Helping Kids Move: The Implementation of the CATCH Program in a Group of Middle School Students

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HELPING KIDS MOVE:
IMPLEMENTATION OF THE CATCH
PROGRAM
IN A GROUP OF MIDDLE SCHOOL STUDENTS
ERIN MICHELLE CHILLAG

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Abstract

Childhood obesity is a national health concern. The CDC reports that 17% of children aged 2-19 are obese. Obesity contributes to numerous health problems. Treating these problems burdens our health care system.

The Coordinated Approach to Child Health (CATCH) Program is an evidence-based physical activity and nutrition program that has been implemented into over 8500 school curriculums and after school programs nationwide. CATCH interventions are based on Social Cognitive Theory. The Health Promotion Model was also used to influence self-efficacy.

CATCH was implemented as part of an existing after school program at a public middle school in West Michigan for a total of 10 weeks. Undergraduate nursing students were trained in CATCH activities and data collection, including height, weight, blood pressure, activity levels and self-efficacy. The nursing students led physical activities and nutrition lessons. The aim was to increase self-efficacy, thereby increasing overall activity levels.

Repeated measures analysis of variance revealed a significant decrease in BMI at conclusion. No significant increases in self-efficacy of physical activity levels were found. No significant relationships were found between self-efficacy or activity levels.

Because adolescents experience a significant decline in activity levels and activity levels track into adulthood, it is important to intervene before this decline begins. CATCH provides physical activities that are fun and enjoyable for adolescents. The results of this dissertation project are site specific, which limits generalizibility to other locations.
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CHAPTER 1
INTRODUCTION

Overweight and obesity have become increasing health problems over the last few decades, especially among children. Overweight for children is defined by the Centers for Disease Control and Prevention (CDC) as body mass index (BMI) at or above the 85th percentile and at or below the 95th percentile, while obesity is defined as BMI above the 95th percentile (2009). The prevalence of obesity among preschool children aged 2-5 years increased from 5.0% to 10.4% between 1976-1980 and 2007-2008 and from 6.5% to 19.6% among those aged 6-11; among adolescents aged 12-19, obesity increased from 5.0% to 18.1% during the same period (Ogden & Carroll, 2010).

Children who are obese are more likely to become overweight or obese adults (CDC, 2009). There are many health problems associated with obesity among children, including bone and joint problems and sleep apnea (CDC, 2009). Obese children are also at increased risk for numerous other health problems, including asthma, diabetes, heart disease, hypertension, and high cholesterol (US Department of Health and Human Services, 2001). Many of these processes begin in childhood. Children who are obese also have an increased risk of premature death. When compared with children of normal weight, children who were overweight at age 18 were a third more likely to die prematurely; children who were obese at age 18 were twice as likely to die prematurely (Neovius, Sundstrom, & Rasmussen, 2009).

There is also a social stigma associated with obesity, which can lead to poor self-esteem and psychological problems such as depression and anxiety (Sealy, 2010). A 2003 study by Eisenberg, Neumark-Sztainer, and Story examined the prevalence of weight-
based teasing among adolescents. They found that 30% of adolescent girls and almost 25% of adolescent boys reported being teased about their weight by peers, and almost 28% of adolescent girls and 16% of adolescent boys reported being teased by someone in their families (Eisenberg et al., 2003). The students who reported weight-based teasing were also two to three times more likely to report suicidal ideation and attempts.

Overweight children also have been found to have fewer friends, are more socially isolated and appear to have friendships that are more peripheral (Strauss & Pollack, 2003). The 2003 study by Strauss and Pollock did not find this social isolation to be associated with other chronic conditions of childhood, such as asthma, migraine, or chronic abdominal pain.

The health care costs relating to overweight and obesity are staggering. Annual medical expenditures related to obesity in the United States in 2003 reached $75 billion, with half of these costs financed by the taxpayer-funded programs Medicaid and Medicare (Finkelstein, Fiebelkorn, & Wang, 2004). The most recent estimates for the annual costs relating to overweight and obesity are $147 billion (American Heart Association, 2011). In the year 2000, approximately 10% of health care expenditures in the United States were related to overweight and obese adult and pediatric patients (Hering, Pritsker, Gonchar, & Pillar, 2009). Often the health problems of obese individuals lead to physical disabilities and an inability to actively participate in the workforce (Sealy, 2010). These individuals may qualify for Social Security benefits, causing further strain on society’s financial resources.

Obesity is not just an isolated problem for the child who is affected. It is a problem that affects the entire family system. Nearly 80% of children with two obese
parents will become obese themselves; 40% with one obese parent will become obese, while only 7.0% with neither parent obese will become obese (Keller & Stevens, 1996). Obesity is often “narrowly viewed as a function of food choices and the eating habits of children and their parents” (Sealy, 2010, p. 567). However, it seems evident that this problem needs to be addressed in a much broader context. Bradley and Corwyn (2002) suggest that health outcomes and obesity are related to issues such as income, economic conditions, education, and geographic location. Access to supermarkets has been shown to be significantly less in ethnic minority communities (Sealy, 2010). Lack of access to fresh, healthy foods contributes to a higher incidence of obesity among vulnerable populations (Food Research and Action Center, 2010).

Obesity is certainly a health problem that is preventable. Unfortunately, if the current trends continue, obesity may soon replace smoking as a leading cause of preventable death in the United States (US Department of Health and Human Services, 2001). Many of the causes of obesity, such as overconsumption of calories and physical inactivity, are amenable to change. Health care providers are in a prime position to educate children and their families on the importance of developing healthy habits in childhood that are carried through into adulthood.

Regular physical activity (PA) is an important component in the prevention of obesity. The CDC recommends 60 minutes or more of PA per day for children and adolescents (2011). Adequate energy expenditure is generally measured by whether the participant “worked up a sweat” (Daniels et al., 2005). The 2003 Youth Risk Behavior Survey (YRBS) provided data revealing that 33.4% of high school students “had not participated in sufficient vigorous physical activity and had not participated in sufficient
In a cross-sectional study, Caspersen, Pereira, and Curran (2000) found consistent declines in physical activity from adolescence through adulthood. Declines in physical activity for males began at age 14 and leveled off at age 21, whereas females began the decline at age 12 and reached a trough at age 20. These data highlight the importance of interventions before and during this period in order to help offset some of the decline, because behavior patterns including physical activity tend to track into adulthood.

Schools are in a prime position to have an impact on the childhood obesity epidemic. More than 95 percent of children in the United States are enrolled in schools (CDC, 2009). In most states, children attend school for approximately 180 days out of the year (National Center for Educational Statistics, 2011). Often children from low-income families eat one or two meals daily at school as part of school meals programs. These children are also more likely to be obese; impoverished children have twice the incidence of obesity than do those above the poverty level (Cornette, 2008). Therefore, schools have an opportunity to provide children with nutritious food choices, as well as engage them in physical activity. Unfortunately, many of the food choices offered in schools are nutrient-poor and calorie-dense.

The state of Michigan has established content expectations for physical education for each grade level. Currently, the recommendation is for instructional periods totaling 150 minutes per week for elementary students and 225 minutes per week for middle and
high school students (Michigan Merit Curriculum, 2012). However these are recommendations and not requirements. Many schools have vastly reduced or eliminated physical education programs, either due to liability issues, budget constraints, or a focus on standardized tests. Only 3.8% of elementary schools, 7.9% of middle schools, and 2.1% of high schools provide daily physical education or its equivalent for the entire school year (American Heart Association, 2011). Twenty-two percent of schools do not require students to take any physical education at all (American Heart Association, 2011).

More recent data according to the 2011 YRBS reported that, in Michigan, 17.3% of females and 12.4% of males had not participated in any moderate or vigorous PA during the 7 days prior to the survey (CDC, 2012). The Michigan YRBS also found that 75.5% of females and 57.2% of males did not attend physical education classes during an average week during high school (CDC, 2012). By offering unhealthy food choices and failing to provide an outlet for excess energy, schools are setting children up for an unhealthy future, as well as lower academic achievement. Physically active children are more likely to thrive academically and socially (American Heart Association, 2011). Children can be taught healthy eating and lifestyle habits through school-based interventions.

One program that has proven to be successful in promoting health in the school environment is the Coordinated Approach to Child Health (CATCH) program. CATCH was originally known as the Child and Adolescent Trial for Cardiovascular Health and was developed by researchers at the University of Texas in 1988 (CATCH, 2012a). It began as a randomized controlled field trial and aimed to assess outcomes of health behavior interventions for primary prevention of cardiovascular disease (Luepker et al.,
This program involves nutrition education and physical activity programs either during or after school. It has recently been endorsed by the Institute of Medicine and CDC as a program that leads to changes in diet and physical activity, and ultimately a reduction in childhood overweight and obesity (CATCH, 2012b). This program was the basis for this dissertation project.

According to their website, the CATCH program is “an evidence-based, coordinated school health program designed to promote physical activity, healthy food choices and the prevention of tobacco use in children” (CATCH, 2012b). It is used with preschool through eighth grade children, and is currently in use in 8,500 schools nationwide. Grand Valley State University (GVSU) partnered with the Recreation Reaps Rewards (RRR) program that is part of Grand Rapids Public Schools (GRPS) to implement the CATCH program in an after school environment for elementary school children. This dissertation project focused on the implementation of this program with a group of middle school students in Grand Rapids, Michigan.

Students within the GRPS system are a fairly diverse group. Their ethnic mix is as follows: 36.32% African American, 33.11% Hispanic, 22.56% Caucasian, 1.26% Asian, 0.62% Native American, 0.11% Pacific Islander, and 6.03% mixed race (K. Zielbauer, personal communication, July 23, 2012). The specific ethnic breakdowns for the middle school where this program was implemented are as follows: 78.57% African American, 10.85% Hispanic, 4.5% mixed race, 5.82% Caucasian, and 0.26% Native American (K. Zielbauer, personal communication, July 23, 2012). CATCH is a program that has been used in very diverse populations, which is one reason why it is a good fit for the GRPS system.
District-wide, 75.7% of students participate in the free or reduced-cost lunch program (K. Zielbauer, personal communication, July 23, 2012). At the intervention school, 77.3% of students participate in this program (K. Zeilbauer, personal communication, July 23, 2012). As mentioned above, impoverished children have twice the incidence of obesity than do those above the poverty level (Cornette, 2008). With over half of the children at this school participating in the free or reduced cost lunch program, there is certainly a higher risk of obesity. Therefore, this was an ideal location to implement the CATCH program and help these children incorporate healthy habits into their lives.
CHAPTER 2
LITERATURE REVIEW

There are many factors that influence PA levels of children. There are also many ways to have an impact on these levels. The purpose of this literature review is to examine the decline in PA as children progress through adolescence, describe factors that contribute to this decline, and explore psychosocial factors that contribute to PA levels. This chapter will conclude with an in-depth examination of literature relating to the CATCH program. Pertinent statistics are listed when available.

Physical activity decline

Much research has been done in the area of childhood obesity prevention, specifically regarding physical activity (PA) patterns and their decline throughout adolescence. During this transitional period, there is a notable decline in PA among both boys and girls; however, this decline is usually more pronounced in girls (Kelly et al., 2010). This is also a period of time when sedentary behaviors such as watching television and playing video games are particularly high (Nelson, Gordon-Larsen, Adair, & Popkin, 2005). Caspersen, Pereira, and Curran (2000) examined age-related changes in physical activity in both girls and boys. Physical activity levels were obtained from the 1992 National Health Interview Survey - Youth Risk Behavior Survey (YRBS). The authors found that between the ages of 12 and 17, the prevalence of females reporting regular, sustained activity dropped 10 percent, while activity in males dropped 16 percent. Regular, vigorous PA began to decline at age 14 for males and at age 12 for females. Males were also more likely to report engaging in strengthening behaviors. The authors concluded that males typically had better PA patterns, especially for more vigorous
activities including strengthening activities, although unfavorable declines were noted in both sexes.

There are several limitations to this study, including the fact that only leisure-time activities were measured. Significant PA time during physical education in school or other team sports may have been missed. The data collected were also by self-report, which may not be as accurate in adolescents. Reliability and validity of the YRBS is not publically available. It is not known whether the results are accurate. This study also relied on cross-sectional data, which do not necessarily reflect individual changes over time. However, the results regarding the decline in PA as adolescents transition to adulthood are consistent with past studies. It is recognized that the data reported from the YRBS in this study are rather dated (1992). Inclusion of older data supports the consistent decline in PA among adolescents, and more current results from 2003 and 2011 YRBS are cited earlier in this paper.

In 2004, Gordon-Larsen, Nelson, and Popkin examined PA patterns and sedentary behavior in a group of ethnically diverse adolescents. This longitudinal study used data from two different cohorts (one adolescent cohort, one adult cohort) of the National Longitudinal Study of Adolescent Health. Incidence, reversal, and maintenance of engaging in five or more episodes of moderate to vigorous physical activity (MVPA) were measured, as well as amount of television and video game use. Over time, there was a significant drop in the percentage of adolescents who performed MVPA five or more times a week. Additionally, the majority of males and females did not achieve the desired five or more episodes of MVPA per week in either adolescence or adulthood. Of those who did achieve the desired amount of MVPA in adolescence, one third failed to reach
this amount as adults. Significantly greater percentages of Hispanic and African American females failed to achieve five or more sessions of MVPA per week when compared to whites. African American females were more likely to remain inactive during both adolescence and early adulthood when compared to white females.

The authors concluded that the majority of adolescents do not engage in the desired amount of weekly PA, and this pattern is sustained into adulthood. Strengths of this study include a large and ethnically-diverse sample. Limitations include reliance on self-report regarding PA. This study also considered only the frequency of activity, and not the duration. This may have resulted in the amount of PA reported being inaccurate, as length of the PA session was not taken into account. It is important to consider duration and intensity for each PA session to fully assess exertion.

Another study by Kahn et al. (2008) also described longitudinal trends in adolescent PA. This was a sample of 12,812 boys and girls ages 10 to 18 who were part of the Growing Up Today Study. The authors sought to examine trends in PA, individual variation in PA, and the effect of multiple factors on PA, such as gender, body mass index (BMI), psychosocial factors, peer and parental attitudes regarding PA, maternal level of PA, and barriers to being physically active. Physical activity was self-reported and measured PA over the last year. Eighty percent of participants completed the surveys at all three time points.

In this study, boys generally reported more hours of PA (mean hours ranged from 7.3 to 11.6 hours per week) than girls (mean hours ranged from 8.0 to 11.2 hours per week). Levels of PA for both boys and girls began to decline at age 13, and this decline was slower for girls than boys. Athletic self-esteem ($\beta = .083, p < .0001$) and social self-
esteem ($\beta = .023$, $p < .001$) were both positively associated with PA in both girls and boys. Peer attitudes regarding body shape and fitness were associated with PA in girls ($p = .0001$), while boys’ perception of the importance of being considered fit and muscular by peers was associated with PA ($p < .0001$). Parental attitudes and maternal level of PA were positively associated with PA in both girls and boys ($p < .0001$).

A major limitation of this study is that the sample was a subset taken from children whose mothers were originally part of the Nurses’ Health Study II. Children of parents who are healthcare professionals may be more aware of the importance of being physically active and therefore may actually be more active, or may have wanted to provide more favorable responses. This study is also limited by the fact that the sample consisted mostly of white adolescents, so there is an inability to generalize across various ethnic groups. The reliance on self-report to measure activity levels is also a limitation. Having participants recall an entire year of PA may have resulted in inadequate reporting of actual activity levels. The survey may have also failed to capture unstructured physical activities done by younger children. The authors highlight the importance of targeting interventions to the period before declines in PA begin. These interventions also need to target individual and environmental factors.

These studies emphasize the significant decline in physical activity as children progress through adolescence. This decline is markedly increased among minority youth. This further reinforces the choice of the selected Grand Rapids middle school as a good location for the CATCH intervention, as the school has a high percentage of minority students. The middle school period is also an important time to intervene before the steep declines in PA begin in the high school years. Bringing the CATCH program to this
group of youth provided an opportunity to teach them that PA is an important and fun part of life. They can carry these habits with them as they progress through high school and into adulthood.

**Factors affecting physical activity levels**

Many studies have examined the factors that contribute to engagement in PA in adolescence. A 2011 study by Butt, Weinberg, Breckon and Claytor examined factors that determined motivation and participation in PA among adolescents. Questionnaires were used to measure duration and intensity of PA, sedentary activity, level of interest in PA, and perceived benefits and barriers to being physically active. A total of 1163 adolescents between the ages of 13 and 16 participated.

In this sample, males spent more time in sedentary activities (M = 200 min, SD = 145.29) than did females (M = 141.6 min, SD = 128.88; p < .001). However, males also reported participating in more minutes of MVPA (M = 122 min, SD = 106.9) than did females (M = 96.6 min, SD = 88.1; p < .001). African Americans participated in a greater amount of sedentary activity (M = 254 min, SD = 285.6) than did white adolescents (M = 155 min, SD = 125.5; p < .001). As the participants aged, females decreased their amount of PA while participation for males increased, specifically for MVPA (p < .001).

