence and emotional state was added. Fourth, the construct of perceptions of competence was added as both a direct and mediating variable on competence motivation through the affective response variables. This is an important addition when including factors on youth's developmental stages into the model. Through the fifth and final extension, Harter's model places higher importance on affect as a meaningful concept influencing motivation in youth (Harter, 1978; Weiss & Amorose, 2008).

This model of competence motivation describes the effect of mastery attempts and successes at optimal challenges on current and future feelings of anxiety, self-perceptions, and extrinsic motivation (Harter, 1978; Weiss & Amorose, 2008). Competence motivation, positive affect, mastery attempts, and success at optimal challenges are latent or unobserved variables. These variables are not directly measured but provide important pathways in the connection of the theoretical model. Socializers' approval, internalization of self-reward system, and perceptions of competence and control are observed indicator variables. These variables are directly measured through psychological assessments and serve as concrete proof of change (Harter, 1978; Schreiber, Stage, King, Nora, & Barlow, 2006; Weiss & Amorose, 2008).

Self-worth. Global self-worth is a construct that has been equated with self-esteem and overall self-concept as a description of a person's overarching beliefs about themselves in general situations (Crocker, Kowalski, & Hadd, 2008; Harter, 1982; Nigg & Paxton, 2008). According to Harter (1982), children as young as eight years old are

able to attribute feelings of success into different domains and compile these feelings. Harter (1982) proposes that self-worth is not a summation of perceptions across varying domains but is a construct that is able to directly measure how a person likes him or herself as a person (Harter, 1978, 1982).

A multidimensional model of the self depicts the different constructs that come together to make up the overall view of the self (Shavelson, Hubner, & Stanton, 1976). The overall self is a hierarchical construct above academic, social, emotional, and physical constructs. The hierarchical model continues to break down each construct into varying contributing dimensions (Crocker et al., 2008; Shavelson et al., 1976). For example, the physical construct includes physical competence, strength, endurance, and physical appearance subdomains. Perceptions of the overall self are more general, stable, and lasting whereas the lower level dimensions are more specific and fast changing (Buckworth & Dishman, 2002; Crocker et al., 2008).

Causal flow of self-worth. In examining the causal flow between the general and specific dimensions of the hierarchical model, there are two fundamental approaches (Buckworth & Dishman, 2002; Crocker et al., 2008). A bottom-up approach posits that the lower level, situation specific perceptions of competence influence the subdomains above them, which influence the domain above that until reaching overall self-esteem/self-concept. The top-down approach posits that changes in overall self-esteem will influence the lower domains and subdomains. Research has found little support for either approach in regards to intervention work where the goal is to create changes in either the higher or lower self-perceptions and expect the causal flow to lead to additional

changes (Crocker et al., 2008). However, research has found evidence for horizontal causal flow in longitudinal studies where a domain of self-perception at one time point influences the same domain of self-perception at the following time point (Crocker et al., 2008). These findings challenge intervention programs that only target self-perceptions at one hierarchical level expecting the bottom-up or top-down causal flow to create influential changes.

It is interesting that these approaches examine the influences through a single domain and not the interaction of possible influences between the domains. It is possible that the causal flow in the hierarchical model of the self is a cyclic mix of the bottom-up and the top-down approach where increases in self-esteem are influenced from changes in competence from one domain trickled down to influence positive changes in competence in a different domain. Therefore, implementing a program that would increase a child's perceptions of competence in sport and therefore, the physical domain would travel up the hierarchical model increasing the child's global self-worth. These positive general feelings then may lead the child to consequently perceiving higher levels of competence in the academic domain. Similarly, there could even be a direct influence between domains when a child increases competence in an activity, which then increases competence in another domain. For example, a child participating in a new physical activity where they learn a new skill and then are able to help a fellow student learn the skill could increase competence in both the physical and social domains simultaneously without the increase and dissemination of overall self-esteem. These pathways of influence have been hypothesized through Harter's effectance model of CMT (1978).

The physical domain could be the initial domain of change through a physical activity program, which has a high availability of mastery attempts and success at optimal challenges along with a supportive environment with a socializer's approval and a self-reward system for mastery goals. Through changes in the physical domain, it could be possible to observe positive changes in the academic, social, and emotional domains. Jump rope teams for youth may be the type of program to create positive self-perceptions in the physical domain, which could then lead to changes throughout other domains.

Perceptions of competence. Perceptions of competence and control is an indicator variable in Harter's CMT model. Perceived competence is a dimension of self-evaluation guided by a person's past and present hopes and feelings (Crocker et al., 2008; Harter, 1982; Nigg & Paxton, 2008). Harter describes the three general domains for competence as cognitive, social, and physical. Through the development on the Self-Perception Profile for Children (SPPC), Harter created five subscales that represent these three domains. The sixth subscale is global self-worth, which, as previously discussed, is not additive of the other subscales but stands alone as its own domain (Harter, 1982). These self-perception subscales represent the role of the different domains at play in Harter's CMT model.

Mastery attempts to success at challenges. Mastery attempts and success at optimal challenges are latent variables in Harter's CMT model. Success at optimal challenges directly and indirectly influences perceptions of competence. Mastery attempts directly influence success at optimal challenges and socializers' approval (Harter, 1978, 1982; Weiss & Amorose, 2008). In the physical domain, this represents a

tangible interaction between attempting a new skill and the outcomes from succeeding at that skill. The connection between success at challenges to positive affect to competence motivation and back to mastery attempts shows the cyclic relationship between being successful at a new skill and wanting to attempt the new skill again. The cycle between mastery attempts and success at challenges that includes perceptions of competence is noteworthy, especially if the perceptions of competence are broken down into the aforementioned domains. If children can differentiate between their competences in separate domains then the changes in perception of competence, driven from success at optimal challenges, in the physical domain can impact competence motivation and therefore mastery attempts in a different domain.

Going a step further from the previous scenario, a child may succeed at a physical skill because they were given the opportunity and encouragement to continue mastery attempts. As a result, their competence in the physical domain is increased, which concurrently increases their academic competence through increases in global self-worth. This new academic competence influences their motivation and for example, may then increase their mastery attempts at a math problem in their homework. This pathway through mastery attempts and success is a hypothesized connection between the domains of competence.

Children on jump rope teams learn new skills every day. Through coach encouragement, reward systems, and peer interaction, participants attempt several new skills, which in jumping rope includes learning both individual and group skills. The progression of these skills allows for continuous learning as new skills build upon the

development of motor control abilities. The mastering of one skill leads to the introduction of new skills. Additionally, the mastering of new skills is a daily occurrence. Skill progression and scaling for ability can be used to assure that people of all levels learn multiple new skills each practice. These variations help create optimal challenges across the range of participants. Also, through routine development, stringing skills together is a new skill in itself. Even in its simplest form, jumping for longer or faster than yesterday is considered a success.

Socializers' approval, self-reward, and mastery goals. The socializers' approval and internalization of self-reward and mastery goal variables are indicator variables in Harter's CMT model. Both variables directly influence perceptions of competence while socializers' approval influences internalization of self-reward (Harter, 1978; Weiss & Amorose, 2008). In the physical domain, these variables are comparable to the child's perceived climate created by coaches, peers, and parents.

Achievement Goal Theory

Achievement Goal Theory describes the interaction between achievement goals and perceived ability, and their influence on achievement behavior (Duda & Hall, 2001; Dweek, 1986; Nicholls, 1984). Goal orientation describes how a person perceives their achievement behavior based on their personal goals and the motivational climate. Goal orientation for children has been studied in classroom and sport contexts (Ames & Archer, 1988; Ames, 1992; Duda & Nicholls, 1992). The two goal orientations are competitive/outcome orientation and mastery/task orientation. Competitive orientation describes a focus on winning, competition between peers, public comparison between

peers, and emphasis on the outcome not the process. Mastery orientation focuses on individual improvement, cooperation between peers, peer learning, and achievement through the process of the task (Ames, 1992; 1992b; Nicholls, 1984; Pintrich, 2000; Reinboth & Duda, 2006; Weinberg, 2013).

Multiple studies have described the relationship between a mastery motivational climate and positive self-perceptions, intrinsic motivation, and self-esteem (Boone & Solmon, 1993; Brunel, 1999; Duda & Nicholls, 1992; Duda & Ntoumanis, 2005; Duda, 1996; Kavussanu & Harnisch, 2000; O'Rourke, Smith, Smoll, & Cumming, 2012; Reinboth & Duda, 2006; Smoll, Smith, Barnett, & Everett, 1993). These findings suggest that while youth are developing and learning new skills, it is beneficial to create a motivational climate where they feel that they are contributing to the team, being positively recognized by their peers and coaches, and feel that they are participating on an equal playing field.

Goal orientation and competence motivation. In examining the interaction between Achievement Goal Theory (AGT) and Competence Motivation Theory (CMT), it is important to note the role of the teachers and instructors (Harter, 1978; Stuntz & Weiss, 2009; Weiss & Amorose, 2008; Wolters, 2004). Motivational climate can be influenced by the climate that an instructor creates. The instructor can be a positive influence by providing positive feedback and reinforcement, encouraging students to work together, and praising success and effort for all participants (Stuntz & Weiss, 2009; Wolters, 2004). CMT describes the importance of the instructor as a mediating variable between mastery attempts and perceptions of competence (Harter, 1978). This depicts

how important the instructor is in increasing perceptions of competence as the participants learn new skills (Harter, 1978; Weiss & Amorose, 2008).

AGT and CMT can also provide similar insight into how a program should be developed to promote positive motivational climate and competence motivation. In an effort to create a high task and low ego orientation, the acronym TARGET can be used to focus a program (Ames, 1992). TARGET stands for Task, Authority, Recognition, Grouping, Evaluation, and Timing, and is an outline that can help a program emphasize achievement goals (Ames, 1992). In using this outline, a program will provide the participants with opportunities to make decisions and be recognized for both their effort as well as success. Additionally, the program will create tasks that are within the participants' skill level, use cooperation instead of competition, and encourage them to work with all participants in the program, not just ones they know. Similarly, CMT uses variables that can be addressed in program development to promote competence motivation (Harter, 1978). The connection between mastery attempts, success at challenges, and perceptions of competence can be influenced by how the program is developed. It is important that the program be designed with a variety of skills that participants can master. More importantly, these skills need to be modifiable to all skill levels so that all participants are successful and feel a sense of accomplishment (Harter, 1978; Weiss & Amorose, 2008).

Physical activity programs have been found to positively impact psychological variables including self-perceptions and physical activity enjoyment. In one study, boys and girls who increased physical activity over two years showed increases in both social

and athletic competence (Stein, et al., 2007). Those who increased activity over the two years were more likely to have increased self-perceptions, again only in social and athletic competence (Stein et al., 2007). In both male and female teenagers, physical activity levels were found to positively influence perception of competence in physical ability (Sabiston & Crocker, 2008). Higher physical activity is also associated with higher levels of self-esteem, self-efficacy, and social influences (Strauss et al., 2001). Physical activity enjoyment increased among the fourth to sixth grade students participating in a program that added 15-minute activity breaks during school (Ernst & Pangrazi, 1999). In a 12-week program for eight to ten year-old girls, physical activity preference was positively influenced by activity, arts/crafts, and self-esteem activities (Story et al., 2003).

Goal Orientations, Competence Motivation, and Jump Rope Teams

As discussed previously, research on jump rope teams is extremely limited. Through an exhaustive literature search, only three articles have been found examining youth teams. As discussed earlier, Pettersson and colleagues (2000) examined body composition among adolescent girls by comparing members of an existing jump rope team, a soccer team, and an inactive control group. The age, time practiced, and healthy body composition was comparable to youth soccer athletes. Additionally, both groups had healthier body composition than the inactive girls (Pettersson et al., 2000). This study indicated that participants on a jump rope team were participating in comparable amounts of exercise as other traditional sport athletes. These findings are limited to

participants who are jump rope athletes participating in the sport for many years. Also, current or past participation in other sports was not controlled for in this study.

The second study involved what was called a "precision jump rope program (Hatfield et al., 1985)." The purpose of this study was to examine the psychological response to jumping rope at a time when Jump Rope for Heart was gaining popularity and there was no research examining this type of program. Participants were eight girls and three boys ages 9 to 11 years-old, who were White and upper middle class students in Washington DC. The eight weeks consisted of one-hour training sessions, twice a week. The training sessions included a five-minute dynamic stretching warm-up followed by an instructor demonstration of the chosen rope skills. The participants would practice the skill, then practice patterns of skills to music, and finally learn two-minute jumping routines. They maintained 80% of their max heart rate for approximately 16 minutes during the sessions. They were also instructed to practice their jump roping at home (Hatfield et al., 1985).

Two self-concept measures were used to assess changes from pre- to post-test. The first was the Martinek-Zaichowsky Self-concept Scale, which consists of 25 bipolar pictorial representations of parameters pertaining to self-concept (Matiniek & Zaichowsky, 1977). The second was the Piers-Harris Children's Self-concept Scale, which consists of 80 items broken down into six subscales, additively forming global self-concept (Piers, 1964). After the eight-week program, the participants showed significant increases in global self-concept based on the Piers-Harris scale from pre- to post-test. Interestingly, the participants did not show significant increases on the physical

appearance and attributes scale, indicating that increases in other constructs led to the overall increase in global self-concept. No significant differences were found using the Martinek-Zaichowsky scale, which the authors attributed to the tendency of the scale to produce a negatively skewed distribution. The authors concluded that there are psychological benefits related to a precision jump rope program (Hatfield et al., 1985).

This study addressed a need to study the psychological responses to jump rope participation; however, there were several limitations. First, the sample size was small. Also, the intervention program was not specific enough for replication. Additionally, the assessments used in this study are no longer typically used for measuring self-concept. Furthermore, there was no theoretical background for this study. The study proposed a theoretical framework for the measured increase in self-concept; however, no follow up studies have been conducted.

The third study examined a four-week jump rope program at 36 elementary schools in China (Ha, Burnett, Sum, Medic, & Ng, 2015). The STAR project consisted of the following: School-based intervention, train-the-leaders, accessibility of resources, and recreational physical activity. For this study, 1,386 adolescents were assigned to either the STAR project or a wait list control group based on the random assignment of their schools. The STAR project included jumping rope during physical education classes and recess. Participants were provided with ropes, teaching materials, and DVDs. Participants did not increase their weekly physical activity levels from pre- to post-test based on accelerometer data. At post-test, the control group showed significantly higher weekly MVPA than the STAR project group, but the control group had significantly

higher MVPA at baseline and stayed the same through the four weeks. The Health-Related Quality of Life Questionnaire was used to measure physical well-being, psychological well-being, autonomy and parent relation, peers and social support, and school environment. The only pre-test to post-test effect was found for autonomy and parent relation in that the STAR project group reported higher scores on these measures than the control group. Male participants reported higher physical well-being scores than females in general. This recent study made a significant contribution to the literature; however, there were several limitations. Specifically, the program did not compare the physical activity obtained during PE classes and recess where the jump rope program was implemented, and only examined daily MVPA. Therefore, it cannot be determined if differences in MVPA between the STAR project and the control group was from the PE classes, recess, or time outside of school. Additionally, the participants did not set specific outcome goals that encouraged participation in MVPA outside of the program. The program was integrated into PE classes and ropes were provided for recess, but it is not clear if they used any motivational tools to encourage students to jump rope and increase MVPA.

It is hypothesized that participants on a jump rope team will have high master and low competition goal orientation. The sport of jump rope does not have the traditional competition outlets like games or matches, which can lead to internal competition and lack of playing time. Jump rope teams traditionally put on performances as a team, where all members of the team can participate and be showcased.

There is a significant need for additional studies examining the effect jump rope programs have on psychological outcomes and meeting physical activity recommendations.

CHAPTER THREE

Methods

Participants

Participants were fourth and fifth graders (n=28) ages seven to 12 years old who had signed up for an after-school jump rope program (i.e., Rope Power). Participants were recruited from programs in two elementary schools in the upper Midwest. At School One, twenty-eight students enrolled in Rope Power with twenty-one participating in the study. At School Two, eight students enrolled in Rope Power with seven participating in the study. Taken together, this resulted in 28 participants for the current study.

Study Design

The primary purpose of this study was to evaluate an after-school jump rope program on physical activity duration and intensity and pre- to post-test measures of psychological variables. Additionally, the feasibility of implementing an after-school jump rope program was examined by conducting small group interviews with the participants. Although Rope Power is a program that currently existed at the time of the study, modifications to the program were made and questionnaires were administered at beginning and end of the program. The Rope Power program lasted eleven weeks and ended with an all-school showcase performance. Accelerometer data were collected at weeks three, six, and nine. Questionnaires were administered at week one and eleven, after the showcase performance. Small group interviews were conducted at week twelve, after the showcase, to assess perceptions of the Rope Power. Table 3-1 presents the timeline of the study. IRB approval was obtained from the University of Minnesota

Institutional Review Board and the Minneapolis Public School Research, Evaluation, and Assessment Department (see Appendix A).

Table 3-1.