Between ages 13 and 14, white males reported an average of 107.23 minutes of MVPA (SD = 97.14), while this amount increased to 124.34 minutes between the ages of 15 and 16 (SD = 93.8). For African American males, these values increased from 174.95 minutes to 191.25 minutes during the same time periods. The amount of activity reported by white females decreased from an average of 108.34 minutes (SD = 99.79) to 87.49 minutes (SD = 78.41) during this time period. For African American females, the decline was from
146.31 minutes (SD = 105.06) to 54.12 minutes (SD = 36.93). Males reported PA to be more fun (M = 14.7, SD = 3.18) than females (M = 14.1, SD = 3.39; \( p < .001 \)), and they reported enjoying getting “out of breath and sweaty” more. Reasons for participating in PA varied by gender. Females focused more on body image factors, but also identified lack of time as a barrier for being physically active.

One major limitation of this study is that the questionnaire focused on self-report of the previous day’s activities, which may not be reflective of their overall participation in PA. It also only considered duration of PA, not intensity. Therefore the full level of exertion reached may not have been captured. The sample also consisted of primarily Caucasian participants, though the percentage of African Americans was consistent with the overall United States population. This study highlights the importance of considering age, gender, and race as factors when developing PA programs for adolescents.

Strauss, Rodzilsky, Burack and Colin (2001) sought to examine factors that impacted PA levels in children, including health beliefs, self-efficacy, social support, and sedentary behaviors. Three different scales were used to measure self-efficacy, self-esteem, and anxiety. These were the Piers-Harris Children’s Self-Concept Scale (Piers & Harris, 1969), the Revised Children’s Manifest Anxiety Scale (Reynolds & Richmond, 1985), and a children’s physical activity questionnaire developed by Saunders et al (1997). This questionnaire was developed to measure psychosocial correlates of exercise, including self-efficacy, social influences, and health beliefs.

An activity monitor was used to monitor PA for one week in 92 children aged 10 to 16 years. Children in the study spent on average 24.5% (SD ± 6%) of their waking hours in moderate or high-level PA. Sixteen percent (SD ± 3.7%) of their time was spent
doing moderate activities such as walking or playing, however only 1.4% (SD ± 1.3%) of their time was spent in vigorous activity. Children spent approximately 10.4 hours per day fairly motionless. Boys and girls had a relatively equal level of PA before age 13 (p = 0.43), however boys were significantly more active after this age (total activity time: M = 23.5%, SD ± 4.7% vs. M = 19.0%, SD ± 3.8%; p < 0.05). Both sexes exhibited a significant decline in moderate and high-level PA between the ages of 10 and 16 (p < 0.001). Higher levels of high-intensity PA were associated with increased self-efficacy and social influences scores. Higher activity levels were significantly associated with all three measures of self-efficacy (p < 0.01). The authors also found that children with low levels of vigorous activity had lower scores on behavior, happiness, intellectual and popularity self-esteem subscores (p < .05). This study emphasizes the importance of focusing activities on increasing self-efficacy among children.

This study is limited by the small sample size, cross-sectional design, and a non-diverse sample. One major limitation is the fact that parents completed the questionnaires regarding sedentary activities. This may lead to inaccurate data, as parents may not be aware of the full extent of their child’s sedentary activities, or they may not want to admit to how much time their child spends in sedentary activities. However this study used an activity monitor to measure PA levels, so any inaccuracies in parental report of sedentary activities may have been offset by data obtained by the monitor.

A 2011 study focused on examining internal and external barriers to PA (Hsu, et al.). The variables studied included social support, perceived barriers, and negative meanings of physical activity (NMPA). NMPA is derived from the theory of meanings of behavior (Spruijt-Metz & Jackson, 1999), and was developed to “supplement existing
cognitive/behavioral models by advancing understanding of how affect impacts health related behavior in adolescents” (Hsu et al., 2011, pg 211). A total of 350 seventh- and eighth-grade students completed questionnaires. The authors found that in this sample, students spent approximately 86% of their time in light PA (M = 879.34 minutes, SD = 120.44) and 10% of their time in sedentary behavior (M = 109.29 minutes, SD = 91.69). Only 4% (M = 40.97 minutes, SD = 63.57) of their time was spent in vigorous PA, and just under 10% of their time in moderate physical activity (M = 99.69 minutes, SD = 100.98). Regarding perceived barriers, girls reported higher internal barriers ($t = 2.76, p = 0.001$) and functional NMPA ($t = 2.48, p < 0.001$). Girls also spent significantly less time in moderate to vigorous PA ($p = 0.027$).

Data from this study emphasize the importance of considering psychosocial factors when designing and implementing a PA program for adolescents. Limitations of this study include measuring only one day of behavior, as well as assessing only primary behaviors during 30-minute blocks of time. This may not take into account times when participants were “multi-tasking,” such as listening to music and being active. Reliance on self-reporting for activities and the cross-sectional design are also limitations of the study, as well as a sample consisting mainly of Latino and Asian urban youth.

The above studies again highlight the fact that adolescents do not get the required daily amount of PA. They also illustrate some of the reasons adolescents choose to engage in physical activity, as well as some of the benefits derived from being active and barriers to being active. These benefits include increased self-esteem, as well as increased self-efficacy, which is addressed in detail in the next section. Reliance on self-report for many of these studies is an overall limitation. It is also possible that some of the measures
failed to capture intensity of activities, and therefore may not have been accurate of exertion as a whole.

The CATCH program addresses some of the barriers adolescents may face in regards to participating in adequate daily PA. This program takes place daily in the after school setting, and provides a structured, safe environment where adolescents can engage in PA with friends. CATCH works to increase daily PA levels, and also adolescents’ feelings about their abilities to engage in PA on their own.

**Self-efficacy**

Self-efficacy, as defined by Bandura (2004), is the belief that “one can exercise control over one’s health habits” (p. 144). Multiple studies have examined the perception of self-efficacy in relation to PA in adolescents. Wenthe, Janz, and Levy (2009) examined factors that predispose, reinforce, and enable adolescents to participate in MVPA. Self-efficacy, enjoyment, family and peer support, school climate, neighborhood safety, and access were investigated. The youth physical activity promotion model (Welk, 1999) was used to guide the development of the Choices Questionnaire, which was developed specifically for this study. This sought to measure predisposing, reinforcing, and enabling factors that contributed to engagement in PA. Participants were a subset of adolescents involved in the *Iowa Bone Development Study*, which was an ongoing longitudinal study. It is not known at what point during the longitudinal study this study took place. A total of 179 subjects wore an activity monitor for 8 hours/day for 3 days, and then filled out the questionnaire.

The authors found that males spent a greater percentage of their day performing MVPA (M = 14.01%, SD = 4.43 versus M = 9.97, SD = 3.65; p < 0.00) and reported
more MVPA than did females. Males also reported greater family support (M = 3.21, SD = 0.81 versus M = 2.96, SD = 0.87; p = .04) and greater physical access to opportunities to engage in MVPA (M = 4.5, SD = 0.71 versus M = 4.32, SD = 0.88; p = .10). Family support (r = 0.29, p < 0.01), friend support (r = 0.33, p < 0.01), and self-efficacy (r = 0.33, p < 0.05) were all found to be positively associated with male MVPA. Family support (r = 0.38, p < 0.01) and self-efficacy (r = 0.20, p < 0.05) were the only factors that were statistically significant in regards to MVPA for females. There were positive associations between enjoyment, friend support, perceived safety and perceived access but these were not significant. This study is limited by the fairly small, homogenous sample and cross-sectional design. It may not be realistic to generalize these findings to other racial/ethnic groups. The cross-sectional design also fails to capture activity patterns over time.

Much research has been done by Lorraine Robbins and her colleagues regarding PA among adolescents. A series of three studies examined various factors relating to self-efficacy and physical activity in the same population of 168 African American and European American children aged 9 to 17. In the first study, Robbins, Pis, Pender, and Kazanis (2004a) sought to explore self-definitions of PA and differences in these definitions among boys and girls at various stages of puberty. The study utilized the Self-Schema Theory (Markus, 1977), which proposes that perceptions and memories, as well as emotional and behavioral responses, are active structures that are guided and formed by past experiences. These schemas then guide how individuals process information about themselves.

Participants had to be in good health and sedentary most days of the week. Questionnaires were completed regarding current PA self-definition and also a prediction
of what they would like to be in the future. Enjoyment of physical activity was measured using the Physical Activity Enjoyment Scale, which was developed by Kendzierski and DeCarlo (1991). Developmental stage was assessed through self-report of several variables, including facial and pubic hair growth and voice changes for males, and pubic hair growth and breast growth for females. Both genders reported on skin changes, growth spurts, underarm hair growth, and overall development.

Physical fitness was measured through oxygen uptake during physical fitness testing, or VO2. The authors found that a stronger current PA self-definition was significantly associated with increased exercise frequency \(r = .517, p < 0.001\), selection of active pursuits as favorite activities outside of school \(r = .299, p < 0.001\), future PA self-definition \(r = .664, p < 0.001\), general enjoyment of PA \(r = .673, p < 0.001\), and peak VO2 \(r = .381, p < 0.001\). Adolescents in late puberty were significantly less likely to choose an active pursuit than adolescents in early and middle puberty \(p < 0.001\). Compared to females, males scored significantly higher for both current \(p = 0.024\) and future \(p = 0.019\) PA self-definition. For both boys \(p = 0.006\) and girls \(p = 0.016\), stronger PA self-definition was significantly and positively associated with higher peak VO2 results. The authors highlight the importance of current PA self-definition and its correlation with fitness level. This also may have relevance as to how adolescents choose to participate in PA in the future.

It is important to design interventions and education that help adolescents develop a strong PA self-definition as these patterns can track into adulthood. It is of note that the correlates found in this study should not be interpreted as causal. A major limitation of this study is the laboratory setting. Some children may have felt pressure to continue the
treadmill exercise longer than they were comfortable, because of the presence of investigators. It is also limited by the a fairly small sample size, as well as the fact that only African American and Caucasian children are included, which restricts generalizibility to other ethnic groups. In addition, the failure to directly measure exercise frequency and intensity is a limitation. While VO2 was measured, it may not necessarily be reflective of the amount and types of PA children engage in during their daily lives. However VO2 is generally accepted to be the best indicator of aerobic fitness (Robbins et al., 2004).

In the second study with the population described above, Robbins, Pis, Pender, and Kazanis (2004b) explored the “relationship between feeling state reported during a standardized episode of physical activity and pre-activity self-efficacy, post-activity self-efficacy, and enjoyment” of the PA session (p. 702). They also compared enjoyment and feeling states among various groups of adolescents. They measured peak VO2 as described above, developmental stage, physical activity self-efficacy regarding ability to walk at a fast pace for progressively longer periods of time, feeling state as measured by the Feeling Scale (developed by Gauvin and Rejeski, 1993), and enjoyment of PA as measured by the Physical Activity Enjoyment Scale (developed by Kendzierski and DeCarlo, 1991). Subjects then completed a standardized PA task involving either walking or running on a treadmill for 20 minutes at a pace calculated based on peak VO2 as measured previously. How they felt during the exercise was measured every 4 minutes.

The researchers found that pre-activity self-efficacy was positively associated with post-activity self-efficacy ($r = .635, p < 0.001$), as well as general enjoyment of PA ($r = .297, p < 0.001$). African American participants enjoyed the standardized activity
significantly more than Caucasian adolescents ($t = 2.09$, $p = 0.038$), however there were no differences between these two groups regarding general enjoyment of PA. The results of this study were found to be consistent with others regarding a positive relationship between self-efficacy and enjoyment of physical activity. This study also utilized Bandura’s social cognitive theory (1986) to explain the results. Again this study is limited by the laboratory setting, as children may have felt pressured to provide more favorable responses. The study was also limited to African American and Caucasian adolescents, with no exploration of socioeconomic status. This study emphasizes the importance of developing physical activities that enhance self-efficacy in adolescents.

In the third study of the population described above, Robbins, Pender, Ronis, Kazanis, and Pis (2004) examined the association between perceived exertion and self-efficacy during an actual episode of PA. Self-efficacy as described in social cognitive theory (Bandura, 1986) is discussed as an important influence on exercise participation. The Rating of Perceived Exertion (RPE) Scale (Borg, 1985) was used to measure perceived exertion every 4 minutes throughout the treadmill exercise during two different sessions. Pre-activity self-efficacy during the first session was positively correlated with post-activity self-efficacy in session two ($r = .64$, $p < 0.001$). Post-activity self-efficacy was positively correlated with peak VO2 ($r = .32$, $p < 0.001$) and negatively correlated with RPE ($r = -.38$, $p < 0.001$). They also found that greater pre-activity self-efficacy predicted lower perceived exertion ($p < 0.01$). Pre-activity self-efficacy was a significant predictor of RPE in boys ($p < 0.001$), but for girls pre-activity self-efficacy did not predict RPE. However for girls, lower perceived exertion was associated with higher self-
efficacy after exercise ($p < 0.001$). RPE was able to predict post-activity self-efficacy despite gender, race, and developmental stage.

The authors highlighted the significant increase in self-efficacy in both boys and girls after completing the PA task because successful completion increases self-efficacy. Their recommendations regarding increasing PA self-efficacy include providing positive PA experiences, modeling of PA by those close to the child, and persuading children that regular participation in PA is an important and enjoyable part of a healthy lifestyle. Again a major limitation with this study is the laboratory setting, which may cause participants to feel pressured to respond favorably. The study also had a relatively small sample size.

Robbins, Sikorskii, Hamel, Wu, and Wilbur (2009) examined perceived benefits and barriers to physical activity among middle school children. The health promotion model was used to explore concepts that motivate people to engage in health enhancing behaviors. This study was a cross-sectional cohort study with a total of 206 middle school students completing questionnaires. Variables measured included demographics, selections of an active versus sedentary pursuit, sports team participation, benefits of and barriers to PA, number of days per week of PA, and number of minutes of PA. The results showed boys participating in a significantly greater amount of vigorous PA than girls ($M = 152.2$ minutes versus $M = 97.98$ minutes, $p = 0.03$). As far as benefits of PA, boys and girls differed in their choices slightly. Boys chose “improvement or development of athletic skills”, “taking care of themselves, staying in shape, and being healthier”, and “having a chance to be active and play” as their top three motivators. Girls’ choices were similar, with the exception of choosing “proving what they can do physically” instead of “improvement of athletic skills.” Girls were more likely to choose
“take care of myself, stay in shape, and be healthier” as a greater perceived benefit of PA. Boys and girls had the same top three barriers, which included minor aches and pains from activity, tiredness, and being too busy.

This study highlights the importance of taking into consideration perceived benefits and barriers when designing PA programs for youth. Health care providers who focus on what adolescents find to be the benefits of PA can assist these youth in increasing their enjoyment and investment in PA. However, a major limitation of this study was the use of a questionnaire that required participants to choose from a list of favorite leisure-time activities. This list consisted of eight sedentary activities and one active pursuit, which may have caused the children to choose sedentary activities more often. While in a previous study where this list was used (Robbins et al., 2004a), this list found selection of an active pursuit to be positively correlated with exercise frequency in middle school students \((p < 0.01)\), allowing open-ended responses to this item may have resulted in more accurate data being obtained. Other limitations of this study include use of a convenience sample, low response rate of 41% and reliance on self-report for measurement of PA.

These studies of self-efficacy by Robbins and colleagues were examined because they have done much research in this area, particularly with minority populations. However it is important to consider limitations of the above studies. These limitations include a laboratory setting, as well as the same population being used for several studies. Despite these limitations, these studies highlight the importance of self-efficacy in relation to physical activity. Self-efficacy has always been a major component of CATCH, and this is one of the reasons self-efficacy was chosen as a focus for this
dissertation project. Increases in an individual’s self-efficacy relating to PA may increase the amount of PA he engages in, and this will help to cement physical activity as a part of his life. This can lead to a healthier lifestyle overall and may decrease the incidence of obesity. Overall healthcare costs relating to the treatment of obesity-related illnesses may decrease as well.

The CATCH Program

A wealth of research has focused on PA and nutrition programs for children and adolescents. The program that is the focus of this dissertation project is the Coordinated Approach to Child Health Program, or CATCH. The CATCH program was implemented in the 1990s in four areas of the United States – California, Louisiana, Minnesota, and Texas (Luepker et al., 1996). The initial field trial consisted of 96 schools throughout these regions, with 48 schools being in the intervention group and 48 schools being in the control group. The program was integrated into the school curriculum and involved several components, including physical activity, nutrition, health education, and smoking prevention. The curriculum was based on social cognitive theory and was designed to influence self-efficacy by aiming to give children more control over their choices relating to nutrition and physical activity. This involved modeling, goal setting, contracting, skill training, practice, and reinforcement in relation to PA and healthy food choices (Kelder et al., 2005). The program has grown significantly and is currently being used in 8,500 schools nationwide in a variety of formats. It also has earned endorsements from the Institute of Medicine and the CDC. This portion of the literature review will discuss several of the studies that tested CATCH, and provide their results.
When the original field trial of CATCH was initiated, it was known as *The Child and Adolescent Trial for Cardiovascular Health*. The intervention was continued for three years, and a total of 5106 ethnically diverse third-grade students participated in this initial trial (Luepker et al., 1996). The original intervention was implemented directly in the school curricula and also involved modifications to the school food service program. These changes involved lowering the fat, saturated fat, and sodium content of the foods, while continuing to offer foods that had a good taste. The goal of the PA component of CATCH was to increase the “amount of enjoyable MVPA during physical education (PE) classes at school to 40% of the PE class” (Luepker et al., 1996, p. 769). The classroom lessons targeted “specific psychosocial factors and involved skills development focused on eating behaviors and physical activity patterns” (Luepker et al., 1996, p. 796).

The System for Observing Fitness Instruction Time (SOFIT) was used to observe PA (McKenzie, Sallis, & Nader, 1991). Reliability and validity were established by the authors of the SOFIT (McKenzie, Sallis & Nader, 1991). The Health Behavior Questionnaire (HBQ), which was developed specifically for CATCH, was also used to evaluate factors related to diet, exercise, and smoking at baseline, mid-intervention, and follow-up. The Self-administered Physical Activity Checklist (SAPAC), also developed for the original CATCH curriculum by Sallis et al. (1996), was administered once during grade 5 to assess “type, duration, and intensity of selected leisure time physical activities, television watching, and video games” (Luepker et al., 1996, p. 770). Results from Luepker et al. (1996) showed that while average length of PE class time did not change in either the intervention or control group (approximately 30 minutes for both groups), there was a significant increase in intensity of PA in the intervention schools during the second
(M = 8.9 kJ/kg, SD = 0.3 for control schools; M = 10.2 kJ/kg, SD = 0.2 for intervention schools; p = .002), fourth (M = 9.2 kJ/kg, SD = 0.3 for control schools; M = 10.3 kJ/kg, SD = 0.2 for intervention schools; p = .005), and fifth (M = 9.5 kJ/kg, SD = 0.3 for control schools; M = 10.4 kJ/kg, SD = 0.2 for intervention schools; p = .04) semesters of the intervention. Students in the intervention schools also had significantly higher self-efficacy measures for both diet and PA at the end of the first year of intervention (p < .006); however, there were no significant differences on these measures at follow-up. According to SAPAC results, total minutes of reported daily PA did not significantly differ between intervention (M = 145.5 minutes) and control schools (M = 154.8 minutes), however, vigorous PA was significantly higher for intervention schools (M = 46.5 minutes for control schools; M = 58.6 minutes for intervention schools; p < .003).

The authors concluded that CATCH was a successful school-based program. Limitations listed were the rather low participation rate of 60.4% and the amount of the intervention that would be feasible in the elementary school setting. It was felt that the competing demands of the classroom setting limited the effects of the program (costs, staff time, and competing classroom requirements). Another limitation was the likelihood that some students regressed into old habits over summer vacation, because there was no intervention during that time period. The lack of a significant difference in self-efficacy between control and intervention schools at follow-up may indicate the need for the program to continue year round to have maximal effect. There was also a lack of community involvement. Many of these factors were taken into account with future CATCH studies. Nevertheless, based on the data from this field trial, CATCH seems to have found a solid foundation from which to expand.
A 1996 study by Edmunson et al. evaluated the results of the original three year CATCH intervention. The intervention was the same as described previously in the Luepker et al. (1996) study, but in this case different variables were examined. The main focus of this study was on psychosocial variables as determinants of behavior. Researchers found significant improvement in the original intervention schools for the variables of dietary intention, usual food choice, and knowledge ($p < 0.001$ for all three variables). These improvements were maintained across the three years, with the greatest improvement at the beginning of the program. They also found a significant improvement in self-efficacy for PA for 3rd and 4th grade students in the intervention schools ($p < 0.001$). However by 5th grade, this dropped to the same levels as students in the control schools. The authors concluded that the CATCH intervention did result in behavioral changes in children, increased their perceived abilities to be able to perform health-related behaviors, and increased their perceived support to engage in healthy behaviors. Based on the results, it appears as though CATCH was initially effective in increasing self-efficacy among this group of children. The CATCH intervention also brought about behavioral change that was sustained over several years.

Limitations identified by the authors were a possible social desirability bias, as well as a loss of students (because of relocation from the school district) who had been exposed to the program throughout the three year study period or the in-migration of unexposed students (exact numbers were not given). In this instance, social desirability bias could be a real threat to the integrity of the study, as the students likely were aware that they were participating in an intervention that targeted healthy lifestyle choices. Therefore they may have felt pressured to answer favorably despite being instructed to
answer as truthfully as possible. The authors also felt that modifications to the program would need to be made for older children, which would be appropriate based on the different developmental needs children have as they age. The study did include a large number of schools and had a large, diverse sample size, which are strengths of the study. Overall, CATCH was effective when compared to control schools. No additive effect was found when family interventions involving take home packets that required adult participation as well as a “family fun night” were added.

Kelder et al. (2005) studied the CATCH Kids Club, a modification of the original CATCH program. This involved an after school program consisting of a PA and nutrition intervention for 3rd to 5th grade students. The study was implemented in 16 after school programs in Texas, and complete data were available on 157 students. The design was a pre-test/post-test quasi-experimental design using a control group. Self-report was used to measure food intake and PA, direct observation of PA was completed, and focus group interviews were also conducted. The SOFIT, which is described above, was used to observe PA. The After-School Student Questionnaire (ASSQ), which was adapted from the previously described HBQ, is a self-administered questionnaire that was used to measure the behavioral and psychosocial variables that are the target of the intervention. Variables in the ASSQ include food preferences, dietary knowledge, self-efficacy, intentions to choose healthy foods, and participation in sedentary and physical activities. The interventions in this study were also based on social cognitive theory (Bandura, 1986) and included an education component, physical activity component, and snack component that were divided into two modules based on developmental age. The nutrition component consisted of 15 lessons divided into five 3-week units. The PA
component consisted of an activity box containing various developmentally appropriate and inclusive activities.

The percentage of time spent in MVPA among children at intervention schools increased (M = 29.46% pre-intervention; M = 56.84% post intervention, p < .001), while there was also a reduction in time spent standing (p < .027). Children at control schools experienced a decline in percentage of time spent in MVPA (M = 47.79% pre intervention; M = 31.34% post intervention). There was also a significant decrease in unstructured play time in intervention schools (M = 64 minutes; p < .002), and an increase of 30 minutes in game play, but this increase was not significant. The authors also found that in intervention schools, nearly all of the outcome variables changed in a positive direction, though not all of them were significant. It was reported that children enjoyed the PA sessions, and those implementing the program found it easy to conduct but felt the educational components were a bit complex for the after school setting. Overall, however, this intervention was effective at increasing amount of time spent in MVPA.

Limitations of this study include reliance on self-report to obtain information about dietary and physical activity habits, as well as possibly social desirability bias from the participants. The intervention was delivered over a fairly short time period (15 weeks total), which may have not been adequate to see many significant effects. There was a fairly large sample size, though the retention rate was only 61 percent. The authors point out the importance of staff engagement and enthusiasm in making the program successful.
A 2005 study by Coleman et al. examined the effectiveness of the CATCH program in four low-income, primarily Hispanic elementary schools that were part of the original CATCH intervention. This was done two years after CATCH was initiated. Four schools of similar make-up were used as controls. A pre-test/post-test matched control, quasi-experimental design was used, with a total of 896 participants, 423 who were exposed to the intervention. The outcome measures included various anthropomorphic measures and fitness tests, as well as intensity of activities performed in PE classes and nutrition information in school lunches.

While girls in both intervention and control groups exhibited significant increases in percentage of risk of overweight or overweight from third (control = 26%; intervention = 30%) to fifth grades (control = 39%; intervention = 30%), the rate of increase for girls in CATCH schools was significantly less (2% for intervention schools; 13% for control schools). There were similar results for boys. Because of this, the authors felt that the CATCH program was effective at slowing the increase in risk of overweight and overweight. They also concluded that community involvement may help to increase the program’s effectiveness. Using feedback to evaluate the program’s success would be helpful as well in order to maximize participation and integration into school curricula. A strength of this study is its effectiveness in a high risk population (primarily low-income, Hispanic children). This study had a high participation/retention rate; however the ability to generalize the results to non-Hispanic children is limited.

McKenzie et al. (1996) sought to examine results and methods of the CATCH Physical Education (PE) program. The goal of this program was to increase the amount of time children spend in MVPA during PE class at school, and also to give them skills to
use throughout their lives to be active. The SOFIT was also used to evaluate and measure PA in this study. Researchers found that children in intervention schools spent a larger percentage of time (M = 51.9%) in MVPA during lessons than children in control schools (M = 42.3%; p = 0.0002). This was an increase of 39% from baseline in intervention schools, while control schools increased by 23%. The estimated energy expenditure of children in intervention schools (M = 2.49 kcal/kg) was higher (p = .002) than control schools (M = 2.26 kcal/kg). By self-report, children in intervention schools reported more daily minutes of vigorous physical activity (VPA) (M = 58.6 minutes) than control students (M = 46.5 minutes; p = .003). Overall this intervention was felt to be effective in increasing PA among the children in the intervention schools.

A strength of this study was the number of PE lessons that were observed (n = 2,096; M = 3.34 lessons observed in control schools; M = 3.85 lessons in intervention schools). However, it is possible that school staff deliberately increased activity duration and/or intensity for the days they were being observed. Another limitation was that the self-assessment questionnaire was only administered once, so changes in overall daily activity could not be assessed over time. Also, it is possible that a social desirability bias existed regarding VPA self-report for the children in the intervention schools. Despite these limitations, this program was effective at increasing the amount of time children spend in MVPA during structured PE class periods, as well as increasing their energy expenditure.

Five-year maintenance effects of the CATCH PE component, as described above, were examined by McKenzie, Li, Derby, Webber, Luepker, and Cribb (2003). The population included third through fifth graders at former CATCH intervention and
control schools. The SOFIT tool was again used to measure PA. A steep decline in VPA was documented; however, energy expenditure and proportion of time spent in MPVA during PE classes were maintained in intervention schools. The former CATCH control schools had also adopted the program after the initial trial, though the initial training was not as intensive at these sites. For third grade control schools, percentage of MVPA time increased from 34.5% of lesson time at baseline to 48.4% at follow up ($p = .0001$). For fourth grade control schools, percentage of MVPA time increased from 41.7% of lesson time at baseline to 48.8% at follow up ($p = .0007$). Regarding teacher training, more teachers in former intervention schools had received CATCH training than those in control schools ($p = .002$), and they reported using the CATCH curriculum more often ($p = .0001$). Teachers in former intervention schools also dedicated a greater amount of lesson time to physical fitness activities ($M = 22.1\%$) than those in control schools ($17.7\%; p = .034$). The importance of staff development and engagement is evident, because teachers in former intervention schools devoted more time to physical fitness activities and used the CATCH curriculum more often than teachers in control schools.

Hoelscher et al. (2004) examined the institutionalization of the CATCH program in former intervention and control schools. They used a cross-sectional design, and institutionalization was defined as “long-term viability and integration of a new program within an organization” (Hoelscher et al., 2004, p. 595). This was measured by use of the main CATCH program components, as well as whether or not students continued to meet the goals of the intervention. Nutrient content of school lunch menus, amount and type of PE classes, and classroom health instruction practices were analyzed. For the PE component, SOFIT was again used to observe PA.
Former intervention schools continued to meet the goal of Healthy People 2010 by spending 50% or more of PE class time in MVPA. Also, for former intervention schools, the amount of PE class that was based on the CATCH curriculum was significantly higher (M = 33%) compared to control schools (M = 9.7%; \( p = .06 \)). All treatment groups (intervention, comparison, and control) exceeded the CATCH goal of 90 minutes of PE per week. The investigators felt that while there was some evidence of institutionalization (meaning how well the program was adopted into the school curriculum and maintained over time) of the CATCH program, overall compliance was less than desired.

A limitation they noted was that much of the data relied on self-report, which may have resulted in biases. It is possible that the school staff wanted to be seen as successful in maintaining the CATCH program, so they may have made modifications to their daily routines while investigators were observing. Also, 56 previous CATCH schools were examined but only 20 former comparison schools were examined. Examination of similar number of control schools and intervention schools may have provided a more representative sample. The authors’ recommendations for success include the importance of training and compatibility with school environment, goals, and mandates. They also felt overall that institutionalization was difficult to assess simply by observation of use of CATCH materials. However, some maintenance effects of the CATCH program in intervention schools were found, specifically regarding the PE activity materials. Reasons cited for use of these materials included popularity and ease of use. The importance in staff training and engagement in affecting initial success and long term success of the program is evident from this study’s findings.
Brown et al. (2007) examined cost-effectiveness of the CATCH program in a predominantly Hispanic, Mexican-American school setting. They used a rather complicated system to calculate cost-effectiveness, which is described in detail in the article. Briefly, their calculations were based on cases of obesity that were avoided based on the CATCH trial, projected adult obesity cases avoided, costs of CATCH, averted medical costs due to obesity cases avoided, quality of life years saved, and increased labor productivity costs that were saved due to decreased obesity. These figures were used to calculate the cost-effectiveness ratio (cost per quality-adjusted life years saved) as well as the net benefit (comparison of averted medical and later productivity costs to the cost of the program) of CATCH. The cost effectiveness ratio was $900, and the mean net benefit of the CATCH intervention, based on the factors mentioned above, was $68,125. Regarding the life-time medical cost differential comparing obese and non-obese males aged 35-64 years was $9,716. For obese and non-obese females of the same age group this figure was $11,086. Based on these values, the prevention of obesity and the health problems related to it could save the health care system tens of thousands of dollars. This analysis led the authors to conclude that the CATCH program is cost-effective and net-beneficial.

The authors do recognize limitations of the study, including basing calculations on projection of cases of adult obesity that were averted as a result of the CATCH intervention as well as the lack of availability of medical cost estimates for older males. Several authors of this study were also involved in previous CATCH studies, so they may have been predisposed to conclude that CATCH is cost-effective. Despite these
limitations, CATCH seems to be effective in reducing the prevalence of overweight and obesity over time.

Lessons learned

Franks et al. (2007) discuss lessons learned from the implementation of the CATCH program that foster program success. These lessons include the importance of involving those who will be using the program in the planning and design of the program, availability of decision makers to those implementing the program, support of school principal or administrator, and adequate training of interdisciplinary teams who will maintain the program. These are all factors that were taken into consideration during implementation of the CATCH program in the school participating in this dissertation project.

Summary

CATCH was originally known as the Child and Adolescent Trial for Cardiovascular Health. The original study aimed to focus on health behavior interventions as a means of primary prevention of cardiovascular disease in children (Luepker et al., 1996). Over time, public awareness shifted from overall cardiovascular health toward health risks related to diabetes and obesity. CATCH made subsequent curriculum changes, and evolved into the Coordinated Approach to Child Health to reflect this broader health perspective. It is currently being used in over 8500 schools nationwide.

There is a wealth of evidence to support the use of the CATCH program as an effective method to slow the rate of childhood overweight and obesity, as well as to increase PA levels and self-efficacy. Several key themes emerge in the examined
literature. Many researchers emphasized the need to consider social cognitive variables when designing developmentally appropriate interventions for children. They also highlight the importance of adequate staff training and engagement, as well as community involvement. The aforementioned studies also highlight the importance of intervening before the sharp decline in PA begins, as well as designing interventions that are fun and enjoyable for children so that they see the benefits of incorporating PA into their lives. By utilizing principles developed by the CATCH program, this dissertation project aimed to have an impact on increasing physical activity and self-efficacy levels among middle-school children and reducing and/or slowing the epidemic increase in childhood overweight and obesity. Community involvement in terms of GRPS and the RRR program were considered to be crucial to the success of CATCH in this school system, as was engagement of the undergraduate nursing students and RRR staff who helped to implement CATCH.
CHAPTER 3
THEORETICAL BASIS

To be successful, interventions targeting behavior change must have a sound theoretical basis. Two theories were used in the implementation of this dissertation project. Social cognitive theory (SCT), originally developed by Albert Bandura in the 1960s and 1970s, was the theory that guided the development of the CATCH program. The health promotion model (HPM), originally developed by Nola Pender in 1982 and modified over three decades, was used in conjunction with SCT to guide the interventions and of evaluation of their effectiveness.

Social Cognitive Theory

Bandura’s SCT views people as “neither driven by inner forces nor automatically shaped and controlled by external stimuli” (Bandura, 1986, p. 18). Through this framework, human behavior is determined by an interaction between behavior, cognitive and personal factors, and environmental events. Forethought is used to motivate and guide actions anticipatorily. Bandura discusses the capability to learn by observation, which “enables people to acquire rules for generating and regulating behavioral patterns without having to form them gradually by tedious trial and error” (Bandura, 1986, p. 19). He also mentions learning through modeling, as is used by many children to master more complex tasks. These factors are important to consider when implementing a PA program such as CATCH, where children are going to observe behaviors and then attempt to master them themselves.