Study Timeline

Week 1	Pre Surveys
Week 2	
Week 3	Accelerometer T1
Week 4	
Week 5	
Week 6	Accelerometer T2
Week 7	
Week 8	
Week 9	Accelerometer T3
Week 10	
Week 11	Showcase & Post Surveys
Week 12	Group Interviews

Rope Power Program Description

Rope Power teaches students various jump rope skills through progression and skill assessments. In general, schools that participate in Rope Power are predominantly elementary schools with availability for third to fifth grade students. The Rope Power program typically begins in January and ends in March with a showcase at a local high school. At the showcase, the teams from the different schools perform their team routine and participate in a double under contest (i.e., jumping rope in which the rope goes under the feet twice in one jump).

Rope power intervention. The PI adapted and added materials to the Rope Power materials for this study. These adapted and added materials are summarized below and presented in Appendix B.

Skill charts. Rope Power consists of 36 skills, which are categorized into six numbered levels with six skills at each level. For this study, the levels were changed from numbers to colors. Additionally, four skills were reassigned to different levels to better fit their difficulty. The changes were made based on the PI's experience on jump rope teams, coaching youth sports, and teaching a jump rope course for college students. The levels were changed from number to color levels in order to lessen the ordinal categorization of the skills and to encourage students to attempt more difficult skills. A large poster, with the skill colors and skill names, was hung on the gym wall in both schools (see Appendix B).

Star charts. Participants received a star chart, which consisted of a blank image of the school mascot and the participant's name (see Appendix B). When participants mastered a skill, they received a star sticker in the same color as the skill level. They put their stickers on their individual charts, decorating it in any way they wished. The star charts were posted in the gym to unite the team and increase discussion among the team members regarding which new jump rope skills they had learned. Approximately, ten minutes of the Rope Power sessions each week consisted of the participants demonstrating the new skills they had recently learned. They received three attempts to demonstrate that they had mastered the skill, which included a few single jumps before

and after the skill. Participants were also given stickers for participation and for working hard through the sessions.

Take home practice logs. Practice logs were given to the participants to take home and document their practice at home (see Appendix B). The log was a tri-fold paper that included their team logo and the participant's name. The practice logs were administered during the first week of the program.

The first component of the log consisted of a section to document the skills that were mastered. Once the skill was mastered, participants were instructed to try the skill three times consecutively, backwards, on one foot, and in combination with other skills. This practice was also documented onto the log. The second component consisted of a goal setting section. Participants wrote individual and team-based short and long-term goals. The third component consisted of recording the frequency and duration of home practice. Participants also documented if they practiced with friends or family members. Finally, participants rated their intensity level for each practice session using the Rate of Perceived Exertion (RPE) scale. The goal was to spend as much time as possible at a high RPE.

Physical Activity Assessment

The ActiGraph GTM1 (Pensacola FL, USA) accelerometer was administered to objectively measure physical activity during the Rope Power session. Participants wore the ActiGraph during the 90-minute rope power session at weeks three, six, and nine. As recommended, the ActiGraph was worn at the front right hip using ActiGraph monitor belts (Nilsson, Ekelund, Yngve, & Sjostrom, 2002; Sirard & Pate, 2001). The

accelerometers were numbered with the participants' study ID in order to match it to their questionnaire data. The accelerometers were distributed as the participants entered the gym to ensure that all were worn correctly and were collected at the end of the session.

Physical activity cut points. Accelerometers objectively measure physical activity by converting dual axis accelerations, measured by piezoelectric transducers and microprocessors, to a quantifiable digital signal referred to as a count (Sirard & Pate, 2001; Trost, Mciver, & Pate, 2005). These quantifiable counts are then translated into meaningful measures of activity time, aerobic capacity, metabolic equivalents (METs), or activity ranges.

To assess the amount of sedentary, light, moderate, and vigorous intensity physical activity time during the Rope Power program, a calibration equation was used to convert the counts to physical activity minutes. There are several different equations that can be used for converting the counts to minutes for children and adolescents, which is a limitation when comparing physical activity levels across studies. Several studies have compared the frequently used equations for children through both direct observation (Guinhouya et al., 2006; Johnson, Russ, & Goran, 1998; Mattocks et al., 2008; Nilsson et al., 2002; Pulsford et al., 2011; Puyau, Adolph, Vohra, & Butte, 2002; Reilly et al., 2006; Trost, Loprinzi, Moore, & Pfeiffer, 2011; Vanhelst, Béghin, Turck, & Gottrand, 2011) and meta-analyses (Patty Freedson, Pober, & Janz, 2005; Trost et al., 2005).

For this study, the equation developed by Freedson and colleagues (1997) was used to distinguish physical activity levels. The cut points were developed for children and adolescents with participants' ages ranging from six to 18 years old (Freedson,

Sirard, & Debold, 1997). The cut points for the counts per minutes are summarized in Table 3-2.

Table 3-2.

Accelerometer Physical Activity Intensity Cut Points

	Sedentary	**Light**	**Moderate**	**Vigorous**	**Very Vigorous**
Counts per minute	0-149	150-499	500-3999	4000-7599	>7600

(Freedson et al., 1997)

Using counts per minute and participant age, METs can be calculated. The Freedson et al. (2005) equations were again used to calculate the MET values. These MET values were originally developed by Freedson et al. (2005) by having participants complete treadmill tests at two walking speeds and one running speed using indirect calorimetry as a validity measure for the ActiGraph accelerometers. The equation depicted below, uses counts per minute (cpm) and age variables (Patty Freedson et al., 2005).

METs = 2.757 + (0.0015 * cpm) –(0.08957 * age (yr)) – (0.000038 * cpm * age (yr))

R^2 = 0.74 SEE = 1.1 METs

Questionnaires

The psychological assessments were administered during the first and last week (i.e., week 11) of the Rope Power program at both schools. The questionnaires included demographic variables, self-perceptions, physical activity enjoyment, goal orientation, and minutes of weekly physical activity. The questionnaires are presented in Appendix D-G in the order they appeared in the survey packet.

Demographic information. The demographic questionnaire assessed age, gender, and race/ethnicity (see Appendix C). It also assessed other after-school activities and sports.

Self-perceptions. To measure perceived self-perceptions, the Harter's Self-Perception Profile for Children (SPPC) was used (see Appendix D). The SPPC is founded in Harter's Competence Motivation Theory (1978). The scale was originally developed from the hypothesis that children do not feel equally competent in every aspect of their lives. During the scale's development, three main domains for competence emerged: Cognitive competence, social competence, and physical competence (Harter, 1982). From those domains, six subscales were developed, each with five items. For children, cognitive competence is academic/classroom performance. Social competence is social acceptance and close friendships. Physical competence includes the two constructs of physical appearance and athletic competence (Hagborg, 1993; Harter, 1982; Muris, Meesters, & Fijen, 2003). The final subscale is general self-worth, which is a direct measure of how the child feels about their self on the whole, and not a summation of their responses from different domains. This scale has been interchangeably used and validated for self-esteem and has been used as a general and stable measure of self-worth (Hagborg, 1993; Harter, 1982; Muris et al., 2003; Robins, Hendin, & Trzesniewski, 1998).

The SPPC assesses self-perceptions using a unique response format. Specifically, Harter (1978) attempted to create a scale that imitates the sentence structure children use when describing their feelings. It was also developed in an effort to offset the frequency

of "socially desirable" responses found in the more traditional "strongly agree" or "strongly disagree" format. The format stems from the way that young children compare themselves to their peers in order to describe their own feelings. The participant has two statements that they compare themselves to. Once they relate to one of the statements, they choose if that statement is "Sort of true for me" or "Really true for me (Harter, 1982)."

The survey utilizes two practice questions at the beginning to help participants learn the question format (Harter, 1982). To aide in the understanding of the format, a poster board including the practice questions was presented to the participants. The researcher described how they should first choose one of the two statements, and then choose if that is "sort of" or "really true." A common mistake when taking the assessment is to answer both sides of the items. Therefore, during the practice questions, participants were told that they should only check one box for each line. The second common mistake is to think that only one side of the questionnaire can be selected. The surveys were quickly checked upon completion and if needed, corrected by the participants. Three out of five items for each subscale are positively coded and two are negatively coded (Harter, 1982). The averages for each subscale were calculated to obtain a mean competence score for each of the six subscales.

The items were found to be reliable in loading on the different competence domains for participants ranging from third to ninth grade (Harter, 1982). Confirmatory factor analysis found that all of the items loaded to the correct subscale without cross loading and the factor structure was a reasonable fit (Harter, 1982; Muris et al., 2003).

The SPPC was found to have satisfactory internal consistency ($\alpha = 0.73$-0.86; Harter, 1982; Muris et al., 2003) and good test-retest reliability ($r \geq 0.84$; Muris et al., 2003). In a study of 8-14 year-old participants, the SPPC was found to report good validity and to "correlate in a theoretically meaningful way with child, parent, and teacher-reports of psychopathology and personality (Muris et al., 2003, p. 1799)."

Physical activity enjoyment. The Physical Activity Enjoyment Scale (PACES) was used to measure enjoyment of physical activity among the participants (Motl et al., 2001; Appendix E). The PACES was originally developed for college students and included 18 bipolar statements with a seven-point Likert scale (Kendzierski & DeCarlo, 1991). Motl and colleagues (2001) modified the scale for children participating in both general PA and physical education settings. The scale includes 16 items and uses a Likert scale ranging from one to five. One corresponds with "Totally Disagree," three corresponds with "Neutral," and five corresponds with "Totally Agree." The sentence prompt for the items is, "When I am physically active…" The items include positive feelings such as, "I enjoy it" and "My body feels good" and negative feelings such as, "I feel bored" and "It frustrates me (Motl et al., 2001)."

The PACES was found to be a valid measure of physical activity enjoyment for girls through factorial and construct validity analysis (Motl et al., 2001). The PACES was also found to display good internal consistency ($\alpha = 0.87$) in a sample of 564 male and female third grade students (Moore et al., 2009).

Goal orientation. To assess the goal orientations of the Rope Power participants, a combination of the Sport Goal Orientation scale (SGO) and the Classroom Goal

Orientation (CGO) scale were used (Duda & Nicholls, 1992; see Appendix F). Because Rope Power is both an after-school class and a sport-like physical activity program, many sport goal orientation questionnaires are not a good fit for assessing goal orientation for jumping rope. Therefore, the CGO and SGO questionnaires were used because they use phrasing that applies to both the classroom and sport environment (Duda & Nicholls, 1992).

The CGO and SGO scales both consist of 21 items loading on four factors including ego orientation, task orientation, work avoidance, and cooperation. The work avoidance and cooperation factors were not relevant and therefore, were not used for the current study, which eliminated five items (Duda & Nicholls, 1992). The CGO and SGO repeat the same 16 items, loading on task or ego orientation and are worded differently to fit either a classroom or sport setting. The item that best fit the vernacular associated with the Rope Power after-school programs was chosen from either the CGO or SGO. For example, "Others mess up and I don't" (SGO item for ego) was compared to "Others get things wrong and I don't" (CGO item for ego) and in this case, the SGO item was used. This created the 16-item combined Classroom/Sport Goal Orientation scale. The prompt statement for the scale is, "In this after-school class, I feel successful when…" The scale uses a 5-point Likert scale with one corresponding to "strongly disagree" and five corresponding to "strongly agree."

The original scales were created and given to 207 students with a mean age of 15.1 years old. The items appropriately loaded on the four factors with no cross loading (Duda & Nicholls, 1992). Cross-domain consistency was found between the sport and

classroom scales (Button, Mathieu, & Zajac, 1996; Duda & Nicholls, 1992). Task orientation was found to significantly relate to measures of satisfaction or enjoyment in the classroom (R^2= .20). Additionally, both the task and performance orientation scales for the classroom were significantly correlated with the respective sport scales (r= 0.67, r= 0.62) (Duda & Nicholls, 1992). The CGO scale showed good test-retest reliability (α=0.83) using a 14-day interval (Nicholls et al., 1990). The Task and Ego Orientation in Sport Questionnaire (TEOSQ), which is adapted from the SGO to focus on a sport environment, showed good internal reliability on both the task (α=0.77-0.87) and ego (α=0.77-0.91) subscales for youth, high school, and collegiate athletes (White & Duda, 1994).

Weekly physical activity. The Self-Administered Physical Activity Checklist (SAPAC) was used to assess amount and intensity of weekly physical activity (Gesell et al., 2008; Appendix G). The checklist separates out before and after school physical activity. Respondents self-report the number of ten-minute physical activity intervals completed during the past week. There are 22 activities common to elementary and middle school-aged children. The first 20 are physical activities (e.g., basketball, walking, outdoor chores) and the final two items are sedentary activities (i.e., watching TV or movies and playing video or computer games; Gesell et al., 2008).

The checklist can be used to calculate both physical activity minutes per week and metabolic equivalents (METs) using a compendium of physical activity for youth populations (Ainsworth et al., 2011; Gesell et al., 2008; Sallis et al., 1996). The adult METs were adjusted for the ages of the participants based on the increased resting

metabolic rate for adolescents ages 8-12 years old (Harrell et al., 2005). For the current study, the before and after school scores were added together for both weekly physical activity and METs.

The SAPAC was found to have good test-retest reliability among elementary school aged participants (Gesell et al., 2008; Sallis et al., 1996; Telford, Salmon, Jolley, & Crawford, 2004; Treuth et al., 2003). The checklist has been validated against physical activity participant interviews, parent interviews, parent-report checklists, and accelerometers. The SAPAC has high agreement with parent-report checklists, parent interviews, and participant interviews (Sallis et al., 1996; Telford, Salmon, Jolley, & Crawford, 2004; Treuth et al., 2003). It also shows good, but slightly over-reporting, agreement with accelerometers (Sallis et al., 1996).

Procedure

Rope Power was held on Mondays and Wednesdays at School One and Tuesdays and Thursdays at School Two for 90 minutes each session for 11 weeks. Participants were third through fifth graders who had self-enrolled in Rope Power at the two elementary schools. Consent forms were sent home with all students who had enrolled in Rope Power (n=36). Once parental consent was obtained (consisted of the student returning the consent form to the researcher), the study was explained to the participants and participants completed an assent form (see Appendix H). Participants also completed a baseline survey at this time. During weeks three, six, and nine, participants wore accelerometers during the 90-minute Rope Power session. The all-school showcase was held during week 11. The showcase consisted of performing the team's routine at the

high school in front of friends and family members. The post-test questionnaires were administered at week 11, the day after the final showcase performance. During week 12, the group-based interviews were conducted at both schools.

All students enrolled in Rope Power participated in the twice a week sessions for 11 weeks and the showcase performance at the end of the program. They all received the adapted materials (star charts and take-home practice logs), new long ropes, and Rope Power t-shirts. Students participating in the study completed the baseline and post-test questionnaires, wore accelerometers at the three time points, and received a snack bar for completing the questionnaires.

Students paid a small fee to self-enroll in Rope Power, which covered the coach assigned by the school, a Rope Power t-shirt, and any materials the school assigned for the program. Regardless of participation in the study, all individuals in both Rope Power teams received updated jump ropes including long ropes for group routines and new materials designed and provided by the PI.

Group-Based Interviews

To inform future research and programs, and to follow-up on the effectiveness of the adapted and added materials, group-based interviews were conducted among a subset of the Rope Power participants (n=6). Two weeks prior to the final showcase, at week ten, interview consent forms were sent home with all Rope Power study participants (n=28). The interviews were conducted during week 12, the week following the showcase and post-test questionnaires. Participants who were able to stay after school and those who provided signed consent forms were eligible to participate in the group-based

interviews. Participant assent forms were read to the participants and participants wrote their names on the assent forms. The consent and assent forms are presented in Appendix H.

One group interview was conducted at each of the two schools. A semi-structured interview was used that included eight questions and possible follow-up questions. The questions were open-ended to encourage group discussion. Any yes/no questions included specific follow up questions to allow participants to expand on their response. The note taking worksheet and interview script are presented in Appendix I. A digital voice recorder was used to record the group interviews.

The questions assessed three main areas reflecting the study aims.

Question 1: What did you like and dislike about the program? Why? Is there anything you would change about the program?

Question 2: What were your thoughts on the added/changed elements of the program (skill levels, skill recording, and take home materials)?

Question 3: What did you think about the all-school showcase and your team performance?

Group interviews provide a meaningful mode of qualitative data collection (Gibson, 2007). Children make excellent interviewees when a comfortable environment is created, because they are more likely to be open with their thoughts and have a lower likelihood of providing biased responses (Gibson, 2007; Stewart, Shamdasani, & Rook, 2007). The interviewer had worked with the participants during their Rope Power

program for the entire duration, which seemed to create a comfortable and open environment for the participants to discuss their thoughts.

Statistical Analysis

Data analysis was completed using SPSS (v 21.0, IBM Corp, New York), ActiLife 6 Data Analysis Software (ActiGraph, LLC), and Microsoft Excel (v 14.4.7, Windows 2011). A Bonferroni-adjusted p-value was calculated for the ANOVA analyses by dividing $\alpha = .05$ by the number of dependent variables (i.e., 5). Therefore, statistical significance was set at $p < .01$.

To examine physical activity time and intensity, counts per minute recorded by the accelerometers were converted into time spent in the intensity levels and metabolic equivalents (METs) ranges. A repeated measure ANOVA was used to examine pre- to post-test changes on minutes of physical activity and MET values. Since there were no differences between the three ActiGraph time points, an average of the three time points was used for the minutes and MET values. Between group ANOVAs were used to examine the effect of gender and minority status on the accelerometer data.