SCT consists of several core determinants, including “knowledge of health risks and benefits of different health practices, perceived self-efficacy that one can exercise
control over one’s health habits, outcome expectations about the expected costs and benefits for different health habits, the health goals people set for themselves and the concrete plans and strategies for realizing them, and the perceived facilitators and social and structural impediments to the changes they seek” (Bandura, 2004, p. 144). Bandura (2004) describes the importance of considering self-efficacy when designing interventions; there is little motivation to change if one does not believe desired results can be attained. Regardless of other benefits or barriers the individual may perceive, he needs to believe he has the capability to produce change through action. As discussed in the literature review in chapter two, much evidence reveals that children who have higher self-efficacy tend to engage in more PA than children with low self-efficacy. This emphasizes the importance of focusing on this variable when designing developmentally appropriate interventions for children.

The original CATCH curriculum was designed using SCT, specifically focusing on the variables thought best to prepare children to perform the target behaviors. The main themes of SCT that were chosen for CATCH include expectancies, self-control and performance, behavioral capability, environment and situation, observational learning, and self-efficacy (Edmundson et al., 1996). Special emphasis was placed on self-efficacy, which was thought to be “especially critical to the initiation of skill acquisition” (Edmundson et al., 1996, p. 443). The CATCH curriculum was designed to influence these processes with the goal being to give children more control over their choices relating to nutrition and physical activity. By engaging children in PA that is fun and enjoyable, their self-efficacy relating to exercise can be increased and healthy, life-long habits can be created.
Bandura (1986) discusses self-efficacy in detail along with many of the factors that influence it. He defines self-efficacy as “people’s judgments of their capabilities to organize and execute courses of action required to attain designated types of performances” (p. 391). Self-efficacy is concerned “not with the skills one has but with judgments of what one can do with whatever skills one possesses” (Bandura, 1986, p. 391). People succeed after generating and testing various strategies, a process during which people who are lacking in self-efficacy will be likely to quit if they are initially unsuccessful. Bandura also discusses various sources of self-efficacy development. These include: (a) enactive attainment, which implies that “the weight given to new experiences depends on the nature and strength of the preexisting self-perception into which they must be integrated”; (b) vicarious experience, which presumes that “seeing or visualizing other similar people perform successfully can raise self-percepts or efficacy in observers that they too possess the capabilities to master comparable activities;” (c) verbal persuasion, which involves talking people into “believing they possess capabilities that will enable them to achieve what they seek;” and (d) physiological state, which leads to the supposition that “people rely partly on information from their physiological state in judging their capabilities” (Bandura, 1986, p. 399 – 401). Another important concept from the SCT is that of persuasory efficacy information. Bandura (1986) describes how the opinions of those who possess “evaluative competence” can affect an individual’s self-efficacy. This concept explores how individuals can be convinced to try tasks they do not feel they are capable of, or to persist at something they were ready to quit, only to find they are indeed able to master the task.
The aforementioned concepts are all important to consider when implementing the CATCH program. In order to have a positive effect on self-efficacy, variables that influence it must be addressed. With vicarious experience, prior to engaging the children in a new activity, the interveners can model the activity to show that it is easy to perform. This will help increase the students’ familiarity with the activity, and seeing that others can perform the activity will help them feel that they can as well. It is also important to give the children verbal encouragement and support for their attempts to perform the activities, as well as encouragement for their successes and progress. This will effect verbal persuasion, as well as persuasory efficacy information, as it is likely the interveners will be regarded as experts in this area and looked up to for their experiences. In these ways, SCT provides an excellent framework through which to have an impact on children’s desires to engage in physical activities, as well as their self-efficacy related to PA.

**Health Promotion Model**

The HPM provides another framework through which to examine other concepts that impact health-related behaviors. This model has long been used to guide interventions targeting behavior change. According to Pender, Murdaugh, and Parsons (2011) the HPM seeks to integrate “nursing and behavioral science perspectives with factors influencing health behaviors” (p. 44). The model includes seven cognitive-perceptual factors and five modifying factors that are used to predict health behaviors. The cognitive-perceptual factors include “importance of health, perceived control of health, definition of health, perceived health status, perceived self-efficacy, perceived benefits, and perceived barriers” (Pender et al., 2011, p. 44). The modifying factors
consist of demographic and biologic characteristics, interpersonal influences, situational influences, and behavioral factors. According to Pender et al. (2011), the HPM attempts to “depict the multidimensional nature of persons interacting with their interpersonal and physical environments as they pursue health” (p. 44). Constructs from expectancy-value theory and SCT are integrated into a nursing perspective to formulate the model.

As described, the cognitive-perceptual factors consist of perceived benefits of action, perceived barriers to action, perceived self-efficacy, activity-related affect, interpersonal influences, situational influences, commitment to a plan of action, and immediate competing demands and preferences (See Figure 1). Several of these factors will be discussed in relation to their effect on the CATCH intervention.

Figure 1. The Health Promotion Model

Pender et al. (2011) define perceived benefits of action as “mental representations of the positive or reinforcing consequences of a behavior” (p. 46). These can have both a direct and indirect influence on motivations to engage in health promoting behaviors. There are also intrinsic benefits, such as increased energy, and extrinsic benefits, such as social rewards. These can have a strong influence over the individual’s desire to maintain these behaviors. Perceived barriers to action consist of “perceptions about the unavailability, inconvenience, expense, difficulty, or time-consuming nature of a particular action” (Pender et al., 2011). These barriers often result in the individual avoiding the performance of health-related behaviors. As discussed in the literature review, several CATCH studies assessed perceived benefits and barriers to action in children who participated in the program. Benefits included feeling better about oneself, looking more attractive, and staying in shape. Barriers mentioned included aches and pains from exercise, feeling too tired, and not having enough time. These are all important factors to consider when designing an intervention targeting health behaviors.

The CATCH intervention for this dissertation project is performed in the after-school setting. There was a specific amount of time (30 minute intervals for purposes of this project) dedicated to PA during the four days a week the program is conducted, so the children could focus on participating in PA during that time. If they were feeling tired or having pain, they were able to rest and were not in any way punished for doing so. Focusing on and playing up the positive aspects of PA were important actions for everyone involved in the program. Providing encouragement also exemplified Bandura’s concepts of verbal persuasion and persuasory efficacy information, hopefully leading to a desire to continue the behaviors and also to an increase in self-efficacy.
The HPM also discusses interpersonal influences, which are “cognitions involving behaviors, beliefs, or attitudes of others” (Pender et al., 2011, p. 48). Those who can have a significant influence on health-promoting behaviors include family, peers, and health care providers. Interpersonal influences also include expectations of significant others, social support, and modeling. Modeling is defined as learning through observation of others, and is analogous to Bandura’s concept of vicarious experience. This occurs when a student sees others engaged in an activity, making him or her more likely to feel that he or she, too, can perform it. To impact this variable and increase self-efficacy, and ultimately PA, the interveners modeled the activities for the students prior to engaging them in the exercise. This helped them become familiar with the activity and increased their feeling that it can be done. This intervention can be particularly effective in the middle-school/adolescent population. Pender et al. (2011) note that “susceptibility to the influence of others may vary developmentally and be particularly evident in adolescence” (p. 48).

Promoting self-efficacy in an effort to get children to increase their level of PA was one of the main goals of this dissertation project. According to Pender et al. (2011), “the most powerful input to self-efficacy is successful performance of a behavior” (p. 54). It was important for the health care provider to provide positive feedback to the children who participated in the CATCH program when they successfully completed a task. This included not only activities performed during the CATCH intervention, but also those the students engaged in outside of program times. Pender et al. (2011) note that “praise and positive feedback along with persuasion and reassurance are concrete ways to build self-efficacy relevant to a particular behavior” (p. 54). These approaches were an
important component of this project, as one of the outcomes was to increase self-efficacy related to engagement in PA.

The goal of the HPM is to encourage individuals to engage in health promoting behaviors. Because this project sought to increase the amount of daily PA engaged in by middle school children, the HPM is an excellent framework on which to base interventions. This model also considers self-efficacy, which has been an important component of CATCH interventions.

The HPM was also chosen because it does not include fear or threat as motivating factors for health behaviors. Children generally do not have the developmental capability to see themselves as vulnerable to disease and therefore do not take actions to prevent future disease (Pender et al., 2011). Children, especially those entering adolescence, typically hold the belief that they are invincible to disease or injury, so using fear to motivate change is ineffective (Pender et al., 2011). The model’s focus on self-efficacy makes it a good complement to SCT. Together these two theories provided an excellent framework for the implementation of this dissertation project.
CHAPTER 4
PROJECT PLAN/METHODS

Framework

For evidence-based projects to be successful, there needs to be a framework on which to base the implementation. The *promoting action on research implementation in health services* (PARIHS) model was used to guide the implementation of the CATCH program. According to White and Dudley-Brown (2012), the PARIHS framework states that “successful implementation is a function of three core elements: importance of clarity about the nature of the evidence being used, the quality of the context, and the type of facilitation needed to ensure a successful change process” (p. 31). Within the model, evidence is defined as “knowledge that is derived from various sources and includes the strength and nature of the evidence as perceived by multiple stakeholders” (White & Dudley-Brown, 2012, p. 41). This includes evidence not only from research, but also from clinical experience, patient experience, and local data (Rycroft-Malone, 2004). It is also important to consider the community/intended population that is targeted by the intervention, as well as local knowledge and experience (National Collaborating Centre for Methods and Tools, 2011).

The PARIHS model defines context as “the environment or setting in which the proposed change or translation of research is to be implemented” (White & Dudley-Brown, 2012, p. 41). This includes organizational culture, leadership, and evaluation. It also considers the availability of resources to undertake the implementation. Within this framework, facilitation is defined as “the technique by which one person makes things easier for others, help others toward achieving particular goals, encourage others and
promote action,” and is achieved by providing support to help individuals change their attitudes, habits, skills, ways of thinking, and working (White & Dudley-Brown, 2012, p. 41). This requires that the facilitator has the appropriate skills, personal attributes, and knowledge (National Collaborating Centre for Methods and Tools, 2011).

These concepts were all important in the implementation of the CATCH program within the target middle school. Much work had already been done regarding the “Evidence” component of the PARIHS framework. The evidence supporting the CATCH program for use with middle school students was outlined in chapter two of this dissertation. The literature review also discussed the importance of considering self-efficacy when developing health related interventions. Part of the evidence also came from experiences of GVSU and RRR faculty who have already implemented CATCH in the elementary school setting within GRPS. By analyzing current literature and speaking with those involved with CATCH, it was determined that the CATCH program provided an evidence-based curriculum that would fit well into the GRPS system.

Context consists of organizational culture, leadership, and evaluation. White and Dudley-Brown (2012) define culture as “values, beliefs, and attitudes shared by members of the organization” (p. 40). This concept also takes into consideration the availability of resources to complete the project. For this dissertation project, GVSU was working with RRR to implement CATCH in a middle school in the GRPS system. The director of RRR was very invested in the CATCH program and was a strong advocate for funding for this program to continue. His vision was that this program would be expanded to all schools within GRPS. This aligns with the vision that was held by GVSU regarding the program. The director felt this program fit with the values of RRR, and his commitment to the
program was an asset as the implementation of CATCH progressed. As this project was the culmination of my doctoral work, I considered myself to be the leader of this implementation from the standpoint of GVSU. Because the director’s vision so closely aligned with the vision that I, as well as GVSU, had for CATCH, he was the leader and champion from the perspective of GRPS.

Regarding the availability of resources, GVSU had secured grant funding to run CATCH for three years. Therefore there were sufficient supplies to run the program for that time period. GVSU was also committed to the success of CATCH, and integrated it into the community health portion of the undergraduate nursing program. This was an asset to the success of the program, assuring there would be people available to help run the program. Eventually the goal was to expand to other disciplines within GVSU, making the program an interdisciplinary initiative. In the evaluation of the effectiveness of this project, data were collected from the students at the beginning, mid-point, and end of the intervention period. Data collection is discussed in further detail later in this chapter.

Facilitation is another concept in the PARIHS framework. This concept involves helping people “understand what they have to change and how to change it to achieve the desired outcome” (National Collaborating Centre for Methods and Tools, 2011, p. 3). This is important to consider not only from an institutional perspective, but also from the perspective of the children who will be involved in the CATCH program. This involved educating the staff at the middle school about the CATCH program, why it was chosen for GRPS, and why it is important for the students. Because the main focus of this dissertation was to increase the amount of PA of children at the school, it was important
to help them understand the importance of CATCH and PA as well. The methods for
doing this have been described in detail in Chapter three, and included a focus on
increasing self-efficacy regarding PA. It was important for me to be a champion for this
program and share with others my enthusiasm for healthy living. The PARIHS
framework was a useful framework to guide the successful implementation of CATCH at
this middle school.

**Plan for Implementation**

Starting in mid October 2012, the CATCH program was implemented at the
middle school. The ethnicities of the students were African American (almost 79%),
Hispanic (almost 11%), and White (about 6%). Approximately 77% of the students
participated in the free or reduced cost lunch program. According to the RRR director,
anywhere from 40-60 students participate in their after school program on most days,
with a maximum of 74 for this program.

A determination was made by the GVSU Human Research Review Committee
that this project was not research, and therefore exempt from review. (Please see
Appendix A for a copy of the determination letter.) Permission was also obtained from
GRPS to conduct this project in the chosen setting. (Please see Appendix B for a copy of
the permission form.) A letter was then sent home with the children who participate in the
after school RRR program at AMS to recruit participants for data collection. (Refer to
Appendix C for a copy of the informational letter and consent form.) This letter included
information on the CATCH program and related data collection, as well as a consent
letter for parents/guardians to sign. Families were given my contact information for use if
they had questions, and were assured that there would be no penalty for not participating
in data collection. The information that was to be collected was shared with parents, with assurance that all data was kept confidential, and nothing identifying their child would be made available to anyone outside of the project. Risks and benefits of the program were also explained and parents were informed that they were able to withdraw their child from the data collection portion at any time if they so desired. They were informed that the information would be used in my doctoral dissertation, and in presentations and/or publications. Assurance that there would be no way the information could be linked to a specific child was emphasized. Parents were asked to sign their consent, and were given a written copy of the letter and printed information about the program. Additionally, parents were encouraged to ask questions at any time throughout the implementation of the dissertation project. When the child returned the signed waiver, he or she received an age appropriate gift incentive (water bottle, GVSU pencil, and granola bar).

A CATCH orientation session was held for nursing students who would be participating in CATCH implementation and data collection at the beginning of each semester the program would occur. These sessions provided the nursing students with education regarding the CATCH program, its development, uses and implementation. This gave me the opportunity to introduce myself to the nursing students and explain the specific aims of my project to them. It was important for me to convey my enthusiasm for CATCH to help get them invested and understand the importance of CATCH. I also educated them about the standardized method for collecting blood pressures, height, weight, activity levels, and self-efficacy data from the students. Body mass index (BMI) was calculated from height and weight using the CDC’s online calculator (CDC, 2013a). Blood pressure percentiles were calculated with a standardized tool provided by Up-to-
Date (2013). Appendix D provides a copy of the measurement protocol, as well as the assent process and related documents.

After the student orientation session, there was a faculty orientation session for those who would be teaching CATCH at the middle school. This provided me with the opportunity to further explain my project and helped me get to know with whom I would be working. I worked to share my excitement with the faculty as well, as they were to be key figures for the success of this project.

The undergraduate students began data collection for CATCH on October 24, 2012, with the actual program beginning the following week. Two groups of eight nursing students helped to implement CATCH at the middle school four days a week. I, along with the nursing course faculty, worked with these students to develop an age-appropriate curriculum for the middle school students. This was modeled after the original CATCH curriculum, which had been obtained with the original grant received by GVSU.

The initial data collection included height, weight, blood pressure, a physical activity questionnaire, and a self-efficacy questionnaire. BMI was also calculated based on height and weight measurements. These data were collected at baseline, half-way through the intervention (approximately 6 weeks) and again at the end of the intervention. The second data collection occurred on December 3 and 4, 2012, and the final measurements were completed February 11 and 12, 2013. Several middle school students had blood pressures that were close to or above the 90th percentile for their age. Students with abnormal blood pressures had notification letters mailed to their home. (Please see Appendix E for a copy of this letter.)
Some flexibility was needed to accommodate middle school student schedules regarding parent/teacher conferences and snow days, as well as GVSU student schedules. The physical activities took place for 6 weeks during the fall semester, and 4 weeks during the winter semester, with the measurements being collected during the fifth week. Because of the schedules of the nursing students during winter semester, it was not possible to have 6 weeks of CATCH implementation. At the completion of the project, students who participated in all three data collections received a small gift (water bottle, Subway gift card, GVSU pencil, banana, and two clementines, as well as a personalized thank you card).

Measures

Physical Activity

Due to its comprehensiveness and ease of administration, as well as the ability to measure intensity, duration, and type of physical activity, the Child and Adolescent Activity Log (CAAL) (Garcia, George, Coviak, Antonakos, & Pender, 1997) was chosen to measure physical activity. (Please see Appendix F for a full evaluation of several physical activity measurement scales.) Permission to use the CAAL was obtained from one of the original authors of the scale. (Please refer to Appendix G for a copy of the permission letter as well as a copy of the scale.)

The CAAL was originally developed out of a desire to comprehensively yet efficiently measure PA levels in children (Garcia et al., 1997). It is designed to capture pattern, duration, and intensity of PA. This tool was tested in a group of 459 ethnically diverse, low-income children in fifth through eighth grades. The scale consists of 21 various activities, including jogging, football, recess games, and an “other” category.
Each day for 5 school days, the students completed the log with “yes” or “no” answers as to whether or not they participated in each activity. They also estimated the duration of each activity on a 6-point scale. With the information obtained, researchers were able to estimate energy expenditure, as well as frequency and duration of various activities.

The students also wore the Caltrac, a portable accelerometer, to enable researchers to correlate students’ individual self-report with a direct measure of PA. Test-retest correlation for the average summary score was found to be 0.95. Content validity was established by comparing activity levels across seasons, years, and by gender. Based on prior research, it was expected that activity levels would decrease with age, boys would be more active than girls, activity levels would be lower during the winter months, and activity type would vary by season. Findings showed a significant gender difference, significant season effect, and a non-statistically significant effect for age, although results trended in the expected direction. Evidence of moderate criterion validity was also established during this study through the use of Caltracs as described above, as well as comparison with participants’ responses to a self-reported typical physical activity estimate and correlation of participants’ average daily expenditure and a fitness protocol.

Overall, the CAAL provides a comprehensive measure of duration, intensity, and caloric expenditure related to PA in a scale that is easy to administer. It can also be administered in approximately 5 minutes per day, which was helpful in the after-school setting at the middle school to minimize the amount of time taken away from the actual CATCH curriculum and RRR program.
Self-efficacy

Self-efficacy relating to PA was measured with the Physical Activity Self-Efficacy Scale (PASES), which was originally developed by Lorraine Robbins and colleagues (Wu, Robbins, & Hsieh, 2011). This scale was developed based on self-efficacy items from Pender’s original work on the health promotion model (Wu, Robbins, & Hsieh, 2011). The PASES consists of 11 items, and measures each participant’s belief that he or she can overcome specific barriers to engaging in PA. A 4-point Likert scale is used to respond to the items, and the total score of the 11 items is taken. The purpose of this scale in the CATCH implementation program was to determine if physical activity interventions targeting self-efficacy were effective. A higher score indicates a higher self-efficacy. The PASES was originally tested in a sample of 296 ethnically diverse adolescents in a middle school. The scale was found to have internal consistency (Cronbach’s alpha coefficient 0.86) and acceptable test-retest reliability (0.61) in its initial development study (Wu, Robbins, & Hsieh, 2011). Permission has been obtained to use this scale for this project. (See Appendix H for a copy of the permission letter as well as the scale)

Anthropomorphic/Physiologic Measures

Height was measured with a calibrated vertical stadiometer. Weight was measured with a calibrated digital scale. Blood pressure was obtained using the American Heart two-step process as documented by the U.S. Department of Health and Human Services (2006). (Please see Appendix D for the full measurement protocol).
Qualitative Data

During the last measurement sessions, students were asked to write down things they liked or did not like about CATCH, and whether or not they would like to participate in CATCH again. This was an informal process, and the results were used as support for CATCH being a fun and enjoyable program.

Summary

The initial intervention began in October 2012 and occurred for approximately two hours a day, four days a week for the second half of fall semester. GVSU resumed the program with a new group of nursing students in January 2013, and the final data collection took place in February 2013. The total duration of the intervention for purposes of this dissertation was 10 weeks, with an additional week for final data collection.

This dissertation project focused solely on the PA component of CATCH, therefore only portions of the CATCH intervention addressing PA are described here. However, both components of CATCH, nutrition and PA, were included in the program implementation. I was present at the school on the majority of days during the intervention period and maintained close contact with the clinical faculty instructor, as well as the nursing students and school faculty. This was to maintain enthusiasm for CATCH and ensure the project’s success. Results of the project were also shared with middle school staff upon completion.

After all the data were collected, it was analyzed with the assistance of a graduate statistics student. The questions addressed were whether or not the students increased the amount of PA in which they engaged, as well as how they felt about their abilities to be physically active. The three sets of data from October 2012, December 2012, and
February 2013 were compared to see if there were any changes in the level of self-reported PA and/or perceived self-efficacy. These data were analyzed with Statistical Package for the Social Sciences (SPSS) version 20.0 software. Forty complete sets of data were desired for the analysis. Initially 32 consent forms were received. At project completion, there were 26 students with complete data for analysis.
CHAPTER 5
RESULTS

This dissertation project involved implementation of an evidence-based physical activity (PA) and nutrition program in the after school setting of a middle school within Grand Rapids Public Schools. During adolescence, there is a sharp decline in PA among both boys and girls (Kelly et al., 2010). Children with higher self-efficacy related to PA also tend to be more active (Robbins et al., 2004b). Therefore the specific aim of this project was to increase personal self-efficacy related to PA, thereby increasing overall levels of PA among middle school students.

The purpose of this chapter is to outline the results of this project. Activity levels were measured with the Child and Adolescent Activity Log (CAAL) (Garcia et al., 1997). Self-efficacy was measured by the Physical Activity Self-Efficacy Scale (PASES) (Wu, Robbins, & Hsieh, 2011). The intervention consisted of the CATCH program itself, and the variables of interest were the student’s scores on the CAAL and PASES, as well as body mass index (BMI). Data were analyzed with Statistical Package for the Social Sciences (SPSS) version 20.0.

At the first data collection in October 2012, there were 32 complete sets of data. At data collection two, in December 2012, there were 26 complete sets of data. For the final data collection in February 2013, there were 25 complete sets of data and 1 partial set. Several students who participated at the beginning were no longer a part of the RRR program at the end of the project, therefore were unavailable for follow up.
Demographics

Initially there were 32 students who participated in data collection. Females represented 62.5% \( (n = 20) \) of this sample, with males making up the other 37.5% \( (n = 12) \). Nine (28%) of the participants were in 6\textsuperscript{th} grade, 16 (50%) were in 7\textsuperscript{th} grade, and 7 (22%) were in 8\textsuperscript{th} grade. There were no male eighth grade participants. Many of the students were part of the school’s sports teams (basketball, volleyball, swimming, etc.) in addition to participating in the RRR program.

Examination of Intervention Effect

The standard of significance for the evaluation of the CATCH program was set at \( p < .05 \). One way repeated measures analysis of variance (RMANOVA) was used to test if the values of the measured variables significantly changed linearly over time (PASES, CAAL, BMI). The CAAL consists of 21 various activities that children can choose, with a range of times listed. For instance, if the child participated in running the previous day, he or she would check ‘yes’ for that selection, then choose the range of minutes he or she ran. If the range selected was 11-20 minutes, then the mid-point of that time is taken, and 15.5 minutes is added to the child’s total activity time. The PASES consists of 11 items on a Likert scale, with 4 being the highest score, and 1 being the lowest. Total PASES scores were calculated for analysis. Table 1 outlines the average number of CAAL minutes reported, separated by age and gender.
Table 1

*Average CAAL minutes, by age and gender*

<table>
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<tr>
<th>Grade</th>
<th>Female</th>
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<th></th>
<th></th>
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<th></th>
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<td>(SD)</td>
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<td>(48.01)</td>
<td>(46.62)</td>
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Table 2 shows CAAL total averages at each time period.

Table 2

*Average CAAL minutes for total sample*

<table>
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<th>M (SD)</th>
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<td>Time 3</td>
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<td>101.90 (74.57)</td>
</tr>
</tbody>
</table>
Results are reported in total number of minutes, therefore higher numbers indicate greater activity on the previous day. The CDC recommends 60 minutes or more of PA per day for children and adolescents (2011).

The PASES scale takes an average of the total from the 11 items. Forty-four is the maximum score, and 11 is the lowest. The higher the self-reported score, the better the individual feels about his or her ability to be active despite barriers he or she may encounter. Table 3 shows the average PASES score for each grade and gender.

Table 3

*Average PASES score, by age and gender*

<table>
<thead>
<tr>
<th>Grade</th>
<th>Female</th>
<th></th>
<th></th>
<th>Male</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time 1</td>
<td>Time 2</td>
<td>Time 3</td>
<td>Time 1</td>
<td>Time 2</td>
<td>Time 3</td>
</tr>
<tr>
<td>6th</td>
<td>n</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>34.33</td>
<td>34.00</td>
<td>32.00</td>
<td>35.00</td>
<td>37.40</td>
</tr>
<tr>
<td></td>
<td>(SD)</td>
<td>(3.22)</td>
<td>-</td>
<td>(4.24)</td>
<td>(9.90)</td>
<td>(2.19)</td>
</tr>
<tr>
<td>7th</td>
<td>n</td>
<td>10</td>
<td>5</td>
<td>7</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>35.70</td>
<td>37.60</td>
<td>39.00</td>
<td>38.33</td>
<td>36.83</td>
</tr>
<tr>
<td></td>
<td>(SD)</td>
<td>(7.36)</td>
<td>(5.55)</td>
<td>(4.08)</td>
<td>(5.05)</td>
<td>(2.40)</td>
</tr>
<tr>
<td>8th</td>
<td>n</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>39.71</td>
<td>37.86</td>
<td>40.43</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(SD)</td>
<td>(2.81)</td>
<td>(5.67)</td>
<td>(3.95)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 4 outlines overall PASES scores at the 3 time periods.
Blood pressure was another variable measured in this project, but not one of the outcome variables. At baseline, 10 students (31.25%) had systolic blood pressure near or above the 90th percentile for their age. Seven children (22%) had diastolic blood pressure near or above the 90th percentile for their age, with some overlap with the systolic group. At conclusion, 8 students (31%) had systolic blood pressure near or above the 90th percentile for age, with 12 (46%) having diastolic blood pressure near or above the 90th percentile, with some overlap with the systolic group. The US Department of Health and Human Services (2006) criteria classifies children as prehypertensive who have systolic or diastolic blood pressures above the 90th percentile for age.

Body mass index (BMI) was another variable of interest, though originally not one of the intended outcome variables. This was due to the fact that adolescence is a time of rapid growth, and rapidly changing body size, shape, and composition (Rogol, Roemmich, & Clark, 2002). Table 5 outlines average BMI at each three points of measurement, separated by age and gender.
Table 5

*Average BMI, by age and gender*

<table>
<thead>
<tr>
<th>Grade</th>
<th>Female</th>
<th></th>
<th></th>
<th></th>
<th>Male</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time 1</td>
<td>Time 2</td>
<td>Time 3</td>
<td>Time 1</td>
<td>Time 2</td>
<td>Time 3</td>
<td></td>
</tr>
<tr>
<td>6th</td>
<td>n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>24.20</td>
<td>26.75</td>
<td>26.00</td>
<td>18.83</td>
<td>18.70</td>
<td>18.48</td>
</tr>
<tr>
<td></td>
<td>(SD)</td>
<td>(4.33)</td>
<td>(.35)</td>
<td>(.00)</td>
<td>(2.54)</td>
<td>(1.68)</td>
<td>(1.15)</td>
</tr>
<tr>
<td>7th</td>
<td>n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>26.82</td>
<td>26.22</td>
<td>26.83</td>
<td>24.50</td>
<td>24.32</td>
<td>23.97</td>
</tr>
<tr>
<td></td>
<td>(SD)</td>
<td>(6.01)</td>
<td>(7.83)</td>
<td>(7.20)</td>
<td>(5.49)</td>
<td>(5.62)</td>
<td>(5.97)</td>
</tr>
<tr>
<td>8th</td>
<td>n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>26.41</td>
<td>25.86</td>
<td>25.39</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(SD)</td>
<td>(9.01)</td>
<td>(9.16)</td>
<td>(8.84)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 6 outlines overall average BMI at each of the 3 time periods.

Table 6

*BMI average for total sample*

<table>
<thead>
<tr>
<th>Data collection period</th>
<th>n</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1</td>
<td>32</td>
<td>24.55 (6.49)</td>
</tr>
<tr>
<td>Time 2</td>
<td>26</td>
<td>24.28 (6.89)</td>
</tr>
<tr>
<td>Time 3</td>
<td>25</td>
<td>24.34 (6.77)</td>
</tr>
</tbody>
</table>
BMI is calculated by dividing weight in pounds by height in inches squared, then multiplying by a conversion factor of 703 (CDC, 2013a). A BMI under 18.5 is considered underweight; 18.5 – 24.9 is considered normal; 25 – 29.9 is considered overweight; and above 30 is considered obese (CDC, 2011). For children, BMI classification is done based on BMI percentile for age. Children with BMIs less than the 5th percentile are considered underweight; normal BMI is 5th to 85th percentile; overweight is above 85th percentile to 95th percentile; and BMIs above the 95th percentile are considered obese (CDC, 2011). For purposes of this project, actual BMI numbers were used to better reflect changes in body mass.

The intention of this project was to increase activity-related self-efficacy of participants, thereby increasing PA levels. Based on evidence gathered from the literature review, it was thought that as individual self-efficacy increased, level of PA would increase. RMANOVA was used to test for changes in value over the three time periods for the outcome variables – CAAL minutes, PASES score, and BMI. For results that were significant, pair wise comparisons within the RMANOVA were performed. Tables 7, 8 and 9 display the RMANOVA results for PASES, CAAL and BMI, respectively. The reported $p$-values had a Greenhouse-Geisser adjustment due to non-constant variances across time periods.
Table 7

*RMANOVA results for PASES*

<table>
<thead>
<tr>
<th>Measure</th>
<th>n</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PASES</td>
<td>24</td>
<td>6.29</td>
<td>1.601</td>
<td>3.928</td>
<td>.149</td>
<td>.816</td>
</tr>
<tr>
<td>Error</td>
<td>930.377</td>
<td>35.225</td>
<td>26.413</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 8

*RMANOVA results for CAAL*

<table>
<thead>
<tr>
<th>Measure</th>
<th>n</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAAL</td>
<td>24</td>
<td>5135.28</td>
<td>1.555</td>
<td>3302.39</td>
<td>1.192</td>
<td>.306</td>
</tr>
<tr>
<td>Error</td>
<td>94779.884</td>
<td>34.210</td>
<td>2770.500</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 9

*RMANOVA results for BMI*

<table>
<thead>
<tr>
<th>Measure</th>
<th>n</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td>24</td>
<td>3.181</td>
<td>1.588</td>
<td>2.003</td>
<td>5.187</td>
<td>.016</td>
</tr>
<tr>
<td>Error</td>
<td>14.106</td>
<td>36.526</td>
<td>.386</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
There were no significant increases in either PASES average score or CAAL average minutes over the three time periods. Because BMI did exhibit a significant RMANOVA result, pair wise comparisons within the model were performed. Table 8 outlines RMANOVA results for BMI over the three time periods. Bonferroni corrections were made for listed p-values. This was done within SPSS by taking the original pairwise p-values, multiplying them by the Bonferroni adjustment, and continuing to use 0.05 as the cutoff for significance.

Table 10

**RMANOVA pair wise comparison BMI results**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean Difference</th>
<th>SE</th>
<th>95% CI</th>
<th>t</th>
<th>Sig. a</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI Change time 1 to 2</td>
<td>.183</td>
<td>.136</td>
<td>[-.167, .534]</td>
<td>-1.50</td>
<td>.570</td>
</tr>
<tr>
<td>BMI Change time 2 to 3</td>
<td>.325</td>
<td>.140</td>
<td>[-.037, .687]</td>
<td>-2.32</td>
<td>.089</td>
</tr>
<tr>
<td>BMI Change time 1 to 3</td>
<td>.508</td>
<td>.196</td>
<td>[.001, 1.015]</td>
<td>-2.80</td>
<td>.049*</td>
</tr>
</tbody>
</table>

*Note.* a Values of table are those obtained after Bonferroni correction applied.

* p < .05

The only time period during which there was a significant decrease in BMI was from time 1 to time 3.

Data were also analyzed with simple linear regression to examine relationships among variables. Several significant relationships were found. Children with higher weight tended to have higher diastolic blood pressure (p = .0187, t = 2.530, R² = .218, n = 24). Children with higher BMIs tended to have higher systolic (p = .0122, t = 2.718, R² =
These results are consistent with what would be expected.

The purpose of this dissertation project was to increase self-efficacy among the students, thereby increasing PA levels. It has been shown that children with higher self-efficacy related to PA tend to be more physically active (Strauss et al., 2001). PASES and CAAL results were compared using simple linear regression. There was no correlation found between PASES average score and CAAL minutes at any of the measurement periods.

At the conclusion of the project, qualitative data were collected from the participants regarding their feelings about the program. The feedback was overwhelmingly positive, with all but one of the students indicating they would like to participate in CATCH again. Students stated that they liked the fun games that were played, they liked learning about the importance of health, and they liked that the nursing students were ‘nice’ to them.

Summary

This project did not yield statistically significant increases in self-efficacy scores or PA levels in this group of students. There was a significant decrease in BMI over the duration of the program. Several significant relationships were found between BMI, blood pressure, and weight, which are consistent with what is expected. Due to the small number of participants, it may have been difficult to capture significant relationships among other variables.
CHAPTER 6
DISCUSSION

The purpose of this chapter is to discuss the findings of this dissertation project and the implications for nursing practice. Childhood obesity is a national health crisis, with more than one third of children and adolescents classified as overweight or obese (CDC, 2013b). There is also a well documented decline in physical activity (PA) as children progress through adolescence (Kelly et al., 2010). Children who have a higher self-efficacy relating to their ability to be active are generally more physically active (Strauss et al., 2001).