Analysis of variance (ANOVA) was used to examine differences on demographic variables between the two schools. Repeated measures ANOVAs were used to examine pre- to post-test changes on the dependent variables (self-perceptions, physical activity enjoyment, goal orientation, weekly physical activity). Between group ANOVAs were used to examine the effect of gender and minority status on pre- to post-test changes on the psychological variables.

The PI transcribed the group-based interview audio files for clarity. Participant voices were number coded during the transcription to connect participants' data throughout the interview and to connect demographic information to the data. The audio from the two interview groups were transcribed separately and analyzed in the same manner. The PI used a thematic analysis approach to analyze the transcripts. The themes were organized based on the three initial questions, which were developed for the exploratory purpose of the interviews. During analysis, the PI color-coded the transcripts based on the thematic analysis of the three main interview questions. Common themes within the interview questions were included in the results and direct quotes which emphasized the common themes were added to give examples to the thematic analysis.

CHAPTER 4

Results

Demographic Information

Demographic information by school is presented in Table 4-1.

Table 4-1.

Participant Demographic Information

	School 1 (n=21) n (%)	School 2 (n=7) n (%)	Total (n=28) n (%)
Gender			
Male	5 (24)	2 (29)	7 (25)
Female	16 (76)	5 (71)	21 (75)
Race			
White	20 (95)	3 (43)	23 (82)
Black	0 (0)	2 (29)	2 (7)
American Indian	0 (0)	2 (29)	2 (7)
Asian	1 (5)	0 (0)	1 (4)
Ethnicity			
Hispanic	1 (5)	3 (43)	4 (14)
Non-Hispanic	20 (95)	4 (57)	24 (86)
Minority			
Yes	2 (10)	5 (71)	7 (25)
No	19 (90)	2 (29)	21 (75)
Age			
Years Avg (sd)	9.6 (1.08)	8.0 (0.82)	9.2 (1.22)

There were no differences between School One and School Two one age, $t(26)=1.58$, $p=.22$, and gender, $t(26)= .243$, $p=.65$. School Two had a significantly larger minority (non-White or Hispanic) population than School Two $t(26)=-4.019$, $p<.05$.

The Rope Power program was offered the previous year at School One. Of the 21 participants from School One, six participated in Rope Power the previous year. Analyses were completed to compare the participants who had previous Rope Power experience (n=6) to those who had not (n=21). There were no differences between these groups on demographic variables. There were no differences found between groups on post-test measures of self-perceptions, enjoyment, goal orientation, weekly physical activity minutes, and weekly METs when controlling for pre-test measures of these variables.

The demographic questionnaire asked participants to report what after-school sports and programs they participated in during the same 12 weeks as Rope Power. Forty-three percent of participants were active in one or more after-school sports. These sports included soccer, basketball, gymnastics, tennis, wrestling, and hockey. Sixty-four percent of participants were active in additional after-school programs. They included classes in computer, arts and crafts, theatre, music, and cooking.

ActiGraph

The counts per minute (cpm) collected by the accelerometers at the three time points (week three, six, and nine) were categorized into intensity levels using the Freedson et al. (1997) cut points. Unlike the Self-Administered Physical Activity Checklist (SAPAC) data, the ActiGraph was administered only during the rope power sessions. There were no significant differences between the time points on percentage of time at each intensity and therefore, the time points were averaged. Two participants had a missing data point at the third time point. An average from the first and second data

point was imputed for the third time point for these participants. Both of the participants needed to leave early from the Rope Power program after less than 20 minutes of program participation. The average time spent in various intensity levels during the 90 minute sessions are presented in Table 4-2.

Table 4-2.
Percentage of Time Spent at Different Intensity Levels during the Rope Power Sessions based on the ActiGraph

		Gender		**Minority**	
	Total (n= 28)	Male (n= 7)	Female (n= 21)	Yes (n= 7)	No (n= 21)
Sedentary					
min (%)	36.7 (40.7)	29.8 (33.1)	39.0 (43.4)	27.5 (30.6)	39.7 (44.1)
Light					
min (%)	8.0 (8.9)	8.7 (9.7)	7.8 (8.6)	9.2 (10.2)	7.6 (8.4)
Moderate					
min (%)	28.0 (31.2)	31.2 (34.6)	27.0 (30.0)	35.4 (39.3)	25.6 (28.4)
Vigorous					
min (%)	7.6 (19.2)	9.5 (10.6)	7.0 (8.0)	9.2 (10.2)	7.1 (7.9)
Very Vigorous					
min (%)	9.7 (10.8)	10.8 (12.0)	9.3 (10.3)	8.7 (9.7)	10 (11.1)

Note. (%) time of 90-minute sessions.

Between groups analysis of variance (ANOVA) indicated that females spent significantly more time in sedentary activity than males, $F(1, 27) = 4.287$, $p < .05$. There were no difference between males and females on light, moderate, and vigorous activity. Non-minority participants spent significantly more time in sedentary activity than minority participants, $F(1, 27) = 8.724$, $p < .05$. Furthermore, minority participants spent

significantly more time in both light activity, $F(1, 27) = 5.276$, $p<.05$, and moderate activity, $F(1, 27) = 24.129$, $p<.001$ than non-minority participants. There was no significant difference between minority and non-minority participants on vigorous activity between the groups.

Within the cut points for vigorous intensity (≥4,000 cpm), the activity level can be categorized into either vigorous or very vigorous. Specifically 4,000 cpm to 7,599 is considered vigorous and at or above 7,600 cpm can is considered very vigorous. Using this very vigorous cut point, participants spent significantly more time in very vigorous activity than vigorous activity, $t(26) =3.174$, $p<.01$. Additionally, males spent significantly more time in overall vigorous activity than females, $F(1, 26)= 8.154$, $p<.01$. Minority participants spent significantly more time in vigorous activity than non-minority participants, $F(1, 26)= 5.356$, $p<.05$.

Using the Freedson et al., (2005) equation, METs were calculated using counts per minute (cpm) and age. The MET ranges for the five physical activity intensity levels and average time spent in the ranges are presented in Table 4-3.

Table 4-3.

Time Spent at METs Intervals

	Sedentary	**Light**	**Moderate**	**Vigorous**	**Very Vigorous**
METs	< 2.1	2.1 - 2.49	2.5 - 6.49	6.5 - 10.59	> 10.6
Minutes	36.7	8.0	28.0	7.6	9.7

Perceptions of Competence

The subscales of scholastic competence, athletic competence, physical appearance, social competence, and self-worth are presented in Table 4-4. Analyses were conducted using Bonferroni adjusted alpha levels of .01 (.05/5).

Table 4-4.

Pre- and Post-Test Scores on the Perceptions of Competence Subscales

		Gender		Minority	
	Total	Male	Female	Yes	No
	(n= 28)	(n= 7)	(n= 21)	(n= 7)	(n= 21)
Athletic					
Pre	2.94 (.51)	3.14 (.51)	2.87 (.51)	2.54 (.32)	3.07 (.50)
Post	2.97 (.61)	2.89 (.73)	3.00 (.58)	2.21 (.33)	3.22 (.45)
Scholastic					
Pre	3.06 (.54)	3.29 (.62)	2.99 (.50)	3.03 (.59)	3.08 (.53)
Post	3.14 (.60)	3.14 (.41)	3.13 (.66)	2.80 (.74)	3.25 (.60)
Appearance					
Pre	3.25 (.58)	3.29 (.74)	3.24 (.53)	2.91 (.55)	3.36 (.55)
Post	3.22 (.61)	3.23 (.67)	3.22 (.61)	3.06 (.38)	3.28 (.67)
Social					
Pre	3.00 (.67)	3.29 (.62)	2.90 (.67)	2.69 (.61)	3.01 (.66)
Post	3.12 (.57)	3.20 (.43)	3.10 (.62)	2.69 (.30)	3.27 (.57)
Self-Worth					
Pre	3.48 (.40)	3.60 (.40)	3.44 (.40)	3.31 (.43)	3.53 (.39)
Post	3.52 (.47)	3.52 (.48)	3.52 (.48)	3.49 (.36)	3.53 (.51)

Note. Standard deviations are in parentheses.

Athletic competence. There was not a significant increase from pre- to post-test on athletic competence, $F(1, 27) = .108$, $p=.745$. After controlling for pre-test scores, there was no significant difference between males and females on post-test athletic

competence. Minority participants had lower athletic competence scores than non-minority participants at pre-test, $F(1, 26)= 6.589$, $p<.05$. After controlling for pre-test scores, there was a significant difference between minority and non-minority participants on post-test athletic competence, $F(1, 25)= 18.577$, $p<.001$, $\eta^2 = .426$, in that athletic competence among non-minority participants increased from pre to post-test but decreased among minority participants from pre to post-test.

Scholastic competence. There was not a significant increase from pre- to post-test on scholastic competence, $F(1, 27) =.579$, $p=.58$. After controlling for pre-test scores, there was no significant difference between males and females on post-test scholastic competence. There was, however, a significant difference between minority and non-minority participants on post-test scholastic competence, $F(1, 25)= 4.462$, $p<.05$, $\eta^2 = .151$ when controlling for pre-test scores. Specifically, scholastic competence scores for minority participants were lower than for non-minority participants when controlling for pre-test.

Physical appearance competence. There was not a significant increase from pre- to post-test on physical appearance competence, $F(1, 26)= .056$, $p=.814$. There were no between group differences for gender or minority status on physical appearance competence.

Social competence. There was not a significant increase from pre- to post-test on social competence, $F(1, 27) = 1.47$, $p=.236$. After controlling for pre-test scores, there were no between group differences for gender or minority status on post-test social competence.

Self-worth. There was not a significant increase from pre- to post-test on self-worth, $F(1, 27) = .262$, $p = .613$. There were no between group differences for gender or minority status on self-worth.

Physical Activity Enjoyment

The means and standard deviations for the pre- and post-test physical activity enjoyment scores are presented in Table 4-5. Analyses were conducted using Bonferroni adjusted alpha levels of .01 (.05/5). There was not a significant increase from pre- to post-test on physical activity enjoyment, $F(1, 27) = .039$, $p = .845$. There were no between group differences for gender or minority status on physical activity enjoyment.

Table 4-5.

Pre- and Post-Test Scores on Physical Activity Enjoyment

		Gender		**Minority**	
	Total (n= 28)	Male (n= 7)	Female (n= 21)	Yes (n= 7)	No (n= 21)
Enjoyment					
Pre	4.53 (.36)	4.53 (.48)	4.58 (.32)	4.37 (.39)	4.63 (.33)
Post	4.55 (.34)	4.50 (.27)	4.57 (.37)	4.45 (.47)	4.58 (.30)

Note. Standard deviations are in parentheses.

Goal Orientation.

The means and standard deviation for the pre- and post-test task and ego orientation scores are presented in Table 4-6. Internal consistency was good for both the task and ego scales ($\alpha = .703$ and $\alpha = .829$ respectively). Analyses were conducted using Bonferroni adjusted alpha levels of .01 (.05/5).

Table 4-6.

Pre and Post-Test Scores on Task and Ego Goal Orientation

		Gender		Minority	
	Total	Male	Female	Yes	No
	(n= 28)	(n= 7)	(n= 21)	(n= 7)	(n= 21)
Task					
Pre	4.74 (.35)	4.81 (.26)	4.72 (.38)	4.70 (.30)	4.75 (.37)
Post	4.71 (.34)	4.81 (.26)	4.68 (.36)	4.70 (.36)	4.72 (.34)
Ego					
Pre	2.29 (.90)	2.95 (1.15)	2.07 (.70)	2.52 (.79)	2.21 (.94)
Post	2.24 (.84)	2.84 (1.14)	2.04 (.64)	2.32 (.88)	2.21 (.85)

Note. Standard deviations are in parentheses.

Task orientation. Task orientation was significantly higher than ego orientation at both pre-test, $t(27)= 12.463$, $p<.001$, and post-test, $t(27)= 14.005$, $p<.001$. Analyses were conducted using Bonferroni adjusted alpha levels of .01 (.05/5). There was not a significant increase from pre to post-test on task orientation, $F(1, 27) = .271$, $p=.607$. There were no between group differences for gender or minority status on task orientation.

Ego orientation. Pre-test task orientation was significantly higher than pre-test ego orientation, $t(1, 27)=12.463$, $p<.001$, and post-test task orientation was significantly higher than post-test ego orientation, $t(1, 27)=14.005$, $p<.001$.

There was not a significant increase from pre- to post-test on ego orientation, $F(1, 27) = .134$, $p=.717$. It is important to note that pre-test scores were significantly higher among the males when compared to the female participants, $F(1, 26) =5.972$, $p<.05$. After controlling for pre-test scores, there was a significant difference between male and female participants on ego orientation. Specifically, ego orientation decreased from pre

to post-test more among the male participants than the female participants. There was not a between group difference for minority status on ego orientation.

Weekly Physical Activity

The means and standard deviation of weekly physical activity minutes and weekly metabolic equivalents (METs) based on the Self-Administered Physical Activity Checklist (SAPAC) at pre and post-test are presented in Table 4-7. Analyses were conducted using Bonferroni adjusted alpha levels of .01 (.05/5).

Table 4-7.

Pre and Post-Test Scores on Weekly Physical Activity Minutes

		Gender		**Minority**	
	Total (n= 28)	Male (n= 7)	Female (n= 21)	Yes (n= 7)	No (n= 21)
Minutes					
Pre	152.4 (159.1)	80.6 (61.7)	179.1 (174.5)	135.7 (75.3)	160.7 (179.7)
Post	402.2 (267.5)	268.6 (162.2)	446.8 (283.5)	300.0 (138.2)	436.3 (293.1)
METs					
Pre	1,430.4 (1,258.8)	823.9 (429.0)	1,632.6 (1,382.9)	1,161.9 (777.9)	1,519.9 (1,387.1)
Post	3,877.9 (2,018.5)	2,929.7 (1,376.2)	4,194.0 (2,124.3)	3,144.6 (1,178.7)	4,122.3 (2,018.5)

Note. Standard deviations are in parenthesis. METs given in $mL*kg^{-1}*min^{-1}$.

Physical activity minutes per week included physical activity during both the rope power sessions and activity outside of the session. There was a significant increase in weekly physical activity minutes from pre to post-test, $F(1, 27) = 53.115$, $p < .001$, η^2

=.663. There were no between group differences for gender or minority status on physical activity minutes.

There was a significant increase in accumulated weekly METs from pre to post-test, $F(1, 27)= 82.138$, $p<.001$, $\eta^2 = .753$. There were no between group differences for gender or minority status on physical activity enjoyment. There was a significant effect for time showing an increase in weekly METs for both males and females, $F(1, 16)= 55.017$, $p<.001$, $\eta^2 = .679$. There was also a significant effect for time showing an increase in weekly METs for both minority and non-minority participants, $F(1, 26)= 54.025$, $p<.001$, partial eta squared= .675.

Results from the Group-Based Interviews

The results of the group-based interviews are presented based on the thematic analysis and organized based on the interview questions outlined in Chapter Three. The demographic information for the interview participants is presented in Table 4-8.

Table 4-8.

Demographic Information for Group Interview Participants

	School 1 (n=4) n (%)	School 2 (n=2) n (%)	Total (n=6) n (%)
Gender			
Male	2 (50)	0 (0)	2 (33)
Female	2 (50)	2 (100)	4 (67)
Race			
White	3 (75)	1 (50)	4 (67)
Black	0 (0)	0 (0)	0 (0)
American Indian	0 (0)	1 (50)	1 (16)
Asian	1(25)	0 (0)	1 (16)
Ethnicity			
Hispanic	2 (50)	2 (100)	4 (67)
Non-Hispanic	2 (50)	0 (0)	2 (33)
Gender			
Yes	2 (50)	2 (100)	4 (67)
No	2 (50)	0 (0)	2 (33)
Age			
Years Avg (sd)	8.8 (0.96)	8.0 (0.00)	8.5 (0.84)

Question one. What did you like and dislike about the program? Why? Is there anything you would change about the program?

The most discussed aspects of Rope Power that the participants enjoyed were the "team" aspect of the program. They reported that they liked that they worked with the same group every week and that they were all working toward the same goal of learning a group routine to perform.

During the interviews, the participants discussed the different parts of the program that contributed to building a team atmosphere. Participants from both schools liked that their star charts were the animal mascots of their schools, which made them feel like they were representing their school. They also reported liking having the mascot on their Rope Power t-shirts. The interview participants stated that they wore their Rope Power t-shirts outside of the Rope Power performance. When asked if they liked that their star charts were kangaroos, the mascot for School One, a participant stated, "Yes! Because we are kangaroos."

Another aspect of the program that both groups enjoyed was how they learned new skills and how they were able to set goals by recording their achievements on their star charts. They had been encouraged to learn new tricks before, but with the star charts, their achievements were more tangible. One participant stated, "It was like a goal for you, a goal to learn new tricks."

When discussing what they did not like about the program, or if there was anything they would change, both focus groups made comments about wanting to learn more tricks. Participants were able to see the names of the tricks at varying levels because they were displayed on a poster. Additionally, some of the higher level tricks had been demonstrated during the Rope Power sessions. The participants reported wanting more time to learn these higher level tricks.

Question two. What were your thoughts on the added/changed elements of the program (skill levels, skill recording, and take home materials)?