This dissertation project involved implementation of the Coordinated Approach to Child Health (CATCH) program at a middle school in Grand Rapids, Michigan. The evaluation consisted of measuring children’s PA levels with the Child and Adolescent Activity Log (CAAL). Self-efficacy was measured with the Physical Activity Self-Efficacy Scale (PASES). Height, weight, and blood pressure were measured as well, with body mass index (BMI) being calculated from height and weight. The measurements were taken at baseline, 6 weeks into the intervention, and at the conclusion of the intervention. Initially 32 students participated in data collection. At the final measurement, there were 25 complete sets of data.

This chapter will begin by reviewing the findings relating to this dissertation project. Limitations of the project will then be examined. Next, the impact of this project and its results will be discussed. Implications for practice, including a discussion of the role of the doctorally prepared nurse, will follow. Finally, this chapter will conclude with a summary of this dissertation project.
Discussion of Findings

Several studies have found linkages between self-efficacy and PA levels among children and adolescents. These studies are outlined in Chapter two of this dissertation. However, the results of this project found no significant link between self-efficacy and activity levels at any measurement point. The results did include a significant decrease in BMI. Significant relationships among several of the anthropomorphic and physiologic measures were also found.

CAAL minutes

The CDC recommends 60 minutes or more of PA per day for children and adolescents (2011). In looking at average reported CAAL minutes by gender and grade, males in 6th and 7th grades were the two groups who did not consistently meet this recommendation. Sixth grade females met it at one of the three measurement times, and were very close to 60 minutes at another (57.7 minutes). Females in 7th and 8th grade met this requirement at all 3 measurement periods. None of the 8th grade males participated in measurements. Many of the students who participated in the measurements, particularly the 7th and 8th grade females, also were part of school sports teams. Due to sports practice, they were not always present for CATCH interventions. It may have been difficult to have a significant increase in total minutes of activity for this group because their baseline averages were already quite high. Results also relied on self-report, which may not be completely accurate in this population.

PASES score

A 2009 study by Wenthe, Janz, and Levy found self-efficacy to be positively associated with PA in both males and females. The CATCH curriculum is also
specifically designed to influence self-efficacy by giving children more autonomy relating to their abilities to be active (Edmundson et al., 1996). The PASES consists of 11 items, and measures each participant’s belief that he or she can overcome specific barriers to engaging in PA. A 4-point Likert scale is used to respond to the items. The highest score one can have on this scale is 44, with 11 being the lowest. Both male and female students in all grades had fairly high scores at all three measurement points. Scores were above 30 at all measurement times, with many scores being between 35 and 40. Sixth grade males, 7th grade males and females, and 8th grade females all exhibited increases in average scores overall, though these increases were not significant. Individual items of the PASES were also analyzed to check for differences in any one area, but none of these differences were significant. It may have been difficult to have a measureable impact on self-efficacy in a group with a baseline score at the students’ already high level. As mentioned, many of the participants, particularly the 7th and 8th grade females, were part of school sports teams. Sports participation may have resulted in higher self-efficacy scores. Also, because of participation in sports, many students were often not present for CATCH interventions. Their absences may have resulted in their not receiving the full benefits of the program relating to self-efficacy.

**Anthropomorphic/Physiologic Measures**

Several significant relationships were found among anthropomorphic measures. Children with higher weight tended to have higher diastolic blood pressure. Children with higher BMIs tended to have higher systolic and diastolic blood pressures. These results are consistent with what would be expected. There were no significant increases or decreases in either systolic or diastolic blood pressures at any measurement point.
However, several students did have either systolic or diastolic blood pressures near or above the 90th percentile for their age. Parents were notified by letter and encouraged to follow up with a primary care provider.

One unexpected finding was a significant decrease in BMI over the course of the intervention. This could be due to a multitude of factors, including the fact that adolescence is a time of rapid growth, and rapidly changing body size, shape, and composition (Rogol, Roemmich, & Clark, 2002). All students, with the exception of 6th grade males, had average BMIs near or above the threshold for being classified as overweight (BMI > 25). It is possible that the decrease in BMI may not have been as significant without the CATCH intervention.

**Limitations**

There are several limitations to this dissertation project. First, the project relied on self-report, which may not always be accurate, particularly among adolescents. While nursing students facilitated the completion of the CAAL and PASES for each student, there may have been some errors. It seems that some students participated in a sport, such as basketball, and counted that as sixty minutes of basketball, but also as sixty minutes of running. This may have created a situation where activities were over-estimated. There is also the possibility of social desirability bias. The participants were aware that an intervention focusing on PA was being implemented, and may have wanted to provide favorable responses.

A second limitation is that the facilities that were available for implementation of the PA component of CATCH were frequently inadequate. The gymnasium was often unavailable because of student sporting events. A hallway area that had limited space
often had to be used. Activities had to then be modified to fit in the available space. This may have resulted in an inability to fully utilize CATCH games and activities, and participants may not have received the full benefit of the program.

A third limitation is the fact that many of the students who participated in the data collection were also part of other sports teams in the school. Participation in Recreation Reaps Rewards (RRR) is a requirement for student athletes. However, this resulted in many of the participants being absent from many of the CATCH sessions to attend sports practice. These students may have been more active than the average student. Students also may not have had any significant changes in self-efficacy because of their infrequent/irregular participation in the CATCH sessions.

A fourth limitation of this study is the fact that students who participated in data collection received a small incentive gift upon returning the consent form and at project completion. Students were aware that an intervention focusing on healthy lifestyle habits was being conducted, and may have felt pressured to provide favorable responses regarding their activity and self-efficacy levels. This may have contributed to a social desirability bias.

A fifth limitation is that this program was conducted with a fairly homogenous group of students. Females represented the majority (62.5%) of participants, and 50% of participants were in 7th grade. While specific data on race/ethnicity were not collected for this project, almost 80% of the students at this school are African American. What appealed to them may not be effective with students from other ethnic backgrounds. This was also a fairly small sample size, with 32 initial participants and 25 final participants. A sample size of 40 participants was estimated as appropriate for statistical analysis.
purposes. The smaller sample limits the findings and limited power leaves the question of whether the full impact of CATCH could be detected.

Lastly, and probably of greatest importance, was the fragmentation of program implementation. The academic calendar of Grand Valley State University and Grand Rapids Public Schools interfered with program offerings. The first half of the program was implemented without much interruption. However, the program ended for the semester on December 4, 2012, and did not resume until January 14, 2013. Any momentum gained during the first half may have been lost over the break. Several days were also missed during the second half of the intervention because of parent/teacher conferences and snow days. These scheduling changes were beyond control. Future programs may benefit from a more consistent intervention period.

It is also of note that there was a vastly different dynamic between the two groups of nursing students who implemented the project in the two semesters. The first group were traditional Bachelor of Science in Nursing students. Students were younger and most had little or no experience with children until the semester of the program. The second group were accelerated second degree (ASD) students. All of these students had degrees in another field, had prior career experience, and many had children of their own. While this observation may not be important, their level of comfort with the middle school children seemed to be much higher, and their organizational skills seemed better, as well. Middle school staff also noted better organization and planning during the second semester of implementation.
Influence/Impact of Findings at Immersion Site

The CATCH program was originally based on social cognitive theory (SCT). Through this framework, human behavior is determined by an interaction between behavior, cognitive and personal factors, and environmental events (Bandura, 1986). The health promotion model (HPM) is another framework that is frequently used for interventions targeting behavior change. The HPM seeks to integrate “nursing and behavioral science perspectives with factors influencing health behaviors” (Pender, Murdaugh, & Parsons, 2011, p. 44). Together these two frameworks were used to guide this project, with a focus on self-efficacy. Research has found that children with greater self-efficacy relating to PA are generally more active (Strauss et al., 2001).

The main themes of SCT that were chosen for CATCH include expectancies, self-control and performance, behavioral capability, environment and situation, observational learning, and self-efficacy (Edmundson et al., 1996). Special emphasis was placed on self-efficacy, which was thought to be “especially critical to the initiation of skill acquisition” (Edmundson et al., 1996, p. 443). The CATCH curriculum was designed to influence these processes with the goal being to give children more control over their choices relating to nutrition and PA.

There are several sources of self-efficacy development, many of which were used for this project. These include: enactive attainment, which implies that “the weight given to new experiences depends on the nature and strength of the preexisting self-perception into which they must be integrated”; vicarious experience, which presumes that “seeing or visualizing other similar people perform successfully can raise self-percepts or efficacy in observers that they too possess the capabilities to master comparable
activities”; and verbal persuasion, which involves talking people into “believing they possess capabilities that will enable them to achieve what they seek” (Bandura, 1986, p. 399–401). Another important concept from the SCT is that of persuasory efficacy information. Bandura (1986) describes how the opinions of those who possess “evaluative competence” can affect an individual’s self-efficacy. This concept explores how individuals can be convinced to try tasks they do not feel they are capable of, or to persist at something they were ready to quit, only to find they are indeed able to master the task.

The HPM includes seven cognitive-perceptual factors and five modifying factors that are used to predict health behaviors. The cognitive-perceptual factors include “importance of health, perceived control of health, definition of health, perceived health status, perceived self-efficacy, perceived benefits, and perceived barriers” (Pender et al., 2011, p. 44). The modifying factors consist of demographic and biologic characteristics, interpersonal influences, situational influences, and behavioral factors. Interpersonal influences are “cognitions involving behaviors, beliefs, or attitudes of others” (Pender et al., 2011, p. 48). Those who can have a significant influence on health-promoting behaviors include family, peers, and health care providers. Interpersonal influences also include expectations of significant others, social support, and modeling, which is defined as learning through observation of others. SCT also discusses the use of modeling in attempts to increase self-efficacy through the concept of vicarious experience. This occurs when a student sees others engaged in an activity, making him or her more likely to feel that he or she too, can perform it.
Concepts from these two frameworks were integrated into this project. During the CATCH orientation sessions for nursing students, these concepts and their importance to this project were shared. Ways to influence the modifiable areas were discussed (social support, modeling, verbal persuasion, etc).

Bandura’s (1986) concept of enactive attainment focuses on the individual’s feelings about the ability to perform a task; this is similar to self-efficacy. In this project implementation, vicarious experience was used often, in conjunction with interpersonal influences. The interveners were the leaders of the PA interventions, and likely possessed evaluative competence in the eyes of the students. They were also considered “health care providers” and were therefore capable of influencing behaviors of the students. Many of the games had several steps or rules. Prior to engaging the children in the activity, the groups of eight nursing students would demonstrate the activity for the children. They would then begin the activity as an entire group. The children seemed to have much less confusion regarding the expectations for the activity when they were first able to visualize someone else performing it. This helped to increase their feelings about their abilities to participate in a new activity through the use of modeling and vicarious experience. Several of the middle school students emerged as leaders as well, and were willing to help model and lead activities. By utilizing peers as instructors, along with the interveners as health care providers, the HPM concept of interpersonal influences was also incorporated to have an effect on health promoting behaviors.

Verbal persuasion was another concept used frequently in this project. The nursing students were encouraged to give the students positive feedback often, regardless of their skill level. Participation and effort was frequently rewarded verbally, particularly
among the students who were not considered athletic. The project facilitator (DNP student) was also present at many of the CATCH sessions, and participated in the activities with the students. She also provided frequent verbal feedback and encouragement to the students.

Together, SCT and the HPM provided an excellent theoretical foundation upon which to base the CATCH interventions, specifically those relating to self-efficacy. However, the desired effects on self-efficacy were not realized in the results. This may have been because of the fragmentation of the intervention, a high pre-existing self-efficacy in many of the students, or other unknown factors. Nonetheless, the students did report enjoying the activities and wished for CATCH to continue.

**Implications for Practice**

CATCH is a PA and nutrition program that is effective at decreasing or slowing obesity rates among children (CATCH, 2012b). More than 95 percent of children in the United States are enrolled in schools (CDC, 2009). In most states, children attend school for approximately 180 days out of the year (National Center for Educational Statistics, 2011). Because of this, schools are in an ideal position to have an impact on the childhood obesity epidemic, and CATCH is an evidence-based program that could be used to do so.

This project focused on increasing PA and self-efficacy among middle school students. It is important to tailor interventions to the specific population. No one group is homogenous and different approaches will work better with some group members than others. Both SCT and the HPM provide several important variables to consider when implementing an evidence-based program that involves behavior change.
The use of undergraduate nursing students to implement CATCH provides a unique opportunity for community engagement on several levels. Students in the middle school gain exposure to healthy lifestyle programs, and nursing students gain exposure to unfamiliar populations. Sustaining and expanding this program to include other schools within GVSU requires further exploration.

**The Essentials of Doctoral Education for Advanced Nursing Practice**

In response to a call for a transformational change in the educational requirements for advanced practice nurses, the doctor of nursing practice (DNP) degree has been adopted as the terminal practice degree in nursing (AACN, 2006). There are eight curricular elements and competencies that constitute DNP education, known as *The Essentials of Doctoral Education for Advanced Nursing Practice* (AACN, 2006). The following section will discuss each of these competencies and how they relate to this doctoral project.

*Scientific underpinnings for practice.* This essential prepares the DNP graduate to integrate nursing science with science from other disciplines; to use science-based theories to enhance health and health care delivery; and to develop and evaluate new practice approaches (AACN, 2006). In accordance with this essential, this dissertation project was based on an evidence-based program (CATCH). CATCH has its foundations in SCT, which is a theory derived from the social sciences. Principles of SCT were integrated with components of the HPM, which is a nursing theory.

The *promoting action on research implementation in health services* (PARIHS) model was used to guide the implementation of the CATCH program. According to White and Dudley-Brown (2012), the PARIHS framework states that “successful
implementation is a function of three core elements: importance of clarity about the nature of the evidence being used, the quality of the context, and the type of facilitation needed to ensure a successful change process” (p. 31). All of these factors were considered when this project was implemented. The evidence for the use of CATCH in this setting was outlined in Chapter two of this dissertation manuscript. Some of the evidence used came from anecdotal experiences of GVSU faculty who had implemented CATCH at other sites within this school district.

The PARIHS model defines context as “the environment or setting in which the proposed change or translation of research is to be implemented” (White & Dudley-Brown, 2012, p. 41). This includes organizational culture, leadership, and evaluation, as well as the availability of resources to undertake the implementation. The director of RRR is very invested in the CATCH program and has been a strong advocate for funding for this program to continue. His vision is that this program will be expanded to all schools within GRPS. This aligns with the vision of GVSU regarding the program. GVSU has secured three years of funding for CATCH to continue as part of the community health experience for undergraduate nursing students. However it was recently learned that as of June 2012, funding from the city of Grand Rapids for the RRR program will no longer continue. This will impact the ability of RRR to add programs such as CATCH to their curriculum. A meeting is scheduled with the Mayor of the City of Grand Rapids in May 2013 to discuss funding options for after school programming within GRPS. Even if funding continues, because of the lack of adequate space/facilities at this school, GVSU faculty have decided not to continue CATCH at this particular middle school.
Facilitation is defined as helping people “understand what they have to change and how to change it to achieve the desired outcome” (National Collaborating Centre for Methods and Tools, 2011, p. 3). The individuals who must achieve this understanding include not only the staff of the immersion site but also the students who are participating in the CATCH program. Overall, feedback from the RRR staff and students at the immersion site was positive. Students liked that there was a focus on their health, and they enjoyed participating in the fun games. Staff also seemed to enjoy the structure that CATCH provided. However, due to budget issues and lack of adequate space for activities, GVSU will not continue to use this middle school as a CATCH site.

**Organizational and systems leadership for quality improvement and systems thinking.** This second essential involves the development and evaluation of care delivery approaches “that meet current and future needs of patient populations based on scientific findings in nursing and other clinical sciences, as well as organizational, political, and economic sciences” and also accountability for quality and safety (AACN, 2006, p. 10). As mentioned, CATCH is an evidence-based program with foundations in the social sciences. Interventions were tailored for this specific project to include elements of the HPM, a nursing theory. CATCH has been used extensively in diverse populations, as well as in a variety of age groups. Therefore, it was a good fit for this project.

Undergraduate nursing students were also included in this project. This involved facilitation with GVSU faculty regarding training, lesson planning, and coordination of lessons. Effective communication was a key element, not only among faculty but also among RRR staff, GVSU students, and the DNP student. Some lessons were learned
about clarity of project aims during the first half of implementation that were used to improve preparation for the second semester.

The CATCH project implementation was the first teaching experience for one of the first semester faculty members. She mentioned that she often felt unprepared and was unsure how to manage the nursing students, who were having trouble becoming engaged in the program. This led to much frustration on her part. Several meetings were held. These included CATCH faculty and the DNP student in efforts to clarify expectations for faculty and the DNP student. The meetings were helpful for facilitation of the project. The DNP student took a more active role in modeling for this group of nursing students regarding how to engage the middle school students. During the second semester, the same faculty member supervised both groups of nursing students. She also had more experience instructing and more experience with CATCH. This seemed to help CATCH run more smoothly, and all of the students seemed to have a better experience.