As stated previously, the first step for this study was to change the organization of the skill list from numbered levels to categorizing the levels by colors. Specifically, there are six levels, each with eight skills, and they were adapted to be green, blue, orange, red, silver, and gold. Every participant in both interview groups reported that they liked that the *levels* were colors and not numbers. One participant commented that the colors made it easier to track their learned skills on their star charts. For another participant, the colors helped her to mentally group the skills together. "…it makes you remember more like what the tricks are. The number[s] would get mixed together."

The second adapted material was the use of star charts to track participants' skill mastery. Participants reported that they liked that the whole school could see their charts. They stated that it made them feel like they were a part of a team, and that they were being recognized for learning new skills. They were able to put their stickers anywhere on their mascots, were able to personalize their chart, and were able to decorate it how they wanted. A participant from School Two suggested that the mascot could be smaller, "maybe a smaller wolf so you could fill it in."

The third added element to the program was a take home pamphlet where they could track their skill progress, track their practice time, and record if they were able to string different tricks together. This element was not widely used by the Rope Power participants from both schools and the interview participants were asked what take home tools would be beneficial for helping them learn new skills. Two participants suggested creating a handout that listed the tricks so the names could be remembered, practiced, and "show other people."

Question three. What did you think about the all-school showcase and your team performance?

All of the participants from both interview groups reported enthusiastically enjoying the experience. Participants reported enjoying seeing so many other students participating and that "[they] met a lot of other schools". Participants from School Two reported being surprised with the large number of individuals who attended the showcase performance. They reported enjoying the energy in the gym, feeling supported, and noting that they did a good job with their routine. They stated that it was exciting to hear the cheering and clapping when they finished. "I liked it because it made me feel like I did a good job."

Secondly, the participants reported that they enjoyed watching the other routines and how the different teams were doing tricks that they had not seen before. Some of the different tricks were similar to ones they had practiced, but differed in the number of jumpers, number of ropes, or direction of movement. They stated that seeing these variations got them to think about new tricks they wanted to try as some of the different tricks were skills that they had never seen before.

Lastly, in seeing the different performances, they reported taking pride in their own routine and what made their performance special. School One had more partner tricks, which is what they reported liking about their routine the most. A participant discussed one particular trick where they all jump over one spinning rope called a "jump the shot." "Usually participants do jump the shot with one rope but this time we did it with two and going in a big circle which was different." School Two stated that they

liked how their routine ended and how they got to do individual tricks that personalized their routine. "I liked how it was choreographed and it kind of started out slow and it got faster."

CHAPTER 5

Discussion

Rope Power Program

Physical activity plays a crucial role in the positive psychological and physiological development of children (Dishman et al., 2010; Stein, Fisher, Berkey, & Colditz, 2007). After-school programs offer opportunities for children to participate in physical activity with the goal of reaching the recommended 60 minutes of physical activity per day. Jump rope programs, where children practice the sport of jump rope, combine the intense physical activity of repetitive jumping rope with a positive environment in which children work together to learn new skills and perform a group routine.

For the current study, the "Rope Power" after school jump program was evaluated at two elementary schools. New and adapted materials were created and administered to children participating in the program in order motivate them to learn new skills, increase time spent jumping rope during each session, and reward participants for mastering the skills. Accelerometers were administered at weeks three, six, and nine to examine the time and intensity of activity during the Rope Power sessions. To examine the psychological affect of Rope Power participation, self-perceptions, physical activity enjoyment, and goal orientation were measured at pre- and post-test. The Self-Administered Physical Activity Checklist was used to assess weekly physical activity minutes and METs to examine the effect of Rope Power participation on weekly physical

activity. To explore the participants' perceptions of the program and the adapted materials, group-based interviews were conducted at both schools.

ActiGraph Data

The third aim of this study was to examine the time and intensity of the physical activity during the Rope Power sessions. During the 90-minute Rope Power session, participants averaged 50.2 minutes of MVPA, which is fairly close to the 60 minute per day physical activity recommendation. The Rope Power participants spent 45.3% of their time in MVPA.

The number and percent time of physical activity minutes in Rope Power is higher than what has been found in previous studies using accelerometers to assess time and intensity of activity in children during after-school programs (Ajja et al., 2014; Bailey et al., 2012; Taverno Ross et al., 2012; Trost et al., 2008). For example, the highest MVPA was found in 10-14 year old participants of the Health and Physical Activity Promotion in Youth (HAPPY) study, which assessed three different physical activity interventions (Bailey et al., 2012). Rope Power boys and girls received 29.4 and 18.9 more minutes, respectively, of MVPA than boys and girls in the HAPPY study (Bailey et al., 2012).

Looking specifically at vigorous physical activity (VPA), boys in Rope Power engaged in an average of 22.6 minutes per rope power session compared to boys in the HAPPY study who engaged in an average of 6.6 minutes per session (Bailey et al., 2012). Another study examining a general after-school program found that boys engaged in an average of 6.8 minutes of VPA (Trost et al., 2008). Girls in Rope Power engaged in an

average of 18.1 minutes of VPA compared to girls in the HAPPY study who engaged in an average of 7.2 minutes (Bailey et al., 2012). Girls in a regular after-school program engage in an average of 4.1 minutes of VPA (Trost et al., 2008).

It is important to differentiate between physical activity intensity levels given unlike adults, it is specifically recommended that children engage in vigorous intensity physical activity (*PAGA,* 2008). Children participating in five or more minutes of vigorous activity per day are 5.2 times less likely to be overweight than children who do not participate in vigorous activity (Wittmeier et al., 2008). Children in Rope Power engaged in an average of 17.3 minutes of vigorous activity per session, which is above five minutes, the amount needed to decrease the risk of being overweight.

Male participants spent less time in sedentary activity than females, and more time in vigorous activity than females. These findings are consistent with studies finding adolescent females spend more time in sedentary activity in physical education classes (Matthews-Ewald et al., 2013; Nettlefold et al., 2011), after-school programs (Taverno Ross et al., 2012; Troiano et al., 2003; Trost et al., 2008), and daily activity (Colley et al., 2011; Nettlefold et al., 2011; Verloigne et al., 2012) than males. In a program where females outnumber males three to one, the physical activity obtained in the program was not biased toward females. Even though girls spent more time in sedentary activity than boys, it is important to note that girls in Rope Power spent more time in activity than found in previous studies examining after-school programs. Physical activity declines with age for both boys and girls, but the decline has been found to be more drastic in girls (Dumith et al., 2011; Strauss et al., 2001; Wichstrom et al., 2012). Rope Power provided

an opportunity for girls to participate in high levels of moderate, vigorous, and very vigorous activity, which could potentially play a role in increasing physical activity in adulthood.

Psychological Variables

Perception of competence. The second aim of this study was to examine the effect of participating in a Rope Power program on various psychological variables. Participation in Rope Power did not increase perceptions of competence across the domains (scholastic, athletic, physical appearance, social, self-worth) as hypothesized. This was surprising given physical activity is positively related to high self-perceptions across domains (Dishman et al., 2010; Sabiston & Crocker, 2008; Strauss et al., 2001). This is also contrary to research indicating that children who increase their weekly physical activity tend to also exhibit increases in social and athletic competence (Stein et al., 2007). But this study is consistent with studies suggesting that there is no link between physical activity and scholastic competence or global self-worth (Stein et al., 2007). The findings of the current study are also inconsistent with programs that combine physical activity sessions with Positive Youth Development (PYD) materials, which are activities developed to target specific psychological concepts (DeBate & Thompson, 2005; Lerner et al., 2005). PYD programs have linked physical activity with increased global self-esteem and body image in third grade girls (DeBate & Thompson, 2005).

Looking specifically at jump rope programs, the findings of the current study are inconsistent with one study that implemented a precision jump rope program.

Specifically, this study found an increase in self-concept among 11 boys and girls ages 9-11 years old (Hatfield et al., 1985). This inconsistency may be attributed to measurement differences between the current and Hatfield et al. (1985) study. Specifically, the Piers-Harris Children's Self-concept Scale was used in the Hatfield, et al. (1985) study and the Harter's Self-Perception Profile for Children (SPPC) was used in the current study. Furthermore, participants in the Hatfield et al. (1985) study had high self-concept pre-test scores measuring in the 77th percentile (Hatfield et al., 1985). In a more recent examination of a jump rope program, no pre-test to post-test changes were found in physical well-being, psychological well-being, or social support among adolescents participating in a four week jump rope program high in MVPA (Ha et al., 2015). This is consistent with the current findings; however, the current study did address many of the limitation found in the Ha et al., 2015 study. For example, the current study focused on providing materials that encouraged MVPA through practicing the jump rope skills during the sessions. Despite adding these materials in the current study, it appears that the amount of MVPA was not effective in increasing perceptions of competence.

There are several possible explanations for the inconsistency between the current and previous studies. First, participants in the current study were involved in various after-school programs, sports, and extra-curricular activities. It is possible that their involvement in Rope Power was too short in duration or days per week to influence their perceptions of perceived competence in comparison to their other activities. Children typically spend approximately 130 minutes per day in after-school program (Ajja et al., 2014; Taverno Ross et al., 2012). However, Rope Power was only 90 minutes and held

twice a week. Furthermore, 64% of the participants were involved in other after-school programs.

Second, the findings may suggest that there is a need to examine the effect of specific intensity levels on psychological outcomes. Previous studies examining the effect of physical activity on self-perceptions, self-worth, or body image focused more on moderate than vigorous intensity activity (Debate & Thompson, 2005; Dishman et al., 2010; Lerner et al., 2005; Stein et al., 2007). Rope Power provided higher amounts of overall MVPA and vigorous and very vigorous activity, which may have affected the results of the study. Additionally, this intense and physically demanding activity was interspersed with low activity, as light activity and sedentary behavior accounted for 49.6% of the session time. The high intensity interval nature of the program, while positively associated with physiological outcomes in children (Baquet et al., 2004; Corte de Araujo et al., 2012), may have had an opposing influence on psychological outcomes, specifically to those with lower cardiovascular endurances.

An exploratory aim was to examine the effect of gender and minority status on the psychological variables. There was no effect of gender on perceptions of competence across the domains. Minority status did affect post-test scores in scholastic, athletic, and social competence when controlling for pre-test scores. The difference between minority and non-minority populations for both scholastic and social competence had small effect sizes of η^2=.151 and η^2=.158 respectively. This implies that although there was a statistical difference, the difference may not be meaningful (Cohen, 1992). The difference found in athletic competence had an effect size approaching a moderate level,

η^2=.426, which suggests a moderate practical significance (Cohen, 1992). Between group differences were found in that minority participants had significantly lower pre- and post-test scores for athletic competence. These results may be explained by higher sport participation among the non-minority students as seen in their demographic questionnaires. Twenty-nine percent of minority participants and 48% of non-minority participants were active in after-school sports. It is possible that the activity of jumping rope was not perceived as a sport, did not impact perceptions of athletic competence, and therefore outside sport participation influenced competence in this domain.

Scholastic competence scores slightly decreased in minority students and slightly increased in non-minority students from pre- to post-test. Social competence remained the same in minority participants and increased in non-minority participants leading to a significant difference in post-test scores after controlling for pre-test scores. Physical activity has been found to increase perceptions of competence in minority girls (Colchico, Zybert, & Basch, 2000), which was not consistent with this study's findings.

Physical activity enjoyment. Participating in Rope Power did not increase physical activity enjoyment among participants. Physical activity enjoyment had been found to positively influence physical activity in children (Dishman et al., 2005; Sallis et al., 2000). However, in the current study, the physical activity program did not influence physical activity enjoyment. It is possible that the vigorous intensity level influenced the physical activity enjoyment scores in the current study. This is supported by an unpublished thesis that found a decrease in exercise enjoyment among college students participating in a high-interval training program (Tuuri, 2014).

Goal orientation. Rope Power participants did not show positive changes in goal orientation (increased task orientation and decreased ego orientation). At both pre- and post-test measures, task orientation was higher than ego orientation. This findings suggests that participants in the Rope Power program viewed their level of competence based on progressive learning and personal improvement rather than on peer comparison and a need for superiority (Duda & Hall, 2001; Nicholls, 1984).

Programs for children, and the people who implement them, can influence the goal orientation of the participants (Ames, 1992; Ames & Archer, 1988). It was hypothesized that participation in the jump rope program would increase positive goal orientation based on the high team association and low competition nature of the program. The star charts were added to the program to emphasize the goal of learning new skills and to show that one person's accomplishments does not diminish another's accomplishments. Additionally, the group routines utilized the talents of the individual participants in an effort to create an environment that would promote high task and low ego orientations.

The lack of change in goal orientation may suggest that either a jump rope program does not create a positive motivational climate through the activity alone or that the environment created could not increase already positive goal orientations. To increase task orientation and decrease ego orientation, future teacher training materials founded in Achievement Goal Theory should be developed to create a positive motivational climate that address program structure, peer interactions, autonomy, and rewards systems (Ames, 1992; Duda & Ntoumanis, 2003).

Weekly Physical Activity

The third aim of this study was to examine weekly physical activity minutes and accumulated METs at pre- and post-test. Participants reported increased weekly minutes of physical activity according to the Self-Administered Physical Activity Checklist (SAPAC). This checklist assessed all physical activity outside of Rope Power. Based on the physical activity recommendations (*PAGA,* 2008), children should participate in 60 minutes of physical activity per day, accumulating 420 minutes per week. At the pre-test assessment, Rope Power participants were not meeting this recommendation and were averaging 152.4 minutes of weekly physical activity. At the end of Rope Power, participants were averaging 402.2 minutes of weekly physical activity, which brought the participants significantly closer to the recommended levels of weekly physical activity. There was a significant increase in weekly physical activity minutes in Rope Power participants ($p<.001$). Analysis showed a moderate to large effects size ($\eta^2=.663$), suggesting both a statistical and practical difference in pre- to post-test weekly physical activity minutes (Cohen, 1992). Out of the 12 participants who were in after-school sports, five participated in gymnastics and reported a high number of physical activity minutes from these practices.

Both male and female participants significantly increased their weekly physical activity minutes after controlling for pre-test minutes ($p<.001$) with a moderate to large effect size ($\eta^2=.679$), suggesting practical significance (Cohen, 1992). Similarly, both minority and non-minority participants showed increases in weekly physical activity minutes after controlling for pre-test minutes ($p<.001$), with a moderate to large effect

size (η^2=.675), suggesting practical significance (Cohen, 1992). These results suggest that the increase in weekly physical activity minutes is universal for the participants regardless of gender or minority status.

To examine weekly accumulated METs, the activities on the SAPAC were assigned energy expenditure levels based on the 2011 Compendium of Physical Activities (Ainsworth et al., 2011) and adjusted for the age of the individual participant (Harrell et al., 2005). There was an increase in weekly METs from pre- to post-test measures with similar increases found between male and female participants and minority and non-minority participants. Participating in the Rope Power program contributed to their weekly METs as jumping rope is an activity requiring high energy expenditure (Ainsworth et al., 2011; Park et al., 2014). The significant increase in METs from pre- to post-test (p<.001) suggests that the increase in weekly physical activity minutes was performed at the moderate to vigorous intensity levels. The moderate to large effect size (η2=.753) suggests practical significance (Cohen, 1988). This increase has important implications for the participants meeting their recommended 60 minutes of physical activity per day.

There was no control group in this study and therefore, it is unclear if the rope power program or some other factor influenced the increase of physical activity over time. For example, this study was conducted in the Midwest where weather can influence physical activity rates. Pre-test measures were administered the first week of January and the post-test was done in the middle of March. Therefore, it is possible that weather contributed to the increase in physical activity minutes per week. However, the

SAPAC does include many indoor activities, indoor sports, and activities that children participate in during winter weather (e.g., outdoor chores and skating).

Study Strengths

There are several strengths related to the research design and measurement of the current study. Specifically, this is only the third study to evaluate a jump rope program and to examine its effect on children. Another strength is the use of an objective measure (i.e., accelerometer) of physical activity. Previous research indicates that repetitive jumping rope is an intense exercise for adults (Myers et al., 2002; Quirk & Sinning, 1982) and children (Park et al., 2014); however, no study has examined jumping rope when practiced as a sport. This study also provided important information about participant responses to the jump rope program through a qualitative component. This information could possibly inform future jump rope programs delivered through research or real world school settings.

Study Limitations

This study addressed many of the previously discussed limitations involved in jump rope studies. However, there are some limitations of the current study. First, there were limitations with the sample size and distribution. The study examined a small sample size of 28 participants. The study could only be conducted at two schools during one Rope Power season, which limited the generalizability of the study. The two schools had an uneven number of participants, with School One having six and School Two having 22 participants. There were also uneven sample sizes when examining possible differences in dependent variables by demographic information.

Second, a control group was not used to compare the Rope Power program to another after-school programs occurring at the same time. Given there was no control group, it is possible that weather played a role in the physical activity changes observed from pre- to post-test. However, it would have been difficult to have a true control group in the current study given many participants were active in a variety of programs.

The fourth limitation was that participants took part in other after-school programs, which may have influenced the results. Other after-school programs included organized sports, art classes, cooking classes, and gymnastics. The participation in other after-school programs likely contributed to large differences in weekly physical activities and could have impacted the pre- and post-test measures of the psychological variables. Controlling for the outside after-school programs would be difficult because it is important for children of this age to have exposure to a variety of after-school activities.