Clinical scholarship and analytical methods for evidence-based practice. The clinical scholarship competency involves the use of analytic methods to critically appraise literature to determine best practice, for evaluation of outcomes, to use information technology to collect data, and dissemination of findings (AACN, 2006). An extensive literature review was completed regarding the decline of PA during adolescence; factors that affect this decline; self-efficacy and activity level in adolescents; and effectiveness of the CATCH program. This literature review also involved examining tools to measure activity levels and self-efficacy. Based on this literature review, the CATCH program was selected, with an emphasis on factors that influence self-efficacy.
Dissemination of findings is an important responsibility of the doctorally prepared nurse. The DNP student presented a poster based on this project at the 2013 Michigan Council of Nurse Practitioners Conference in Lansing, Michigan and was also named the “Evidence Based Champion” in the student category. This poster was also presented at the April 2013 Sigma Theta Tau chapter conference in Grand Rapids, Michigan.

Information systems/technology and patient care technology for the improvement and transformation of health care. This competency provides the DNP graduate with “knowledge and skills related to information systems/technology,” thereby helping the student “apply new knowledge, manage individual and aggregate level information, and assess the efficacy of patient care technology appropriate to a specialized area of practice” (AACN, 2006, p. 12). This dissertation project did not involve the use of information technology in the intervention. However Statistical Package for the Social Sciences (SPSS) Version 20.0 was used to analyze the data. Outcomes were evaluated based on these results.

Technology and information technology were not used for the current project at the immersion site. However, according to a Nielsen study done in July 2012, 58 percent of children aged 13 to 17 have some sort of smart phone, representing a 60 percent increase from the year prior (Washington Post, 2012). This raises the possibility that future interventions involving smart phone-based applications may be an effective way to deliver health information to adolescents. This will be an important area to consider with the rapid advent of new technology, and its frequent use by teens.

Health policy for advocacy in health care. DNP graduates are “prepared to design, influence, and implement health care policies that frame health care financing,
practice regulation, access, safety, quality, and efficacy” (AACN, 2006, p. 13). Advocating for social justice and equality in health care policy is an important responsibility of the doctorally prepared nurse. Programs such as CATCH require resources to begin and maintain. Funding is needed to secure program materials, staff members need to be trained to use the curriculum, and an adequate number of staff must be available to run the program. Currently, RRR receives funding from the city of Grand Rapids and also the State of Michigan (Matt McKinnon, personal communication, September 27, 2012). However, the RRR program director has recently been notified that funding from the city of Grand Rapids will end after June 2013 (Matt McKinnon, personal communication, February 22, 2013). GVSU has secured funding from Blue Cross/Blue Shield to implement the CATCH program for a total of 3 years. This grant will continue through 2014. The future sustainability is uncertain.

Adequate funding is needed to continue to programs such as CATCH. CATCH has been shown to be effective at decreasing or slowing rates of obesity among children (CATCH, 2012b). A 2007 study by Brown et al., concluded that CATCH was cost-effective and beneficial. Because of this, CATCH is a program that can lead to tens of thousands of dollars in savings in health care costs. It is important for DNP graduates to convey this information to stakeholders and advocate for continued funding. A meeting is scheduled with the Mayor of the City of Grand Rapids in early May 2013.

**Interprofessional collaboration for improving patient and population health outcomes.** DNP graduates are prepared to have effective team leadership skills, as well as to play a central role in “establishing interprofessional teams, participating in the work of the team, and assuming leadership of the team when appropriate” (AACN, 2006, p. 14).
In this setting, the DNP student had an opportunity to work with several members of various teams. Coordination with GVSU course coordinators and CATCH faculty was crucial to program facilitation. Inclusion of RRR program and site coordinators was also important. Because of the educational preparation of a DNP, specifically the initiation and completion of a dissertation project, the graduate is in an ideal situation to facilitate multi-disciplinary teams, as well as work to analyze organizational issues and find solutions. By providing effective leadership, the DNP can help overcome barriers to change and thereby bring best practice to patients.

**Clinical prevention and population health for improving the nation’s health.**

According to the AACN (2006), “DNP graduates engage in leadership to integrate and institutionalize evidence-based clinical prevention and population health services for individuals, aggregates, and populations” (p. 15). This includes health promotion, evidence-based practice, cultural diversity/sensitivity, and public health. Many of these components were addressed within the context of this dissertation project. CATCH is an evidence-based PA and nutrition program that has been shown to be effective at decreasing or slowing rates of obesity among children (CATCH, 2012b). There is a well-documented sharp decline in PA as children progress through adolescence; therefore it is important to intervene prior to this time period to help ingrain the importance of health promoting behaviors (Caspersen, Pereira, and Curran, 2000). Also, children who are obese are more likely to become overweight or obese adults (CDC, 2009). If programs can be implemented that are effective at decreasing the rates of obesity among children, these children will be less likely to become overweight or obese as adults, thereby saving costs related to the treatment of chronic disease. The doctorally prepared nurse is in an
excellent position to facilitate the implementation of programs to increase the nation’s health.

*Advanced nursing practice.* DNP graduates are prepared not only to have advanced clinical assessment skills, but also to integrate biophysical, psychosocial, behavioral, sociopolitical, cultural, economic, and nursing science as appropriate in their area of specialization (AACN, 2006). This includes practice within a primary care or acute care setting, but also preventative health within the community. For this dissertation project, the DNP student was able to implement the competencies of advanced nursing practice within a community. An assessment of the immersion site was conducted prior to implementation of the project to identify any potential facilitators or barriers. An evidence-based therapeutic intervention (the CATCH Program) was implemented at the site and evaluated based on collected data. The DNP student was able to develop effective relationships with the RRR staff, middle school students, nursing students, and CATCH faculty, thereby facilitating program implementation. Systems level issues were identified regarding sustainability of the CATCH program at this site. The DNP student also had the opportunity to mentor the undergraduate students in the realms of preventative and community care, as well as in working with diverse populations. Links among practice, organizational, population, fiscal, and policy issues have been identified throughout this chapter.

A DNP graduate is prepared to impact the health care system on many levels. This dissertation project represents just one of the many ways DNPs can work to improve the health of the nation. DNP graduates who have an advance practice focus not only participate in direct care, but also “should be able to use their understanding of the
practice context to document practice trends, identify potential systemic changes, and make improvements in the care of their particular patient populations in the systems within which they practice” (AACN, 2006, p.18). By enacting *The Essentials of Doctoral Education for Advanced Nursing Practice* (AACN, 2006), the doctorally prepared nurse can work to bring change not only to the way care is provided to the patient, but also the way health care is delivered across settings and populations.

**Summary and Conclusions**

The purpose of this project was to increase physical activity self-efficacy among middle school students, thereby increasing PA levels, through the use of the CATCH program. Total minutes of activity were measured with the CAAL, and self-efficacy was measured with the PASES at baseline, mid-point, and project completion. Undergraduate nursing students were included in implementation of the PA and nutrition lessons. Neither self-efficacy nor exercise level were significantly increased from baseline at any measurement point. However, a significant decrease in BMI was found at the second and third measurements. This could have been due to a multitude of factors, including the fact that adolescence is a time of rapid growth and body change.

Overall, students at the school reported enjoying the CATCH activities. It is important for PA interventions to be meaningful to the students. Activities should be well-structured, quality in nature, and not involve allow for a lot of time where the participants are standing around and waiting to participate. Future interventions at this or other similar schools may be more successful by establishing a consistent time period over which to administer interventions, as well as a longer intervention period. The factors impacting activity levels and self-efficacy in this population could also be more
fully explored. Nurses, particularly doctorally prepared nurses, are in a unique position to impact the health of children. By leading multi-disciplinary teams and keeping current with best practice, the doctorally prepared nurse can help improve the health of children and future generations.
DATE: October 8, 2012

TO: Erin Chillag
FROM: Grand Valley State University Human Research Review Committee
STUDY TITLE: [380835-1] Helping Kids Move: Implementation of the CATCH Program in a group of Middle School Children
REFERENCE #: New Project
SUBMISSION TYPE: New Project
ACTION: NOT RESEARCH
EFFECTIVE DATE: October 8, 2012
REVIEW TYPE: Administrative Review

Thank you for your submission of materials for your planned research study. The Human Research Review Committee has determined that this project DOES NOT meet the definition of covered human subject research* according to current federal regulations. Statements made by you in the application abstract support this conclusion:

This is NOT a research project, but it is the implementation of an evidence-based program. I am not seeking to generate new knowledge, nor am I seeking generalizable knowledge. I am working with a specific population & will be collecting data from them, but am not contributing to general knowledge.

The project, therefore, does not require further review and approval by the HRRC.

If you have any questions, please contact the HRRC Office, Monday through Thursday, at (616) 331-3197 or hrrc@gvsu.edu. The office observes all university holidays, and does not process applications during exam week or between academic terms. Please include your study title and reference number in all correspondence with this office.

cc:

*Research is a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge (45 CFR 46.102 (d)).
Appendix B: Grand Rapids Public Schools Approval Letter

Title of the Project: Helping Kids Move: Implementation of the GetActive Program

Researchers Name(s): [Names redacted]
Affiliation: Grand Valley State University

Starting Date: October 1, 2012
End Date: March 2013

Purpose of the Study:
The purpose of my doctoral project is to increase adolescents' self-efficacy relating to their ability to be physically active. This will then increase how much physical activity they participate in on a daily/weekly basis.

Benefit(s) of the Research/Project to the School/Community:
A coordinated approach to Child Health, or CATHE, is an evidence-based physical activity and nutrition program that seeks to decrease the incidence of obesity. Kids who are physically active do better in school, decreasing obesity will decrease healthcare costs.

Type(s) of Data to be Collected and Data Collection Time points. Please also attach all instruments and consent forms.
- Height, weight, waist circumference, and blood pressure
- Activity will be measured with the Child & Adolescent Activity Log (CAAL)
- Self-efficacy will be measured with the Physical Activity Self-Efficacy Scale (PASES)

These will all be measured at baseline, 6 weeks, and 12 weeks (end of my project).
How will confidentiality and security of the data be maintained at all times? (Please note that you will be required to annually sign and fully comply with the GRPS FERPA Compliance Agreement if permission for this project is granted by GRPS.)

Each child's name will be matched with a numeric identifier. Only myself and research assistants will have access to the code book. Data forms will be transported by me to GVSU's Center for Health Sciences.

Location(s) where the data will be held and all individuals that will have access to this data (paper and/or electronic)

GVSU's Research Office & in password-protected files of the secure L-drive according to GVSU policy & procedures.

I will have access to this data.

Population: Alger Middle School students participating in RRR

Assistance Needed from GRPS: Collaboration with RRR at Alger Middle School

Estimated cost to Grand Rapids Public Schools and Source of Funds: no cost-funded by grants obtained by GVSU.

1. The researcher shall obtain the written approval of the Director of Assessment and Evaluation for the research design, all research instruments, and all pieces of correspondence to school personnel or parents regarding this research prior to their actual use in the study.

2. Permission for a research project is given solely to the individuals listed above and only for the exact project, data collection instruments, consent forms, and data access specified above and included with this application. In addition, permission is for a period of no more than one school year. If the project is to last longer than one school year, a renewal application will need to be submitted and approved prior to continuing with the project beyond one school year.

3. If applicable to the project, researchers must receive written and signed approval from their college, university, or organization's Internal Review Board, Human Subjects Review Board, or other similar department prior to beginning their study. Approval of the research request by A&E is contingent on receipt of an institutional approval form. Copies of all documents (e.g., notification of adverse events, project updates, final reports) submitted to the college, university or organization's Internal Review Board, Human Subjects Review Board, or other similar department must also be provided to Grand Rapids Public Schools Office of Assessment and Evaluation prior to their submission to the IRB or HSRB.

4. Requests for district data, especially if they involve programming, may result in charges to the researcher to cover the district's costs. These charges will be determined, communicated to the researcher, and agreed upon in writing prior to the initiation of the study.

5. The researcher must obtain written parental consent consistent with FERPA and PPRA law. Copies of these legal guidelines are available from A&E.

Achievement Testing • Program Evaluation • Planning • Research • Educational Data Systems • Consultation
6. No data, articles, or reports based on this study shall be released by the researcher to parties internal or external to the Grand Rapids Public Schools without prior written approval of the Director of Assessment and Evaluation. The names of the parties to which the researcher intends to share data must be provided to A&E before beginning the study.

7. Activities of the researcher shall be in accordance with all federal, state, and local school district guidelines for handling student data and protection of the rights and privacy of parents and students.

8. The researcher must sign, and fully comply with all aspects of, the Grand Rapids Public Schools FERPA Compliance Agreement. This compliance agreement must be signed annually.

9. The researcher shall provide a report of findings for the data obtained from the Grand Rapids Public Schools in an acceptable format to the Director of Assessment and Evaluation.

10. The terms of this agreement may not be modified except by mutual written agreement between the office of Assessment and Evaluation and the investigator. Notwithstanding the foregoing, this agreement may be terminated by either party upon thirty days written notice to the other party at the addresses listed below.

**Lead Researcher**

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**School District**

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**Achievement Testing • Program Evaluation • Planning • Research • Educational Data Systems • Consultation**
Appendix C: CATCH Informational Letter/Consent Form

October 19, 2012

Dear parents & guardians of Alger Middle School students:

Hello! My name is Erin Chillag and I am a nurse who is in graduate school at Grand Valley State University. This fall, I am working with the Recreation Reaps Rewards (RRR) program at Alger Middle School. We are starting the Coordinated Approach to Child Health, or CATCH, program at your child’s school. This program teaches children about good food choices and helps them to be more active.

I am asking for your help. I would like to take your child’s height, weight, and blood pressure at 3 times during the program to see how well CATCH works. This will be done privately. I will use the information from all the students as a group for my final school project (my dissertation). Your child’s own information will not be shared with anyone outside of the project.

Please sign the permission slip and return it to the RRR program by MONDAY OCTOBER 22. Your child will get a gift when he/she brings back the form.

I hope you and your child are having a good start to the school year, and I look forward to working with your child in this important project!

Thank you.

Sincerely,

Erin M Chillag, RN, CPNP
Grand Valley State University Graduate Nursing Student
Kirkhof College of Nursing
CATCH Program Information

- This is a permission form to let us measure your child’s height, weight and blood pressure as part of the Recreation Reaps Rewards CATCH program. We will also ask your child questions about how active he or she is and how he or she feels about being active.

- We will take the measurements in a private area where no other children will be able to see the results. We will do this in case children feel nervous about having their height and weight taken.

- We will take your child’s height, weight, and blood pressure 3 times, in October 2012, December 2012, and February 2013.

- The measurements from all the students will be used together in a graduate nursing student project, to help us learn reasons kids choose to be active and make good choices about health.

- Your name and your child’s name will not be shared with anyone outside of the project. All of the information about your child will be kept private.

- In March 2013, when the program is over, the group’s results will be shared with the families of the students who participated, RRR staff, and Grand Valley State University.

- If your child brings back the attached signed form by **MONDAY OCTOBER 22, 2012**, he/she will receive a gift.

- If at any time you have questions, you can call [Matt McKinnon](mailto:Mckinnon@grsu.edu), RRR Program Coordinator, at 616-456-4496, or [Erin Chillag](mailto:chillag@grsu.edu) at 616-331-3558.

- By signing the permission form (attached), you agree to have your child’s height, weight and blood pressure taken and added to the report for the project.
CATCH PERMISSION FORM

PLEASE SIGN THIS PAGE AND RETURN IT TO THE RRR PROGRAM BY MONDAY OCTOBER 22

PRINT Child’s Name: ___________________________ Date of Birth ___________________________

PRINT Parent’s/ Guardian’s Name: _______________________________________________________

Parent/Guardian SIGNATURE: ___________________________

Date Signed: ___________________________

Parent phone number: ___________________________

Email address (optional): _______________________________________________________________

My child’s allergies: _________________________________________________________________

My child’s health problems: __________________________________________________________

Activities/sports my child currently takes part in: ________________________________________

Kirkhof College of Nursing • Cock-DeVos Center for Health Sciences
301 Michigan St. NE • Grand Rapids, MI 49503 • Phone: (616) 331-3558 • Fax: (616) 331-2510
Appendix D: Procedure for Data Collection

PROCEDURE FOR DATA COLLECTION

Client Recruitment:

An informational letter and consent form will be distributed to children enrolled in the RRR after school program to bring home to their parent/guardian. Parents can either choose to enroll or decline to enroll their child in the CATCH data collection. The recruitment letter overviews CATCH activities and describes to parents how they can enroll their child(ren). Children who return the signed form will be given a small incentive gift. GVSU student nurses and faculty will receive a list and enrollment information for those children qualifying for measurement.

Measurements:

1. Nursing students will complete the Assent process for all children during baseline measurements.

2. Nursing students will measure height, weight, and blood pressure for each enrolled child.

3. Nursing students will work with children to complete the CAAL and the PASES questionnaires. Measurements will be made as a baseline measure the week after enrollment, mid point in December 2012 and a final measure in February 2013.