Practical Implications

Children in the Rope Power program participated in close to the recommended daily levels of moderate to vigorous intensity physical activity. Based on the group-based interviews, the participants appeared to enjoy the program. The participants reported enjoying being part of a team and representing their school. They were able to set goals in mastering different skills, and through the star charts, have a tangible way to record their hard work.

Based on this study, it is recommended that jump rope programs categorize their skill levels with colors and not numbers. This allows the skills to be put in order of difficulty without discouraging students from attempting higher level skills. It may help

in the participants' ability to group the skills and remember the names of the skills. It makes a colorful and child friendly visual aide on the wall of the gym. It also allows for skills to be recorded with colored stickers that represent the mastery skill level of the student. Jump rope programs should use star charts to make the participants feel more like a team, that they are representing their school/community, and that their achievements are being recognized. The mascot should be small enough that the participants can fill up their mascot, and printed with enough space that they can put the stickers where they want to and add personalized decoration to it.

Take home materials can be a great learning tool to encourage participants to continue working on their jump rope skills at home. Participants reported that they liked the take home tool because it helped them remember the names of the skills. Take home materials that include pictures of the various skills seems to be helpful in the development of useful program materials.

Participants reported that the end of the program showcase was a beneficial component of the program. It provided the teams an opportunity to show how hard they had worked and how much they had learned throughout the program. If building a jump rope program in a new community, the showcase should be a standard component. Even if the program is new and there are not many teams or performers, showing their routine to a small group of friends and family, a physical education class, or a community center will potentially help in growing the program.

Future Directions

Future research examining jump rope after-school programs is needed. Specifically, studies that include larger sample sizes than the current study are needed to examine the psychological effect of participating in a jump rope program. It would also be beneficial to increase the time spent in the program, possibly to three times a week. This would be beneficial not only for increasing the weekly amount of physical activity, but also to provide enough time to positively affect psychological outcomes.

Research has not examined high-intensity interval programs in children, outside of their metabolic cost (Corte de Araujo et al., 2012) and ability to change physical fitness (Baquet et al., 2004). It would be beneficial to further investigate the influence of high-intensity programs that are not traditional sport practice on perceptions of competence and enjoyment. Specifically, studies should examine if baseline physical fitness or competence in the athletic domain influence changes in self-perceptions or physical activity enjoyment through the program, either directly or as a mediating variable.

Although studies have directly measured the metabolic cost, heart rate, and oxygen consumptions of individuals jumping rope, it has been while jumping at a set cadence for shorter periods of time. Future studies should examine these physiological outcomes through the sport of jumping rope. Individuals practicing jump rope skills and routines incorporate muscle strengthening moves and high heart rate intervals for long periods of time. This may lead to even more positive cardiovascular changes than previously found in rhythmic jump rope studies. It is evident that jumping rope provides

an excellent opportunity for children to engage in the recommended level of physical activity. Additional studies are needed to further examine these programs.

CHAPTER 6

References

Ainsworth, B. E., Haskell, W. L., Herrmann, S. D., Meckes, N., Bassett, D. R., Tudor-Locke, C., … Leon, A. S. (2011). 2011 Compendium of physical activities: A second update of codes and MET values. *Medicine and Science in Sports and Exercise*, *43*(8), 1575–1581. doi:10.1249/MSS.0b013e31821ece12

Ajja, R., Clennin, M. N., Weaver, R. G., Moore, J. B., Huberty, J. L., Ward, D. S., … Beets, M. W. (2014). Association of environment and policy characteristics on children's moderate-to-vigorous physical activity and time spent sedentary in afterschool programs. *Preventive Medicine*, *69*, S49–S54. doi:10.1016/j.ypmed.2014.09.010

Alliance, A. (2014). *American after 3PM: Afterschool programs in demand.* Washington, D.C.

Ames, C. (1992a). Achievement goals, motivational climate, and motivational processes. In G. C. Roberts (Ed.), *Motivation in Sport and Exercise* (pp. 161–176). Champaign, IL: Human Kinetics.

Ames, C. (1992b). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology*, *84*(3), 261–271.

Ames, C., & Archer, J. (1988). Acheivement goals in the classroom: Students' learning strategies and motiviation processes. *Journal of Educational Psychology*, *80*(3), 260–267.

Arnett, M., & Lutz, B. (2002). Effects of rope-jump training on the os calcis stiffness index of postpubescent girls. *Medicine & Science in Sports & Exercise*, *34*(12), 1913–1919.

Bailey, D. P., Fairclough, S. J., Savory, L. A., Denton, S. J., Pang, D., Deane, C. S., & Kerr, C. J. (2012). Accelerometry-assessed sedentary behaviour and physical activity levels during the segmented school day in 10-14-year-old children: The HAPPY study. *European Journal of Public Health*, *171*(12), 1805–13. doi:10.1007/s00431-012-1827-0

Baker, J. A. (1966). Comparison of rope skipping and jogging as methods of improving cardiovascular efficiency of college men. *The Research Quarterly*, *39*(2), 240–243.

Barlow, S. E. (2007). Expert committee recommendation regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: Summary Report. *Pediatrics*, *120*, S164–S192.

Barnes, M. (2010). *Solving the Problem of Childhoon Obesity Within a Generation*. Washington DC: Executive Office of the President of the United States.

Baquet, G., Guinhouya, C., Dupont, G., Nourry, C., & Berthoin, S. (2004). Effects of a short-term interval training program on physical fitness in prepubertal children. *Journal of Strength And Conditioning Research*, *18*(4), 708–713. doi:10.1519/13813.1

Beighle, A., & Moore, M. (2012). Physical activity before and after school. *Journal of Physical Education Recreation and Dance*, *83*(6), 25–28.

Berenson, G. S. (2012). Review: Health consequences of obesity. *Pediatric Blood Cancer*, *58*, 117–121. doi:10.1002/pbc

Bocarro, J., Kanters, M., Suau, L., Casper, J., Floyd, M., Mckenzie, T., … Sciences, N. (2011). Impact of school sport policy on observed physical activity un middle school children. In *Active Living Research Annual Conference* (pp. 61–66). San Diego CA.

Boone, J., & Solmon, M. A. (1993). The impact of student goal orientation in physical education classes. *Research Quarterly for Exercise and Sport*, *64*(4), 418.

Brunel, P. C. (1999). Relationship between achievement goal orientations and perceived motivational climate on intrinsic motivation. *Scandinavian Journal of Medicine & Science in Sports*, *9*(6), 365–74. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/10606102

Buckworth, J., & Dishman, R. K. (2002). *Exercise Psychology* (First Edition). Champaign, IL: Human Kinetics.

Button, S. B., Mathieu, J. E., & Zajac, D. M. (1996). Goal orientation in organizational research: A conceptual and empirical foundation. *Organizational Behavior and Human Decision Processes*, *67*(1), 26–48.

Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: Definitions and distinctions for health-related research. *Public Health Reports*, *100*(2), 126–131.

Cohen, J. (1992). A power primer. *Quantitative Methods in Psychology, 12*, 155-159.

Colchico, K., Zybert, P., & Basch, C. E. (2000). Effects of after-school physical activity on fitness, fatness, and cognitive self-perceptions : A pilot study amoung urban, minority adolescent girls. *American Journal of Public Health*, *90*(6), 977–978.

Colley, R. C., Garriguet, D., Janssen, I., Craig, C. L., Clarke, J., & Tremblay, M. S. (2011). Physical activity of Canadian children and youth: Accelerometer results from 2007-2009 Canadian Health Measures Survey. *Statistics Canada Catalogue No. 82-003-XPE Health Reports*, *22*(1), 15–24. doi:10.1016/j.yspm.2011.03.006

Connelly, J. B., Duaso, M. J., & Butler, G. (2007). A systematic review of controlled trials of interventions to prevent childhood obesity and overweight: A realistic synthesis of the evidence. *Public Health*, *121*, 510–517. doi:10.1016/j.puhe.2006.11.015

Creswell, J. W. (2009). The use of theory. In *Research Design: Qualitative, Qualitative, and Mixed Methods Approach* (3rd ed., pp. 49–71). Los Angeles: SAGE Publications.

Corte de Araujo, A. C., Roschel, H., Picanço, A. R., do Prado, D. M. L., Villares, S. M. F., de Sá Pinto, A. L., & Gualano, B. (2012). Similar health benefits of endurance and high-intensity interval training in obese children. *PLoS ONE*, *7*(8), 1–8. doi:10.1371/journal.pone.0042747

Crocker, P. R. E., Kowalski, K. C., & Hadd, V. (2008). The role of the self. In A. L. Smith & S. J. H. Biddle (Eds.), *Youth Physical Acitivty and Sedentary Behavior* (First.Edition) pp. 215–238. Champaign, IL: Human Kinetics.

Daniels, S. R., Arnett, D. K., Eckel, R. H., Gidding, S. S., Hayman, L. L., Kumanyika, S., … Williams, C. L. (2005). Overweight in children and adolescents: Pathophysiology, consequences, prevention, and treatment. *Circulation*, *111*(15), 1999–2012. doi:10.1161/01.CIR.0000161369.71722.10

DeBate, R. D., & Thompson, S. H. (2005). Girls on the run: Improvements in self-esteem, body size satisfaction and eating attitudes/behaviors. *Eating and Weight Disorders*, *10*, 25–32.

Dietz, W. H. (2004). Overweight in childhood and adolescence. *The New England Journal of Medicine*, *350*(9), 855–857.

Dishman, R. K., Hales, D. P., Sallis, J. F., Saunders, R., Dunn, A. L., Bedimo-Rung, A. L., & Ring, K. B. (2010). Validity of social-cognitive measures for physical activity in middle-school girls. *Journal of Pediatric Psychology*, *35*(1), 72–88. doi:10.1093/jpepsy/jsp031

Dishman, R. K., Motl, R. W., Saunders, R., Felton, G., Ward, D. S., Dowda, M., & Pate, R. R. (2005). Enjoyment mediates effects of a school-based physical-activity intervention. *Medicine & Science in Sports & Exercise*, *37*(3), 478–487. doi:10.1249/01.MSS.0000155391.62733.A7

Duda, J. L. (1996). Maximizing motivation in sport and physical education among children and adolescents: The case for greater task involvement. *Quest*, *48*(3), 290–302. doi:10.1080/00336297.1996.10484198

Duda, J. L., & Hall, H. (2001). Achievement goal theory in sport: Recent extensions and future directions. In R. Singer, H. Hausenblas, & C. Janelle (Eds.), *Handbook of Sport Psychology* (Second Edition., pp. 417–443). New York: Wiley.

Duda, J. L., & Nicholls, J. G. (1992). Dimensions of achievement motivation in school work and sport. *Journal of Educational Psychology*, *84*(3), 290–299.

Duda, J. L., & Ntoumanis, N. (2005). After-school sport for children: Implications of a task-involving motivational climate. In J. L. Mahoney, J. Eccles, & R. Larson (Eds.), *Organized activities: Contexts of development*. New York: Lawrence Erlbaum Publishers.

Dumith, S. C., Gigante, D. P., Domingues. M. R. & Kohl, H. W. (2011). Physical activity change during adolescence: A systematic review and a pooled analysis. *International Journal of Epidemiology, 40*, 685-698.

Duzgun, I., Baltaci, G., Colakoglu, F., Tunay, V. B., & Ozer, D. (2010). The effects of jump-rope training on shoulder isokinetic strength in adolescent volleyball players. *Journal of Sport Rehablitation*, *19*(2), 184–99. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/20543219

Dweek, C. S. (1986). Motivational processes affecting learning. *American Psychologist*, *41*(10), 1040–1048.

Elder, J. P., Lytle, L., Sallis, J. F., Young, D. R., Steckler, A., Simons-Morton, D., … Ribisl, K. (2007). A description of the social-ecological framework used in the trial of activity for adolescent girls (TAAG). *Health Education Research*, *22*(2), 155–65. doi:10.1093/her/cyl059

Ernst, M. P. & Pangrazi, R. P. (1999). Effects of a physical activity program on children's activity levels and attraction to physical activity. *Pediatric Exercise Science, 11*, 393-405.

Eyler, A., Brownson, R., Aytur, S., Cradock, A., Doescher, M., Evenson, K., … Schmid, T. (2010). Examination of trends and evidence-based elements in state physical education legislation: A content analysis. *Journal of School Health*, *80*, 326–332.

Eyler, A., Nguyen, L., Kong, J., Yan, Y., & Brownson, R. (2012). Patterns and predictors of enactment of state childhood obesity legislation in the United States: 2006-2009. *American Journal of Public Health*, *102*(12), 2294–302. doi:10.2105/AJPH.2012.300763

Franks, B. D., Morrow, J. R., & Plowman, S. A. (1988). Youth fitness testing: Validation, planning, and politics. *Quest*, *40*(3), 187–199. doi:10.1080/00336297.1988.10483900

Freedson, P., Pober, D., & Janz, K. (2005). Calibration of accelerometer output for children. *Medicine & Science in Sports & Exercise*, *37*(11), S523–S530. doi:10.1249/01.mss.0000185658.28284.ba

Freedson, P., Sirard, J., & Debold, E. (1997). Calibration of the computer science and applications, inc. (CSA) accelerometer. *Medicine & Science in Sports & Exercise*, *29*, S45.

Gesell, S. B., Reynolds, E. B., Ip, E. H., Fenlason, L. C., Pont, S. J., Poe, E. K., Barkin, S. L. (2008). Social influences on self-reported physical activity in overweight latino children. *Clinical Pediatrics, 47*(8), 797-802.

Gibson, F. (2007). Conducting focus groups with children and young people: Strategies for success. *Journal of Research in Nursing*, *12*(5), 473–483. doi:10.1177/17449871079791

Gortmaker, S. L., Lee, R. M., Mozaffarian, R. S., Sobol, A. M., Nelson, T. F., Roth, B. A, & Wiecha, J. L. (2012). Effect of an after-school intervention on increases in children's physical activity. *Medicine & Science in Sports & Exercise*, *44*(3), 450–7. doi:10.1249/MSS.0b013e3182300128

Guinhouya, C. B., Hubert, H., Soubrier, S., Vilhelm, C., Lemdani, M., & Durocher, A. (2006). Moderate-to-vigorous physical activity among children: Discrepancies in accelerometry-based cut-off points. *Obesity*, *14*(5), 774–7. doi:10.1038/oby.2006.89

Gutin, B. (2008). Child obesity can be reduced with vigorous activity rather than restriction of energy intake. *Obesity*, *16*(10), 2193–6. doi:10.1038/oby.2008.348

Ha, A. S., Burnett, A., Sum, R., Medic, N., & Ng, J. Y. Y. (2015). Outcomes of the rope skipping "STAR" programme for schoolchildren. *Journal of Human Kinetics*, *45*, 233–240. doi:10.1515/hukin-2015-0024

Hagborg, W. J. (1993). The rosenberg self-esteem scale and harter's self-perception profile for adolescents, *Psychology in the Schools*, *30*, 132–136.

Hallal, P. C., Andersen, L. B., Bull, F., Guthold, R., Haskell, W., & Ekelund, U. (2012). Golbal physical activity levels: Surveillance progress, pitfalls, and prospects. *The Lancet, 380*, 247-257.

Handrigan, G., Plamondon, A., Teasdale, N., & Corbeil, P. (2013). The biomechanical impact of obesity on manual materials handling: A laboratory study. *Canadian Journal of Diabetes*, *37*(2013), S242. doi:10.1016/j.jcjd.2013.03.154

Harrell, J. S., Mcmurray, R. G., Baggett, C. D., Pennell, M. L., Pearce, P. F., & Bangdiwala, S. I. (2005). Energy costs of physical activities in children and adolescents. *Medicine & Science in Sports & Exercise*, *37*(2), 329–336. doi:10.1249/01.MSS.0000153115.33762.3F

Harriger, J. A., & Thompson, J. K. (2012). Psychological consequences of obesity: Weight bias and body image in overweight and obese youth. *Internation Review of Psychiatry*, *24*(February), 247–253. doi:10.3109/09540261.2012.678817

Harter, S. (1978). Effectance motivation reconsidered: Toward a developmental model. *Human Development*, *1*, 34–64.

Harter, S. (1982). The perceived competence scale for children. *Child Development*, *53*(1), 87–97.

Hatfield, B., Vaccaro, P., & Benedict, G. J. (1985). Self-concept responses of children to participation in an eight-week precision jump-rope program. *Perceptual and Motor Skills*, *61*, 1275–1279.

Healthy People 2020. (2012). Washington DC, U.S.

Huang, L., Chen, P., Zhuang, J., Zhang, Y., & Walt, S. (2013). Metabolic cost, mechanical work, and efficiency during normal walking in obese and normal-weight children. *Research Quarterly for Exercise and Sport*, *84*(sup2), S72–S79. doi:10.1080/02701367.2013.849159

Internaltional Rope Skipping Federation. (2015). Retrieved January 1, 2015, from http://www.fisac-irsf.org/

Johnson, R. K., Russ, J., & Goran, M. I. (1998). Physical activity related energy expenditure in children by doubly labeled water as compared with the Caltrac accelerometer. *International Journal of Obesity*, *22*, 1046–52. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/9822941

JRFH About this Program. (n.d.). *Jump Rope for Heart*. Retrieved from www.aahperd.org/jump.com

Kalbfleisch, S. E. (2001). Youth Fitness and Jump Rope for Heart. Retrieved from www.jumprope.com/jump2bfit/youth

Kavussanu, M., & Harnisch, D. L. (2000). Self-esteem in children: Do goal orientations matter? *The British Journal of Educational Psychology*, *70*, 229–42. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/10900780

Kendzierski, D., & DeCarlo, K. J. (1991). Physical activity enjoyment scale: Two validation studies. *Journal of Sport & Exercise Psychology*, *13*(1), 50–64.

Kim, E. S., Im, J.-A., Kim, K. C., Park, J. H., Suh, S.-H., Kang, E. S., … Jeon, J. Y. (2007). Improved insulin sensitivity and adiponectin level after exercise training in obese Korean youth. *Obesity*, *15*(12), 3023–30. doi:10.1038/oby.2007.360

Kjonniksen, L., Torsheim, T., & Wold, B. (2008). Traking of leisure-time physical activity during adolescence and young adulthood: A 10-year longitudinal study. *The International Journal of Behavior, Nutrition, and Physical Activity, 5,* 69-80.

Lerner, R. M., Lerner, J. V, Almerigi, J. B., Naudeau, S., Smith, L. M., Bobek, D. L., & Richman-Raphael, D. (2005). Positive youth development, participation in community youth development programs, and community contributions of fifth-grade adolsecents: Findings from the first wave of the 4-H study of postive youth development. *Journal of Early Adolescence*, *25*(1), 17–71. doi:10.1177/0272431604272461

Lytle, L. A. (2012). Dealing with the childhood obesity epidemic: A public health approach. *Abdominal Imaging*, *37*, 719–24. doi:10.1007/s00261-012-9861-y

Matiniek, T. J., & Zaichowsky, L. D. (1977). *Martinek-Zaichowsky self-concept scale*. Jacksonville, IL: Psychologists & Educators.

Matthews-Ewald, M. R., Moore, L. C., Harris, C. V., Bradlyn, A. S., & Frost, S. S. (2013). Assessing moderate to vigorous physical activity in rual west virginia elementary school physical education classes. *West Virginia Medical Journal*, *109*(4), 12–16.

Mattocks, C., Ness, A., Leary, S., Tilling, K., Blair, S. N., Shield, J., … Riddoch, C. (2008). Use of accelerometers in a large field-based study of children: Protocols, design issues, and effects on precision. *Journal of Physical Activity and Health*, *5*(Supp 1), S98–111. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/18364528

McKenzie, T. L., Crespo, N., Baquero, B., & Elder, J. (2010). Leisure-time physical activity in elementary schools: Analysis of centextual conditions. *Journal of School Health*, *80*, 470–477.

Mears, D. (2008). The effects of physical education requirements on physical activity of young adults. *American Secondary Education*, *36*(3), 70–83.

Moore, J. B., Yin, Z., Hanes, J., Duda, J., Gutin, B., & Barbeau, P. (2009). Measureing enjoyment of physical activity in children: Validation of the physical activity enjoyment scale. *Journal of Applied Sport Psychology*, *21*(S1), S116–S129. doi:10.1080/10413200802593612

Morrow, J. R., Jackson, A. W., Disch, J. G., & Mood, D. P. (2001). Physical Fitness and Activity Assessment in Adults. In *Measurement and Evaluation in Human Performance* (4th ed.). Champaign, IL: Human Kinetics.

Morrow, J. R., Zhu, W., Franks, Don, B., Meredith, M. D., & Spain, C. (2009). 1958-2008: 50 Years of youth fitness tests in the united states. *Research Quarterly for Exercise and Sport*, *80*(1), 1–11.

Motl, R. W., Dishman, R. K., Saunders, R., Dowda, M., Felton, G., & Pate, R. R. (2001). Measuring enjoyment of physical activity in adolescent girls. *American Journal of Preventive Medicine*, *21*(2), 110–117.

Muris, P., Meesters, C., & Fijen, P. (2003). The Self-Perception Profile for Children: Further evidence for its factor structure, reliability, and validity. *Personality and Individual Differences*, *35*(8), 1791–1802. doi:10.1016/S0191-8869(03)00004-7

Must, A., Bandini, L. G., Tybor, D. J., Phillips, S. M., Naumova, E. N., & Dietz, W. H. (2007). Activity, inactivity, and screen time in relation to weight and fatness over adolescence in girls. *Obesity*, *15*(7), 1774–81. doi:10.1038/oby.2007.211

Myers, J., Prakash, M., Froelicher, V., Do, D., Partington, S., & Atwood, E. (2002). Exercise capacity and mortality among men referred for exercise testing. *The New England Journal of Medicine*, *346*(11), 793–801.

Nettlefold, L., McKay, H. A, Warburton, D. E. R., McGuire, K. A, Bredin, S. S. D., & Naylor, P. J. (2011). The challenge of low physical activity during the school day: At recess, lunch and in physical education. *British Journal of Sports Medicine*, *45*(10), 813–819. doi:10.1136/bjsm.2009.068072

Nguyen, N. T., Nguyen, X.-M. T., Lane, J., & Wang, P. (2011). Relationship between obesity and diabetes in a US adult population: Findings from the National Health and Nutrition Examination Survey, 1999-2006. *Obesity Surgery*, *21*(3), 351–355. doi:10.1007/s11695-010-0335-4

Nguyen, T., & Lau, D. C. W. (2012). The obesity epidemic and its impact on hypertension. *Canadian Journal of Cardiology*, *28*(3), 326–333. doi:10.1016/j.cjca.2012.01.001

Nicholls, J. G. (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Psychological Review*, *91*(3), 328–346. doi:10.1037//0033-295X.91.3.328

Nigg, C. R., & Paxton, R. J. (2008). Conceptual persepctives. In A. L. Smith & S. J. H. Biddle (Eds.), *Youth Physical Acitivty and Sedentary Behavior*. Champaign, IL.

Nilsson, A., Ekelund, U., Yngve, A., & Sjostrom, M. (2002). Assessing physical activity among children with accelerometers using different time sampling intervals and placements. *Pediatric Exercise Science*, *14*, 87–96.

O'Rourke, D. J., Smith, R. E., Smoll, F. L., & Cumming, S. P. (2012). Parent-initiated motivational climate, self-esteem, and autonomous motivation in yough athletes: Testing propositions from achievement goal and self-setermination theories. *Child Development Research*, *2012*, 1–9. doi:10.1155/2012/393914

Ogden, C. L., Carroll, M. D., Kit, B. K., & Flegal, K. M. (2012). Prevalence of obesity and trends in body mass index among US children and adolescents, 1999-2010. *JAMA*, *307*(5), 483–90. doi:10.1001/jama.2012.40

Orhan, S. (2013). Effect of weighted rope jumping training performed by repeititon method on heart rate, anaerobic power, agility and reaction time of basketball players. *Advances in Environmental Biology*, *7*(5), 945–951.

Park, S. A., Lee, A. Y., Lee, K. S., & Son, K. C. (2014). Comparison of the metabolic costs of gardening and common physical activities in children. *Korean Journal of Horticultural Science and Technology*, *32*(1), 123–128. doi:10.7235/hort.2014.13122

Parsad, B., & Lewis, L. (2009). *After-school programs in public elementary schools*. National Center for Education Statistics, U.S. Department of Education, Institute of Education Sciences Washington DC.

Pate, R. R., Neill, J. R. O., & Mclver, K. L. (2011). Physical activity and health: Does physical education matter? *Quest*, *63*, 19–35.

Pettersson, U., Nordstro, P., & Alfredson, H. (2000). Effect of high impact activity on bone mass and size in adolescent females: A comparative study between two

different types of sports. *Calcified Tissue International, 67*, 207–214. doi:10.1007/s002230001131

Physical Activity Guidelines for Americans (PAGA). (2008). Washington DC.

Piers, E. V. (1964). *The Piers-Hawis children's Self-concept scale: How I feel about myself*. (Counselor Readings & Tests, Ed.). Nashville, TN.

Pintrich, P. (2000). An achievement goal theory perspective on issues in motivation terminology, theory and research. *Contemporary Educational Psychology*, *25*(1), 92–104. doi:10.1006/ceps.1999.1017

Pulsford, R. M., Cortina-Borja, M., Rich, C., Kinnafick, F.-E., Dezateux, C., & Griffiths, L. J. (2011). Actigraph accelerometer-defined boundaries for sedentary behaviour and physical activity intensities in 7 year old children. *PLoS ONE*, *6*(8), e21822. doi:10.1371/journal.pone.0021822

Puyau, M. R., Adolph, A. L., Vohra, F. a, & Butte, N. F. (2002). Validation and calibration of physical activity monitors in children. *Obesity Research*, *10*(3), 150–7. doi:10.1038/oby.2002.24

Quirk, J. E., & Sinning, W. E. (1982). Anaerobic and aerobic responses of males and females to rope skipping. *Medicine & Science in Sports & Exercise*, *14*(1), 26–29.

Ramstetter, C., Murray, R., & Garner, A. (2010). The crucial role of recess in schools. *Journal of School Health*, *80*, 517–526.

Reilly, J. J. (2006). Obesity in childhood and adolescence: Evidence based clinical and public health perspectives. *Postgradguate Medical Journal*, *82*(969), 429–437.

Reilly, J. J., Kelly, L. A., Montgomery, C., Jackson, D. M., Slater, C., Grant, S., & Paton, J. Y. (2006). Validation of Actigraph accelerometer estimates of total energy expenditure in young children. *International Journal of Pediatric Obesity*, *1*(3), 161–167. doi:10.1080/17477160600845051

Reinboth, M., & Duda, J. L. (2006). Perceived motivational climate, need satisfaction and indices of well-being in team sports: A longitudinal perspective. *Psychology of Sport and Exercise*, *7*(3), 269–286. doi:10.1016/j.psychsport.2005.06.002

Ridgers, N. D., Fairclough, S. J., & Stratton, G. (2010). Variables associated with children's physical activity levels during recess: The A-CLASS project. *The International Journal of Behavioral Nutrition and Physical Activity*, *7*(1), 74. doi:10.1186/1479-5868-7-74

Robins, R. W., Hendin, H. M., & Trzesniewski, K. H. (1998). Measuring global self-esteem: Construct validation of a single-item measure and the rosenberg self-esteem scale. *Personality and Social Psychology Bulletin*, *27*(2), 151–161.

Sabiston, C. M., & Crocker, P. R. E. (2008). Exploring self-perceptions and social influences as correlates of adolescent leisure-time physical activity. *Journal of Sport & Exercise Psychology*, *30*(1), 3–22. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/18369240

Sallis, J. F., Mckenzie, T. L., Beets, M. W., Beighle, A., Erwin, H., & Lee, S. (2012). Physical education's role in public health : Steps forward and backward over 20 years and HOPE for the future. *Research Quarterly for Exercise and Sport*, *83*(2), 125–135.

Sallis, J. F., Prochaska, J. J., Taylor, W. C., Hill, J. O., & Geraci, J. C. (1999). Correlates of physical activity in a national sample of girls and boys in grades 4 through 12. *Health Psychology, 18(4),* 410-415.

Sallis, J. F., Strikmiller, P. K., Harsha, D. W., Feldman, H. A., Ehlinger, S., Stone, E. J., … Woods, S. (1996). Validation of interviewer- and self-administered physical acitivty checklist for fifth grade students. *Medicine & Science in Sports & Exercise*, *28*(7), 840–851.

Schreiber, J. B., Stage, F. K., King, J., Nora, A., & Barlow, E. A. (2006). Reporting structural equation modeling and confirmatory factor analysis results: A review. *The Journal of Educational Research*, *99*(6), 323–337.

Shavelson, R. J., Hubner, J. J., & Stanton, G. C. (1976). Self-concept: Validation of construct interpretations. *Review of Educational Research*, *46*(3), 407–771.

Simons-Morton, B. G., Taylor, W. C., Snider, S. A., & Huang, I. W. (1993). The physical activity of fifth-grade students during physical education classes. *American Journal of Public Health*, *83*, 262–264.

Sirard, J. R., & Pate, R. R. (2001). Physical activity assessment in children and adolescents. *Sports Medicine*, *31*(6), 439–54. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/11394563

Smoll, F. L., Smith, R. E., Barnett, N. P., & Everett, J. J. (1993). Enhancement of children's self-esteem through social support training for youth sport coaches. *Journal of Applied Psychology*, *78*(4), 602–610. doi:10.1037//0021-9010.78.4.602

Stein, C. J., Fisher, L., Berkey, C., & Colditz, G. A. (2007). Adolescent physical activity and perceived competence: Does change in activity level impact self-perception? *Journal of Adolescent Health*, *40*(5), 462.e1–462.e8. doi:10.1016/j.biotechadv.2011.08.021.Secreted

Stewart, D. W., Shamdasani, P. N., & Rook, D. W. (2007). Conducting the focus group. *SAGE Research Methods*, 89–109. doi:10.4135/9781412991841

Story, M., Sherwood, N. E., Himes, J. H., Davis, M., Jacobs, D. R., & Cartwright, Y. (2003). An after-school obeisty prevention program for African-American girls: The Minnesota GEMS pilot study. *Ethnicity and Disease, 13,* S54-S64.

Strauss, R. S., Rodzilsky, D., Burack, G., & Colin, M. (2001). Psychosocial correlates of physical activity in healthy children. *Archives of Pediatrics & Adolescent Medicine*, *155*(8), 897–902. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/11483116

Stuntz, C., P. & Weiss, M. R. (2009). Motivating children and adolescents to sustain a physically active lifestyle. *American Journal of Lifestyle Medicine, 4*, 433-444.

Tassitano, R., Barros, M., Tenorio, M., Bezerra, J., Florindo, A., & Reis, R. (2010). Enrollment in physical education is associated with health-related behavior among high school students. *Journal of School Health*, *80*, 126–133.

Taverno Ross, S. E., Dowda, M., Colabianchi, N., Saunders, R., & Pate, R. R. (2012). After-school setting, physical activity, and sedentary behavior in 5th grade boys and girls. *Health & Place*, *18*(5), 951–5. doi:10.1016/j.healthplace.2012.06.013

Taylor, V. H., Forhan, M., Vigod, S. N., McIntyre, R. S., & Morrison, K. M. (2013). The impact of obesity on quality of life. *Best Practice & Research Clinical Endocrinology & Metabolism*, *27*(2), 139–146. doi:10.1016/j.beem.2013.04.004

Telford, A., Salmon, J., Jolley, D., & Crawford, D. (2004). Reliability and validity of physical activity questionnaires for children: The Children's Leisure Activities Study Survey (CLASS). *Pediatric Exercise Science*, *16*(17), 64–78.

Town, G. P., Sol, N., & Sinning, W. E. (1980). The effect of rope skipping rate on energy expenditure of males and females. *Medicine & Science in Sports & Exercise*, *12*(4), 295–298.

Treuth, M. S., Catellier, D. J., Schmitz, K. H., Pate, R. R., Elder, J. P., McMurray, R. G., … Webber, L. (2007). Weekend and weekday patterns of physical activity in overweight and normal-weight adolescent girls. *Obesity*, *15*(7), 1782–8. doi:10.1038/oby.2007.212

Treuth, M. S., Sherwood, N. E., Butte, N. F., McClanahan, B., Obarzanek, E., Zhou, A., … Rochon, J. (2003). Validity and reliability of activity measures in African-American Girls for GEMS. *Medicine and Science in Sports and Exercise*, *35*(3), 532–539. doi:10.1249/01.MSS.0000053702.03884.3F

Troiano, R. P., Berrigani, D., Dodd, K. W., Masse, L. C., Tilert, T., & Mcdowell, M. (2003). Physical activity in the United States measured by accelerometer. *Medicine & Science in Sports & Exercise, 40*, 181–189.

Trost, S. G., Loprinzi, P. D., Moore, R., & Pfeiffer, K. A. (2011). Comparison of accelerometer cut points for predicting activity intensity in youth. *Medicine & Science in Sports & Exercise*, *43*(7), 1360–8. doi:10.1249/MSS.0b013e318206476e

Trost, S. G., Mciver, K. L., & Pate, R. R. (2005). Conducting accelerometer-nased activity assessments in field-based research. *Medicine & Science in Sports & Exercise*, *37*(11), S531–S543. doi:10.1249/01.mss.0000185657.86065.98

Trost, S. G., Rosekranz, R. R., & Dzewaltowski, D. (2008). Physical activity levels among children attending after-school programs. *Medicine & Science in Sports & Exercise*, *40*(4), 622–629. doi:10.1249/MSS.0b013e318161eaa5

Trudeau, F., Espindola, R., Laurencelle, L., Dulac, F., Rajic, M., & Shephard, R. J. (2000). Follow-up of participants in the Trois-Rivieres Growth and Development Study: Examining theiry health-related fitness and rist factors as adults. *American Journal of Human Biology*, *12*(2), 207–213. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/11534017

Trudeau, F., Laurencelle, L., & Shephard, R. J. (2004). Tracking physical activity from childhood to adulthood. *Medicine & Science in Sports & Exercise*, *36*(11), 1937–1943.

Trudeau, F., & Shephard, R. J. (2005). Contribution of school programs to physical activity and attitudes in children and adults. *Sports Medicine*, *35*(2), 89–105.

Tucker, J., Welk, G., & Beyler, N. (2001). Physical activity in U.S. adults. *American Journal of Preventitive Medicine, 40*(4), 454-461.

Tuuri, A. M. (2014). *High intensity interval training and enjoyment.* Unpublished master's thesis, University of Wisconsis La Crosse, United State.

USA Jump Rope. (n.d.). Retrieved from www.usajumprope.org

Vanhelst, J., Béghin, L., Turck, D., & Gottrand, F. (2011). New validated thresholds for various intensities of physical activity in adolescents using the Actigraph accelerometer. *International Journal of Rehabilitation Research*, *34*(2), 175–7. doi:10.1097/MRR.0b013e328340129e

Verloigne, M., Van Lippevelde, W., Maes, L., Yildirim, M., Chinapaw, M., Manios, Y., … De Bourdeaudhuij, I. (2012). Levels of physical activity and sedentary time among 10- to 12-year-old boys and girls across 5 European countries using accelerometers: An observational study within the ENERGY-project. *International Journal of Behavioral Nutrition and Physical Activity*, *9*(1), 34. doi:10.1186/1479-5868-9-34

Vucenik, I., & Stains, J. P. (2012). Obesity and cancer risk: Evidence, mechanisms, and recommendations. *Annals of the New York Academy of Sciences*, *1271*(1), 37–43. doi:10.1111/j.1749-6632.2012.06750.x

Wang, Y. C., Orleans, C. T., & Gortmaker, S. L. (2012). Reaching the healthy people goals for reducing childhood obesity: Closing the energy gap. *American Journal of Preventive Medicine*, *42*(5), 437–44. doi:10.1016/j.amepre.2012.01.018

Weaver, R. G., Beets, M. W., Webster, C., Beighle, A., & Huberty, J. (2012). A conceptual model for training after-school program staffer to promote physical activity and nutrition. *Journal of School Health*, *82*(4), 186–195.

Weinberg, R. S., & Gould, D. (2011). Motivation. In *Foundations of Sport and Exercise Psychology* (5th ed., pp. 51–76). Champaign, IL: Human Kinetics.

Weiss, M. R., & Amorose, A. J. (2008). Motivational orientation and sport behavior. In T. S. Horn (Ed.), *Advances in Sport Psychology* (3rd ed., pp. 119–130). Champaign Il: Human Kinetics.

Wichstrøm, L., von Soest, T., & Kvalem, I. L. (2012). Predictors of growth and decline in leisure time physical activity from adolencence to adulthood. *Health Psychology*, *August 27*(Advanced online publication). doi:10.1037/a0029465

Wiersma, L., & Rubin, D. (2012). The development and pilot testing of active kids: A park-based afterschool physical ativity program for hispanic youth. *Obesity Prevention and Intervention*, *10*, 1–12. Retrieved from http://cjhp.fullerton.edu/SpecialIssue1_2012/documents/01-12wiersma.pdf

Wille, N., Erhart, M., Petersen, C., & Ravens-Sieberer, U. (2008). The impact of overweight and obesity on health-related quality of life in childhood-results from an intervention study. *BMC Public Health*, *8*, 421. doi:10.1186/1471-2458-8-421

Wittmeier, K. D. M., Mollard, R. C., & Kriellaars, D. J. (2008). Physical activity intensity and risk of overweight and adiposity in children. *Obesity*, *16*(2), 415–20. doi:10.1038/oby.2007.73

Wolters, C. A. (2004). Advancing achievement goat theory: Usinf goal structures and goal orientations to predict students' motivation, cognition, and achievement. *Journal of Educational Psychology, 96*(2), 236-250.

Yin, Z., Moore, J. B., Johnson, M. H., Vernon, M. M., & Gutin, B. (2012). The impact of a 3-year after-school obesity prevention program in elementary school children. *Childhood Obesity*, *8*(1), 60–70. doi:10.1089/chi.2011.0085

Zabinski, M. F., Saelens, B. E., Stein, R. I., Hayden-Wade, H. A, & Wilfley, D. E. (2003). Overweight children's barriers to and support for physical activity. *Obesity Research*, *11*, 238–46. doi:10.1038/oby.2003.37

Zalesin, K. C., Franklin, B. A, Miller, W. M., Peterson, E. D., & McCullough, P. A. (2011). Impact of obesity on cardiovascular disease. *Medical Clinics of North America*, *95*(5), 919–937. doi:10.1016/j.mcna.2011.06.005

APPENDIX A
IRB Forms

UNIVERSITY OF MINNESOTA

Twin Cities Campus

Human Research Protection Program
Office of the Vice President for Research

D528 Mayo Memorial Building
420 Delaware Street S.E.
MMC 820
Minneapolis, MN 55455

Office: 612-626-5654
Fax: 612-626-6061
E-mail: irb@umn.edu or ibc@umn.edu
Website: http://research.umn.edu/subjects/

January 14, 2014

Jessica A Galvan

RE: "Effects of an after-school jump rope program on perceptions of competence and self-worth"
IRB Code Number: **1311P46081**

Dear Ms. Galvan

The Institutional Review Board (IRB) received your response to its stipulations. Since this information satisfies the federal criteria for approval at 45CFR46.111 and the requirements set by the IRB, final approval for the project is noted in our files. Upon receipt of this letter, you may begin your research.

IRB approval of this study includes the assent form and consent form received November 26, 2013.

The IRB would like to stress that subjects who go through the consent process are considered enrolled participants and are counted toward the total number of subjects, even if they have no further participation in the study. Please keep this in mind when calculating the number of subjects you request. This study is currently approved for 60 subjects. If you desire an increase in the number of approved subjects, you will need to make a formal request to the IRB.

For your records and for grant certification purposes, the approval date for the referenced project is December 16, 2013 and the Assurance of Compliance number is FWA00000312 (Fairview Health Systems Research FWA00000325, Gillette Children's Specialty Healthcare FWA00004003). Research projects are subject to continuing review and renewal; approval will expire one year from that date. You will receive a report form two months before the expiration date. If you would like us to send certification of approval to a funding agency, please tell us the name and address of your contact person at the agency.

As Principal Investigator of this project, you are required by federal regulations to inform the IRB of any proposed changes in your research that will affect human subjects. Changes should not be initiated until written IRB approval is received. Unanticipated problems or serious unexpected adverse events should be reported to the IRB as they occur.

The IRB wishes you success with this research. If you have questions, please call the IRB office at 612-626-5654.

Sincerely,

Christina Dobrovolny, CIP
Research Compliance Supervisor
CD/bw

CC: Beth Lewis

UNIVERSITY OF MINNESOTA

Route this form to:	Revised
See instructions below	October 2013

Change In Protocol Request

Instructions:

Use this form when submitting change requests to approved IRB protocols. This form is for use when the changes are initiated by the PI. Do not use this form to respond when changes are requested by the IRB. Please do not use this form when responding to changes requested in a stipulation or deferral letter.

Submit this form to the Human Research Protection Program:

U.S. Mail Address: **or**
Human Research Protection Program
MMC 820
420 Delaware St. SE
Minneapolis, MN 55455-0392

Electronic Submission:
Submit to: irb@umn.edu
PI must submit request using University of Minnesota e-mail Account.

The UMN IRB reviewed and APPROVED this submission including all attachments listed on this form by expedited review.
By Jeffery Perkey on Mar 14, 2014

This approval includes acknowledgment of school district approval of the changes submitted on March 11, 2014

IRB Protocol Information

IRB Study Number:	**1131P46081**
Principal Investigator:	Jessica Albers
Primary Study Title:	Effects of an after-school jump rope program perceptions of competence and self-worth
Date of this Submission	11/26/13
Study Includes	☐ Drug(s) / Biologic(s) ☐ Device(s)

Indicate the type of change(s)	Additional information/requirements
☒ Change(s) to Study Procedures/Protocol Amendment Protocol Version2, Dated2/17/14	**Does the change affect study design, change the study endpoint(s) or change the statistical method?** ☐ **No** ☒ Yes **Is this protocol under Masonic Cancer Center's Cancer Protocol Review Committee (CPRC) review?** ☒ No ☐ Yes, CPRC # If "Yes" is checked for *both* questions above, this submission (Change in Protocol form and any supporting documentation) must be reviewed by CPRC (CCPRC@umn.edu) prior to review by the IRB. CPRC will forward this submission to the IRB after CPRC approval. Submission to CPRC must meet the IRB signature requirement (signed by the PI or sent from the PI's x.500 UMN email account).
☐ Notice of Closure to Accrual	
☐ Recruitment changes/Advertisements	Attach a copy of the revised material (flyer, script, etc.) with the submission
☐ Revised Investigator Brochure	Version , Dated
☒ Updated consent form	Include both an updated form with changes highlighted and a "clean" version
☐ Other	Briefly Describe:

1. **Briefly summarize the change(s). For protocol amendments, do not say "See summary of changes provided with amendment." Rather, summarize the nature of the significant revisions.**

There will not be any changes to the existing protocol but focus groups will be added after the complettion of the program. The focus groups will consit of 5-7 of the elementary school children currently participating in the Rope Power program and who have already aggreed to participate in the Rope Power survey study. The focus group will last from 45min to 1hr and will be conducted during the after-school programs within 2 weeks of the completion of the Rope Power program.

2. **Describe the rationale for the change(s):**

One of the goals of this study is to implement jump rope programs in different after-school communities. Focus groups will rpovide an insight into the program evaluation from the perspective of the participants. This will allow changes to be made when continuing with the program based on the thoughts and suggestions of the recent participants. We want to make sure that we have good inofrmation not only on the psychological effects of participating in the program, but on how well we implemented the program.

3. **How will these changes affect the overall risk to subjects in this study?**

There is still minimum risk to the participants. The addition of focus groups will not change that risk.

4. **Do the changes to the study prompt changes to the consent form(s)?**

☐ **No.**
☒ **Yes. If yes:**

- **Attach a copy of the revised consent form(s) with changes tracked or highlighted as well as a clean copy.**

4.1 Will currently enrolled subjects will be notified of the changes?

☐ **No**
☒ **Yes, explain below how they will be notified** (i.e. subjects will be re-consented with the updated form once approved, subjects will be provided with an information sheet, subjects will be told of changes at next study visit, etc.).

Current participants will receive a second consent form specifically for the focus groups. Additionally, second assent forms will be created for the participants to fill out before the focus groups.

5. **List and attach all documents included with this request, including version dates:**

Focus Group Consent Form
Focus Group Assent Form
Focus Group Script

Jessica Albers _____ 2/17/14 _____
Principal Investigator's Signature **Date**

Cancer Protocol Review Committee (CPRC) Use Only:

MINNEAPOLIS PUBLIC SCHOOLS
Urban Education. Global Citizens.

Research, Evaluation and Assessment Department
1250 W. Broadway Avenue
Minneapolis MN 55411-2533

March 10, 2014

Jessica Albers
University of Minnesota
School of Kinesiology
Cooke Hall 210
1900 University Ave SE
Minneapolis MN 55455

Dear Jessica:

On behalf of the Minneapolis Public School District we have reviewed your research proposal, "Effects of an After-School Jump Rope Program on Perceptions of Competence and Self-Worth", REA #O-2013-18. It is our pleasure to inform you that your research project has been approved. We believe that your research will benefit the Minneapolis Public Schools staff and students. Keep in mind that upon completion of your study, a paper copy and an electronic version of the final report must be sent to the Research, Evaluation and Assessment (REA) Department. Please also send a copy of your report(s) to your District co-sponsor and principal(s) you worked with - electronically, if possible. If your project lasts for more than one year, at the end of each project year, a progress summary report will be due (please submit a paper and electronic version).

A copy of this letter and a copy of your Minneapolis Public Schools completed application must be forwarded to your University's Institutional Review Board (IRB), if applicable. Once your project is approved by your IRB, you can use this letter as verification that your request to begin conducting research has been granted. A copy of the IRB approval letter must be forwarded to the REA Department. Institutional Review Board approval letters must be kept current and remain in REA files for the duration of the project. If your study should require any modifications, our office should be made aware of it by submitting an addendum to your proposal. If applicable, the District requires all researchers to formally register as a Community Partner (in order to adhere to partner guidelines, background checks for all research staff, etc.) before any study activities begin. To complete the registration process, please go to the Community Partners Online Web site at http://cpo.mpls.k12.mn.us/. Please forward a copy of your completed CPO registration to the REA Department. Failure to comply with the above stipulations places your project at risk for continuing to conduct research within the Minneapolis Public Schools or approval of future projects. We wish you the best in your endeavors and look forward to reviewing your progress and/or final report(s) in the near future. Thank you for your interest in the Minneapolis Public Schools.

Sincerely,

Eric Moore
Research, Evaluation & Assessment
Director

Melody Jacobs-Cassuto, Ph.D.
Research, Evaluation & Assessment
Specialist

cc: Jack Tamble, Community Education

APPENDIX B

Rope Power Materials

Skill Levels

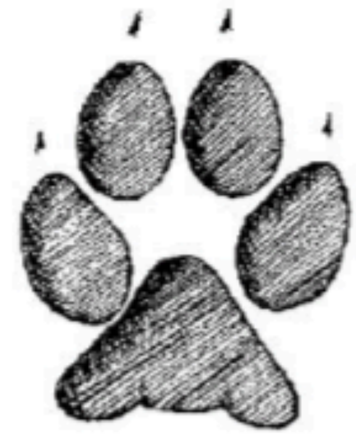
GREEN	BLUE	ORANGE	RED	SILVER	GOLD
Double bounce	DB backward	Heel heel	180	Krouger	DU Criss Cross
Single bounce	Single backward	Heel toe	360	Frog	Toad
Rocker	Front straddle	Toe toe	Double under	EB	Tripple under
One foot hop	Side straddle	Criss cross	Backwards CC	Cossack	DU 360
Pinwheel	Foot cross	SS criss cross	Can can	Caboose	TS
Bell	Side swing	Side heel click	Grapevine	360 criss cross	AS
Skier	Wounded duck	Cross cross	Double 180	SS cossack	Backward DU
Walk forward	Twist	Bubble	GBO backwards	One leg DU	Octopus

Star Chart

Whittier Rope Power

Take Home Log

Whittier Rope Power



Team Member: ______________________

Whittier International Elementary School

Skills Log:

Trick	1x	3x	Combo	Backward	On 1 Foot	Double Under

My Goals:

My Short Term Goals:

-
-
-
-
-

My Long Term Goals:

-
-
-
-
-

My Team Goals:

-
-
-
-
-

Date	How Long?	Practice Buddies	How Hard?

Date	How Long?	Practice Buddies	How Hard?

How hard are you working?

1- Really Easy	6-
2-	7- Hard
3- Easy	8- Really Hard
4-	9-
5- Medium	10- Maximal

APPENDIX C

Demographic Questionnaire

MCE Afterschool Program Study

Demographic Information

Name_____

Age_____ Grade_____

(circle one) Male Female Birth Date_____

Which do you consider yourself? *(circle one)* White Asian Black American Indian

Which do you consider yourself? *(circle one)* Non Hispanic/Latino or Hispanic/Latino

How many years have you been a student at this school? _____

Have you ever been in Rope Power before? _____

What other after school sports do you participate in? _____

_____

_____

What other after school programs at Armatage do you participate in?_____

_____

_____

_____

What other after school activities outside of Armatage do you participate in?_____

_____

_____

Participant Code __ ___

APPENDIX D

Self-Perception Profile for Children

What I Am Like

	Really True for Me	Sort of True for Me	*Practice Questions*			Sort of True for Me	Really True for Me
	❑	❑	Some kids like dogs better than cats	BUT	Other kids like cats better than dogs	❑	❑
	❑	❑	Some kids like vanilla ice cream	BUT	Other kids like chocolate ice cream	❑	❑

	Really True for Me	Sort of True for Me				Sort of True for Me	Really True for Me
1	❑	❑	Some kids feel that they are just as smart as others their age	BUT	Other kids aren't so sure and wonder if they are as smart	❑	❑
2	❑	❑	Some kids do very well at sports	BUT	Other kids don't feel that they are very good when it comes to sports	❑	❑
3	❑	❑	Some kids are not happy with the way they look	BUT	Other kids are happy with the way they look	❑	❑
4	❑	❑	Some kids find it hard to make friends	BUT	For other kids it's pretty easy	❑	❑
5	❑	❑	Some kids are often disapointed with themselves	BUT	Other kids are pretty pleased with themselves	❑	❑
6	❑	❑	Some kids are pretty slow in finishing their school work	BUT	Other kids can do their school work more quickly	❑	❑
7	❑	❑	Some kids feel they could do well at just about any sport	BUT	Other kids are afraid they might not do well at a sport skill	❑	❑
8	❑	❑	Some kids wish their body was different	BUT	Other kids like their body the way it is	❑	❑
9	❑	❑	Some kids have a lot of friends	BUT	Other kids don't have very many friends	❑	❑
10	❑	❑	Some kids don't like the way they are leading their life	BUT	Other kids do like the way they are leading their life	❑	❑
11	❑	❑	Some kids do very well at their classwork	BUT	Other kids don't do very well at their classwork	❑	❑

	Really True for Me	Sort of True for Me				Sort of True for Me	Really True for Me
12	❑	❑	Some kids feel that they are betten that others their age at sports	BUT	Other kids don't feel they can play as well	❑	❑
13	❑	❑	Some kids wish their physical appearance was different	BUT	Other kids like their physical appearance the way it is	❑	❑
14	❑	❑	Some kids are kind of hard to like	BUT	Other kids are really easy to like	❑	❑
15	❑	❑	Some kids are happy with themselves most of the time	BUT	Other kids are often not happy with themselves	❑	❑
16	❑	❑	Some kids have trouble figuring out the answers in school	BUT	Other kids almost always can figure out the answers	❑	❑
17	❑	❑	Some kids don't do well at new sport skills	BUT	Other kids are good at new skills right away	❑	❑
18	❑	❑	Some kids think that they are good looking	BUT	Other kids think that they are not very good looking	❑	❑
19	❑	❑	Some kids are popular with others their age	BUT	Other kids are not very popular	❑	❑
20	❑	❑	Some kids like the kind of person they are	BUT	Other kids often wish they were someone else	❑	❑
21	❑	❑	Some kids feel that they are pretty intelligent	BUT	Other kids question whether they are intelligent	❑	❑
22	❑	❑	Some kids do not feel that they are good at sports	BUT	Other kids feel thay they are good at sports	❑	❑
23	❑	❑	Some kids really like their looks	BUT	Other kids wish they looked different	❑	❑
24	❑	❑	Some kids feel that they are socially accecpted	BUT	Other kids wished that more people their age accecpted them	❑	❑
25	❑	❑	Some kids are very happy being the way they are	BUT	Other kids wish they were different	❑	❑

APPENDIX E

Physical Activity Enjoyment Scale for Children

Physical Activie Enjoyment Scale (PACES) modified by Motl et al., 2001

When I am physically active...

	Totally Disagree		Nuetral		Totally Agree
1. I enjoy it	1	2	3	4	5
2. I feel bored	1	2	3	4	5
3. I dislike it	1	2	3	4	5
4. I find it pleasurable	1	2	3	4	5
5. It's no fun at all	1	2	3	4	5
6. It gives me energy	1	2	3	4	5
7. It makes me sad	1	2	3	4	5
8. It's very pleasant	1	2	3	4	5
9. My body feels good	1	2	3	4	5
10. I get something out of it	1	2	3	4	5
11. It's very exciting	1	2	3	4	5
12. It frustrates me	1	2	3	4	5
13. It's not at all interesting	1	2	3	4	5
14. It gives me a strong feeling of success	1	2	3	4	5
15. It feels good	1	2	3	4	5
16. I feel as thoguht I would rather be doing something else	1	2	3	4	5

APPENDIX F

Classroom and Sport Goal Orientation Questionnaire

Classroom and Sport Goal Orientation Survey
Duda & Nicholls 1992

Q	**In this after school class, I feel successful when...**	Strongly Disagree		Neutral		Strongly Agree
1	I do my very best.	1	2	3	4	5
2	I learn something interesting.	1	2	3	4	5
3	Others can't do as well as me.	1	2	3	4	5
4	I work really hard.	1	2	3	4	5
5	I can beat others.	1	2	3	4	5
6	Something I learn makes me want to practice more.	1	2	3	4	5
7	I can do better than my friends.	1	2	3	4	5
Q	**In this after school class, I feel successful when...**	Strongly Disagree		Neutral		Strongly Agree
8	I'm the only one who can do the skill.	1	2	3	4	5
9	I have the highest score.	1	2	3	4	5
10	I solve a problem by working hard.	1	2	3	4	5
11	Others mess up and I don't.	1	2	3	4	5
12	What I learn really makes sense.	1	2	3	4	5
13	I'm more skilled than other people.	1	2	3	4	5
14	I learn a new skill by trying hard.	1	2	3	4	5
15	I'm the best.	1	2	3	4	5
16	I do something I couldn't do before.	1	2	3	4	5

Thank you!!!!!

APPENDIX G

Self-Report Physical Activity Checklist

Physical Activity Survey
(Tipping the Energy Balance)

Think about the past week, then for each activity listed below, check the correct box. Do NOT count activities you did during school- ONLY activities you did before and after school.

On a typical day over the last week...	BS **BEFORE SCHOOL**			AS **AFTER SCHOOL**		
	NONE	Less than 10 minutes	More than 10 minutes	NONE	Less than 10 minutes	More than 10 minutes
1. Bicycling	☐	☐	☐	☐	☐	☐
2. Swimming Laps	☐	☐	☐	☐	☐	☐
3. Gymnastics: bars, beam, tumbling, trampoline	☐	☐	☐	☐	☐	☐
4. Exercises: push-ups, sit-ups, jumping jacks	☐	☐	☐	☐	☐	☐
5. Basketball	☐	☐	☐	☐	☐	☐
6. Baseball / Softball	☐	☐	☐	☐	☐	☐
7. Football	☐	☐	☐	☐	☐	☐

On a typical day over the last week...	BS BEFORE SCHOOL			AS AFTER SCHOOL		
	NONE	Less than 10 minutes	More than 10 minutes	NONE	Less than 10 minutes	More than 10 minutes
8. Soccer	☐	☐	☐	☐	☐	☐
9. Volleyball	☐	☐	☐	☐	☐	☐
10. Tennis	☐	☐	☐	☐	☐	☐
11. Playground Games: Four aquare, kickball, tag, hopscotch, hide and seek	☐	☐	☐	☐	☐	☐
12. Water Play: playing in pool, ocean, lake	☐	☐	☐	☐	☐	☐
13. Jump Rope	☐	☐	☐	☐	☐	☐
14. Dance	☐	☐	☐	☐	☐	☐
15. Outdoor Chores: mowing, shoveling, gardening	☐	☐	☐	☐	☐	☐
16. Indoor Chores: Mopping, vacumming, sweeping	☐	☐	☐	☐	☐	☐

On a typical day over the last week...	BS BEFORE SCHOOL			AS AFTER SCHOOL		
	NONE	Less than 10 minutes	More than 10 minutes	NONE	Less than 10 minutes	More than 10 minutes
17. Walking	☐	☐	☐	☐	☐	☐
18. Running or Jogging	☐	☐	☐	☐	☐	☐
19. Rollerblading/ Ice Skating	☐	☐	☐	☐	☐	☐
20. Martial Arts	☐	☐	☐	☐	☐	☐
21. Watched TV or Movies	☐	☐	☐	☐	☐	☐
22. Played Video or Computer Games	☐	☐	☐	☐	☐	☐

APPENDIX H

Consent and Assent Forms

Jump Rope and Perceptions of Competence Study

The purpose of this form is to provide information that may affect your decision as to whether or not to allow your child to participate in this research study. If you decide to allow your child to participate in this study, this form will also be used to record your consent.

Your child is invited to be in a research study looking at the Minneapolis Community Education (MCE) Rope Power program. The study will record how much physical activity your child gets during Rope Power as well as ask them to answer a survey twice during the program. Your child was selected as a possible participant because he/she is signed up for the Rope Power after school class. We ask that you read this form and ask any questions you may have before agreeing to let your child be in the study. Your decision will not affect your child's ability to participate in the Rope Power program.

This study is being conducted by: Jessica Albers, PhD Student in Kinesiology at the University of Minnesota.

Background Information
The first purpose of this study is to examine how participating in Rope Power can affect your child views themselves and their abilities. Classes that children regularly attend can positively affect their self-perceptions in terms of physical ability, academics, social skills, and self-worth. These small changes during an after school program can ultimately make a large impact on their overall self-esteem. It is important to see how these after school programs impact children. Second, this study aims to monitor how much physical activity students are getting in the Rope Power after school class. It is important that parents and the school district are aware of how after school classes contribute to the recommended weekly amount of physical activity for children.

Procedures
If you allow your child to be in this study, we would ask them to do the following. During the first and last week of Rope Power, they will be asked to fill out a survey. This survey will contain 4 questionnaires asking about self-perceptions, physical activity enjoyment, motivational climate, and weekly physical activity levels. The surveys will be read to them in a group, and they will be asked to choose an answer that is the best fit for how they feel. The survey will take about 30 minutes to complete. There are no wrong answers and their answers will not be shared with coaches or peers.

During the third, sixth, and last week of their program, your child will be asked to wear an accelerometer to measure their physical activity during their class time. An accelerometer is a small plastic device, similar to a pager, which they clip onto the waistline of their pants close to the hip. It will record their movement during the Rope Power class and students will only wear it for that time period.

Before your child participates, he/she will be asked if they want to participate on their own and will fill out an assent form. Your child will only participate if we have a consent form and a child assent form. If they participate, they will receive a nutritious snack bar for their time.

Risks and Benefits of Being in the Study
There are no physical risks involved in participating in this study. The activity monitor does not affect their movements and do not hurt in any way. The surveys are not associated with and have not been found to elicit any negative psychological responses. They do not contain questions on any material that is sensitive or intrusive in nature.

There are no known direct benefits to participation. This is a collection of thoughts and feelings, which will be used to evaluate and reform existing programs. The activity monitors measure the activity they are already participating in whether or not this study existed.

Compensation
After completion of each of the surveys, your child will receive a nutritious snack bar for their time.

Confidentiality
The records of this study will be kept private. If the surveys reveal psychological areas of concern, the Principal or student designee will be informed. In any sort of report we might publish, we will not include any information that will make it possible to identify a subject. Research records will be stored securely and only researchers will have access to the records. Study data will be encrypted according to current University policy for protection of confidentiality.

Voluntary Nature of the Study:
Participation in this study is voluntary. Your decision, as well as your child's decision, will not affect your child's ability to participate in the Rope Power program. Your decision whether or not to participate will not affect your current or future relations with either Minneapolis Community Education or the University of Minnesota. If your child decides to participate, he/she is free to not answer any question or withdraw at any time without affecting those relationships.

Contacts and Questions:
The researcher conducting this study is: Jessica Albers. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact them at 210 Cooke Hall, University of Minnesota, (210) 391-0511, galva031@umn.edu. *You may also contact Dr. Beth Lewis at blewis@umn.edu, (612) 625-0756.*

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 Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.
You will be given a copy of this information to keep for your records.

CONSENT FORM

Jump Rope and Perceptions of Competence Study

Statement of Consent:

I have read the above information. I have asked questions and I have received answers. I consent to allow my child to participate in the survey study about perceptions of competence and physical activity in students in Rope Power after school programs.

Name of Child:_____

Signature of parent or guardian:_____Date: _____

Signature of Investigator:_____Date: _____

Participant Assent Form
Jump Rope and Perceptions of Competence Study

Hello, my name is Jessica and I am a student at the University of Minnesota studying physical activity.

Your are being asked to participate in a study looking at how you feel during your Rope Power after school program and how much physical activity you get during the program. You are being asked to fill out a survey telling us about yourself. It has four parts on how you view yourself, how you enjoy physical activity, how you feel during the class, and how much physical activity you do. The survey will take about 30 minutes to finish.

We also want to know how much physical activity you get during your after school program. We want to make sure you are participating in lots of different activates here at school that are helping you be active. To do this, you will be asked to wear a small monitor that clips on your pants that will record how physically active you are. It monitors your movement up to down and side to side. It will not affect your movements or hurt in any way.

If you agree to be in this study, you will be asked to fill out a survey twice, once now and once toward the end of your after school program. You will also be asked to wear the activity monitor three times during the program.

There are no right or wrong answers. We want to know more about your thoughts and feelings so you cannot be wrong.

You can always say that you do not want to take the surveys at any time. Please ask any questions you have at any time.

Once you fill out the survey I will not share your thoughts. Your teachers or classmates will not see your answers.

Writing your name here means that you have read this form or have had it read to you and that you are willing to fill out the survey and wear the activity monitor. If you do not want to participate, do not write you name on the form. Participating is up to you. No one will be mad at you if you do not want to participate or change your mind at a later time. You will still be in Rope Power if you do not want to participate.

Name _____

Date _____

Signature of person explaining the study _____

CONSENT FORM

Focus Groups for Rope Power

The purpose of this form is to provide information that may affect your decision as to whether or not to allow your child to participate in this research study. If you decide to allow your child to participate in this study, this form will also be used to record your consent.

Your child is invited to be in a focus group for Rope Power students to gather additional information that will be used as a program evaluation. The focus group will expand on the information previously collected with surveys and activity monitors by directly asking the participants what they liked and did not like about the program. We ask that you read this form and ask any questions you may have before agreeing to let your child be in the study. The focus group participation requires additional permission. Your decision will not affect your child's ability to participate in the Rope Power program, any other after school program or your relationship with MPS or the University of MN.

This study is being conducted by: Jessica Albers, PhD Student in Kinesiology at the University of Minnesota.

Background Information

The purpose of the study is to learn more about what students like and dislike about the Rope Power program. It is important to directly ask the participants what they enjoy about the programs they participate in so we do not assume what they enjoy. This step will aid in program evaluation and the development of future jump rope programs.

Procedures

If you allow your child to participate in the focus group, we would ask him/her to do the following. During the last week March, the participants will sit down for a round table discussion with about five peers and the researcher. They will be asked to fill out a worksheet with their initial thoughts on Rope Power before they share with the group. Then they will be lead in an open discussion on the different parts of Rope Power program and performance. All of their ideas will be heard with respect from the group and the researcher. The researcher will take notes and the discussion will be audio recorded for future transcription.

Before your child participates, he/she will be asked if s/he wants to participate on his/her own and will fill out an assent form. Your child will only participate if we have a parent/guardian consent form and a child assent form. A nutritious snack bar will be given to participants at the end of the focus group discussion.

Risks and Benefits of Being in the Study

There are no physical risks involved in participating in this study. The researcher will make it clear that disrespecting the thoughts of others in the group will be allowed and that everyone will get a chance to tell their ideas.

There are no known direct benefits to participation. This will be an open discussion on the student's thoughts and feelings and there are no right or wrong responses.

Compensation

At the completion of the focus groups, your child will receive a nutritious snack bar for his/her time.

Confidentiality

The records of this study will be kept private. In accordance with school policies, information that indicates any type of abuse or danger to the student or other students will be reported to the Principal. In any sort of report we might publish, we will not include any information that will make it possible to identify an individual student. Research records will be stored securely according to current University policy for protection of confidentiality.

Voluntary Nature of the Study:

Participation in this study is voluntary. Your decision, as well as your child's decision, will not affect your child's ability to participate in the Rope Power program. Your decision whether or not to participate will not affect your current or future relations with either Minneapolis Community Education or the University of Minnesota. If your child decides to participate, he/she is free to not answer any question or withdraw at any time without affecting those relationships.

Contacts and Questions:

The researcher conducting this study is: Jessica Albers. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact them at 210 Cooke Hall, University of Minnesota, (210) 391-0511, galva031@umn.edu. *You may also contact Dr. Beth Lewis at blewis@umn.edu, (612) 625-0756.*

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 Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.

You will be given a copy of this information to keep for your records.

CONSENT FORM

Focus Groups for Rope Power

Statement of Consent:

I have read the above information. I have asked questions and I have received answers. I consent to allow my child to participate in the focus group discussion about the Rope Power after school programs.

Name of Child:_____

Signature of parent or guardian:_____Date: _____

Signature of Investigator:_____Date: _____

Participant Assent Form
Focus Group on Rope Power

Hello, my name is Jessica and I am a student at the University of Minnesota studying physical activity.

You are being asked to participate in a group discussion about what you liked and did not like about the Rope Power program. We want to know your thoughts about the program so we can make sure we are making the program the best it can be.

If you agree to be in this study, you will be asked to fill out a worksheet on what you think about Rope Power. Then we will have an open discussion about your thoughts on the after-school program, the jump rope performance, the star charts, and learning new jump rope tricks.

There are no right or wrong answers in this discussion. Everyone's ideas are important so we ask that you be respectful of the other people in the room. This means that you will not make fun of any ideas that someone has. Everyone gets a chance to share his or her thoughts. If you are not respectful of others you will be asked not to participate anymore.

You can always say that you do not want to participate in the discussion at any time. Please ask any questions if you have them.

Once the discussion is over, I will only share the thoughts of the group as a whole. I will not share the names of people in the group and no one will know who specifically made the comments. Also, if there is a thought or feeling you want to share, but not in front of the group, you can talk with me after the group discussion.

Writing your name here means that you have read this form or have had it read to you and that you are willing participate in the group discussion. If you do not want to participate, do not write you name on the form. Participating is up to you. No one will be mad at you if you do not want to participate or change your mind at a later time. You will still be in Rope Power if you do not want to participate.

Name _____

Date _____

Signature of person explaining the study _____

APPENDIX I

Small Group Based Interview Materials

Rope Power Focus Group Worksheet

Think about your Rope Power afterschool class.

What are some things you liked?	What some things you did not like?

Think about learning new tricks and your collection of stars.

What are some things you liked?	What some things you did not like?

Think about the performance at Washburn.

What are some things you liked?	What some things you did not like?

Think about your Rope Power Routine.

What are some things you liked?	What some things you did not like?

How did you end up taking the Rope Power class?

Did you ask your parents to sign you up or did they sign you up on their own?

Was Rope Power the only after school class you were signed up for?

What are some of the things you liked about Rope Power?

What made you like those things?

Would you want the class to be longer or more times a week?

What are some things you did not like about Rope Power?

What made you dislike those things?

How would you change things you did not like?

Did you like recording your learned skills with stars?

If you could change anything about the star charts what would you change?

What did you think about performing at Washburn?

Did you like the other performances?

What did you think about the novelties performance?

If you could change anything about the performance, what would you change?

What did you think about your team's routine?

Would you take out anything?

Would you want to add anything?

Would you take the Rope Power class again?

Would you recommend the class to a friend?