KCON Health Measurement Procedure

I. Set-Up

1. NUR 367/369 faculty/nursing students, RRR staff develop flow designed to increase screening efficiency and accommodate RRR space and scheduling needs. Due to the multiple days required to complete the measures, communication between clinical groups and RRR staff is vital.

2. The health screen is conducted in an area that protects confidentiality and provides noise control.

3. NUR 367 nursing faculty/students review measurement procedures with RRR staff and nursing students who were unable to attend initial orientation.
4. NUR 367 faculty/nursing students coordinate needed equipment and supplies.

5. All GVSU nursing students/faculty participating in measures will record their names and initials in the CATCH After School Program Measurement Signature Log (see page 65).

II. Registration

1. GVSU nursing students will receive a list containing the names, ages, and grades of children whose parents/caregivers have consented to participation in the project. Accompanying the list will be the enrollment form or pertinent information from the enrollment form for each child qualifying for measurements. This enrollment information is completed by parents/caregivers during the consent process and includes the child’s birthdate and an assessment of any activity cautions that could affect participation in fitness testing.

III. On measurement days, GVSU nursing students will collaborate with RRR staff to facilitate bringing children enrolled in the project to the measurement area in small groups.

IV. Assent and Measurement Recording

1. Measurements and measurement completion indicators will be recorded on CATCH Health Measurement Form (see Page 64). Calculate child’s age in years and months and record on the form. GVSU student nurses will initial the appropriate category as they complete a measure. If measurements are collected over separate dates, indicate additional dates by measurement category. The CATCH Health Measurement Form will be placed in a temporary folder as measurements are taken to ensure the privacy of children. Children will carry the folder between stations and deliver their folder to the next measurement station. GVSU student nurses and RRR staff will assist in this process.

2. An Assent Process for Graduate Project “CATCH Program” is included in this document. (See Page 62). This form was completed for all children during the baseline measurement period. Directions for completion of this form are included in item 3 below for informational purposes.

3. For all children, complete entire form using the script on the form to gain children’s assent to the measurement process. Indicate completion on CATCH Health Measurement Form. If children refuse to provide assent for a particular measure, omit taking this measure. The measure can be taken later if assent is provided, but avoid actions that would lead to coercion.
III. Health Measurements

1. GVSU nursing students and faculty will obtain measurements. To insure reliability and validity, all nursing participants have completed competency validation.

2. Care should be taken when designing flow for the measurement sessions to improve efficiency. Measurements can be taken in any order.

3. Measuring Height Protocol
   a. Use a calibrated vertical stadiometer with a right angle headpiece. No carpet should be under the stadiometer.
   b. Maintain child’s privacy by taking measurements in a private or partially screened area.
   c. Child should remove shoes.
   d. Stand child with heels, buttocks, shoulders and head touching a flat upright surface.
   e. Have child look straight forward. The child’s eyes should measure parallel to the head piece.
   f. Bring the perpendicular headpiece down to touch the crown of the head.
   g. Read the measurement to the nearest 1/8 inch.
   h. Reposition and repeat the measurement. These two measures should agree within 1/4 inch. Repeat this process if difference between readings is greater. Record both measurements on the CATCH Health Measurement Form.

4. Measuring Weight Protocol
   a. Use a calibrated beam balance or electronic scale.
   b. Child must be able to stand in the center of the platform without assistance.
   c. Child should wear lightweight outer clothing and remove shoes.
   d. Read the measurement to the nearest to the nearest tenth of a pound (one decimal point). Reposition and repeat measurement, these numbers should agree within 1/4lb (0.3 decimal points). Repeat this process if difference between readings is greater. Record both measurements on the CATCH Health Measurement Form.

5. Calculating BMI Protocol
   a. BMI calculation by the DNP student will be completed during the data analysis period later in the project.

6. Measuring children’s activity and self-efficacy regarding physical activity
   a. The Child And Adolescent Activity Log (CAAL) will be used to measure physical activity. Each time the CAAL is administered, the project coordinator
or designated GVSU faculty will instruct the child on how to complete the scale. Each item will be asked, i.e. “Did you do any activity yesterday?” For children who answer “yes,” each item will be read off and the child will answer “yes” or “no” and fill in the appropriate amount of time he/she was active for that particular activity.

b. The Physical Activity Self-Efficacy Scale (PASES) will be used to measure self-efficacy. Each time the PASES is administered, the project coordinator or designated GVSU faculty will read each item to the children and they will then answer appropriately and fill in the answers.

c. GVSU nursing students will be walking throughout the area answering questions as needed and ensuring each child fully completes the questionnaires. They will be instructed to ensure they are not guiding any answers.

d. Record any comments on challenges using specific questions to improve tool design for future use.

e. Avoid influencing children by verbal and non-verbal cues, e.g. tone of voice, facial expression.

f. Indicate tool completion on the CATCH Health Measurement Form and attach completed forms to the form.

7. **Blood Pressure Protocol**


b. Pediatric and small adult Blood pressure cuffs are provided through KCON; nursing students use personal stethoscopes. BP cuffs should be validated on measurement day using the BP MEASUREMENT DEVICE QUALITY INSTRUMENT posted on Blackboard.

c. Width of bladders should be 40% of arm circumference and length of bladder should cover 80-100% of the circumference of the arm. Bottom of cuff should be approximately 2 centimeters above the cubital fossa.

d. Position the child sitting quietly for 5 minutes, seated with feet flat on the floor, right arm supported with cubital fossa at heart level. Palpate for a brachial pulse in the cubital fossa.

e. Use a two-step method for taking blood pressure. (Note if clinical grade electronic blood pressure measuring devices are available a two-step method can be omitted.)

f. Compare child’s systolic and diastolic blood pressure to the appropriate NHLBI table. Use the child’s age, and height percentile determine their BP
percentile. This will be determined using the pediatric blood pressure percentile calculators for boys and girls aged 2 to 17 found on the Up to Date online resource (2013). Record the BP reading and BP percentile on *CATCH Health Measurement Form*.

- BP less than 90th percentile is normal
- BP between the 90th and 95th percentile is prehypertension.
- BP greater than 95th percentile may be hypertension
- Stage 1 95th-99th percentile plus 5 mmHg
- Stage 2 >99th percentile plus 5 mmHg

**g.** Repeat BP readings for all results above normal range in systolic or diastolic categories.

**h.** GVSU nursing students make referrals as needed with faculty assistance. A referral guideline is included in measurement tools. Document any immediate referrals on assent form. A letter identifying health concerns will be sent to parent(s)/caregiver(s). Please see page 64 for a copy of this letter.

**8. Infection control precautions**

- Equipment and hands are cleaned between children.
- Hands cleaned with alcohol-based hand sanitizer.
- Blood pressure cuffs are sanitized with disinfectant wipes.
- Stethoscopes cleansed with alcohol wipes.
- Scales are wiped with disinfectant wipes when there has been skin to scale contact

**IV. Submission and Handling of Participant Health Data**

1. Review *CATCH Health Measurement Form* for completeness.

2. Review completion of all measurements for each child on master list.

3. Keep all assent forms, surveys, and *CATCH Health Measurement Form* together. Maintain security and confidentiality of data collected. Faculty will submit completed data to be de-identified and analyzed off site.
V. Conclusion of Activity

1. Nursing students/faculty proceed to their second-assignment, if applicable.

3. All equipment and supplies are returned to designated area.

4. Return all completed and unused forms to data manager as instructed.

5. Forms are retained in a locked secure location.

6. No individual information is provided to RRR or other community partners.

7. Data is retained for five years.

VI. Consultation/Emergency Contacts

1. For clarification, consultation or emergencies contact:

   To be designated with each measurement opportunity
Assent Process for Graduate Project, “CATCH Program”

**WHO:** Children will be those in the after school program, Recreation Reaps Rewards, conducted by the Grand Rapids Parks and Recreation Department, and whose parent(s) have signed the informed consent for the child to participate in the project. Nursing students will introduce the project and the procedures in one-to-one conversations with those children whose parent(s) have completed the informed consent.

Child’s Name: ________________________________

Grade in school: _______  Age: _______

After school program location:
Alger Middle School

**SCRIPT:** “Hello, my name is ______ and I am a nursing student. We want to learn about the things you eat and the ways that you like to play.

You can decide whether you want to do these things or not. If you choose not to do these activities we talked about, you can still be in the after school program.

If you want to skip any questions, that’s OK. If you want to stop we can do that, too.

So, these are the things I would like to do with you. You can say it’s OK with you or not.

Are you ready??

I will ask you questions about the kinds of foods you choose to eat and the kinds of exercise you do. I will show you pictures of different kinds of foods and ask you to pick the ones you would like to eat.

I will measure how tall you are and how much you weigh.

I will measure your blood pressure. (show cuff) I will wrap this around your arm and make it feel kind of tight, but it does not get so tight that it will hurt you. I will write down the numbers on this piece of paper.

Is this OK with you? ___ yes ___ no ___________________________Child’s Name

__________________________________________  __________

Nursing Student, GVSU/KCON  Date

*Reprinted/modified with permission from Catherine D’Amor, Grand Valley State University*
CATCH Health Measurement Form

Child’s Name ____________________________________  Date of Birth________

Current Age ______ Years ______ Months  Grade____________________

<table>
<thead>
<tr>
<th>MEASUREMENT CATEGORY</th>
<th>RESULTS</th>
<th>GVSN INITIALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement #1</td>
<td>Measurement #2</td>
<td>Measurement #3</td>
</tr>
<tr>
<td>DATE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assent (check if completed)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>CAAL (check if completed)</td>
<td></td>
<td></td>
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<tr>
<td>PASES (check if completed)</td>
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<tr>
<td>Weight (to nearest 0.1 pound)</td>
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<tr>
<td>Height (to nearest 1/8 of inch)</td>
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<tr>
<td>BMI (to 2 decimal places)</td>
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<td></td>
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<tr>
<td>Blood Pressure (indicate arm)</td>
<td>BP _____</td>
<td>BP _____</td>
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<tr>
<td>Arm R _____ L _____</td>
<td>Arm R _____ L _____</td>
<td>Arm R _____ L _____</td>
</tr>
</tbody>
</table>

*Reprinted/modified with permission from Catherine D’Amor, Grand Valley State University*
<table>
<thead>
<tr>
<th>Semester</th>
<th>Printed Name</th>
<th>Signature</th>
<th>Initials</th>
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</table>
November 20, 2012

Dear Parent/Guardian of ______________________:

As part of the CATCH program, we measured your child’s blood pressure on ____________________.

The result was ____________________.

This reading is above the blood pressure reading of most ______ year old children. This does not mean that your child will always have high blood pressure. You do need to contact your child’s doctor, nurse or health clinic to follow up about this reading in the next 1-2 weeks.

If you do not have a health care provider for your child, you can contact the GVSU Family Health Center on 72 Sheldon Blvd SE, 616-988-8774. Please contact me at 616-331-5608 if you have questions.

Sincerely,

Erin M Chillag, RN, CPNP
Grand Valley State University Graduate Nursing Student
Kirkhof College of Nursing
Appendix F: Physical Activity Measurement Scale Evaluation Table

<table>
<thead>
<tr>
<th>Scale</th>
<th>Details</th>
<th>Number of Questions/Length of time to complete etc</th>
<th>Reliability/Validity</th>
<th>Strengths</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAQ-A (Physical Activity Questionnaire for Adolescents)</td>
<td>7-day guided, self-administered questionnaire designed to measure MVPA in children ages 9–15 years</td>
<td>9 items, completed once for 7 day recall. Does not calculate metabolic expenditure, computes an activity score</td>
<td>Limited reliability/validity among minority adolescents (r = 0.39 with Caltrac, r = 0.46 with PA recall interview)</td>
<td>Relatively short – 9 items, gathers a full week of data</td>
<td>Has to rely on recall for 7 days which can be inaccurate</td>
</tr>
<tr>
<td>SOFIT (System for Observing Fitness Time)</td>
<td>Direct-observation; observers randomly select 4 children from PE class &amp; observe for 20 seconds each – to determine amount of time spent in MVPA</td>
<td>Direct observation</td>
<td>Validated with heart rate monitoring for elementary &amp; middle school children, accelerometers with 5th graders, and accelerometers with 3rd – 5th graders during PE (all values &gt; 0.50); high inter-rater reliability (0.86) among trained observers</td>
<td>Provides direct observation by trained observers for time spent in MVPA</td>
<td>Requires 2 days of training; provides group data instead of individual data; only accounts for time spent in MVPA during PE class &amp; not activities outside of class</td>
</tr>
</tbody>
</table>
| **CAAL (Child & Adolescent Activity Log)**
(Garcia, George, Coviak, Antonakos, & Pender, 1997) | 21 items – developed to characterize pattern, duration, & intensity of PA; choose from various activities listed | Administered daily x 5 days, with the first day of data collection requiring recall of 3 days worth of activities if collecting data for the weekend on Monday | Validated by correlation with Caltrac readings; good test-retest reliability (average summary score = 0.95), good content & moderate criterion validity (described in plan/procedure section) | Assesses type, duration & intensity of activities performed & provides a week’s worth of data (less if desired); administered daily so increases accuracy/recall Column for “other” to include activities not listed | Relies on recall which can be inaccurate in children |
| **HBQ (Health Behavior Questionnaire)**
(CATCH, 1993) | 11 sections assessing various health related activities, including diet & physical activity | Numerous sections – 123 questions, takes 45 minutes to complete; must be administered by at least one person | Originally developed for CATCH; reliability & validity established during CATCH studies. Internal consistency > 0.6 | Comprehensive | Time consuming, focuses on other details such as smoking & nutrition |
| **ASSQ (After School Student Questionnaire)**
(CATCH, 2012c) | Assesses nutrition & physical activity knowledge & | 18 pages long, takes approximately 45 minutes to complete; must | Originally developed for CATCH; reliability & validity established during | Comprehensive | Time consuming, assesses other factors such as smoking & nutrition |
| Pattern | Be administered by at least one person | CATCH studies. Modified from HBQ which has internal consistency $> 0.6$ | | |
|---|---|---|---|
| SAPAC (Self-Administered Physical Activity Checklist) (Sallis et al., 1996) | List of 21 activities with space for up to 4 more; assesses sedentary activities like TV & video games; have to account for whether or not they “breathed hard” during PA | About 30-40 minutes to administer | Developed for CATCH; validated with accelerometers ($r = 0.57$) & heart rate monitors ($r = 0.30$) | Lots of activities to choose from | Time consuming; relies on recall |
Appendix G: CAAL Permission Letter and Scale

September 4, 2012
301 Michigan Street, NE, Suite 352
Grand Rapids, MI 49503

Dear Ms. Chillag:

This letter serves as my permission for your use of the Child/Adolescent Activity Log (CAAL) for evaluation of the effectiveness of the CATCH curriculum among students who will participate in this program. As the program evaluation will be your dissertation project, I also agree that you may reproduce the CAAL in your dissertation manuscript which will be available on Grand Valley State University’s electronic archive, ScholarWorks. However, I do not surrender copyright of this instrument to you or to Grand Valley State University. Copyright will remain with Dr. Anne Garcia, and the other co-authors of the 1997 publication in the International Journal of Behavioral Medicine.

Thank you for your interest in our research tool. Cordially,

[Signature]

Cynthia P. Covak, PhD, RN, CNE
Associate Dean for Nursing Research & Faculty Development
Kirkhof College of Nursing
Grand Valley State University
NAME: __________________________________________________

Yesterday was: (circle day)

Sunday  Monday  Tuesday  Wednesday  Thursday  Friday  Saturday

Did you do any activity yesterday?

_____ NO     If no, stop filling out the form

_____ YES   If yes, please indicate below which activities you did and how long you did them by filling in the circles

<table>
<thead>
<tr>
<th>Activity</th>
<th>YES</th>
<th>Number of Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Walking</td>
<td>O</td>
<td>__1-10 minutes __11-20 minutes __21-40 minutes __41-60 minutes __1-2 hours __&gt;2 hours</td>
</tr>
<tr>
<td>2. Running/Jogging</td>
<td>O</td>
<td>__1-10 minutes __11-20 minutes __21-40 minutes __41-60 minutes __1-2 hours __&gt;2 hours</td>
</tr>
<tr>
<td>3. Ice/ Roller Skating</td>
<td>O</td>
<td>__1-10 minutes __11-20 minutes __21-40 minutes __41-60 minutes __1-2 hours __&gt;2 hours</td>
</tr>
<tr>
<td>4. Swimming for fun</td>
<td>O</td>
<td>__1-10 minutes __11-20 minutes __21-40 minutes __41-60 minutes __1-2 hours __&gt;2 hours</td>
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<tr>
<td>5. Swimming laps</td>
<td>O</td>
<td>__1-10 minutes __11-20 minutes __21-40 minutes __41-60 minutes __1-2 hours __&gt;2 hours</td>
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<td>1-10 minutes</td>
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<td>6. Bicycling</td>
<td>O</td>
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<td>7. Aerobics/other dance</td>
<td>O</td>
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<tr>
<td>8. Volleyball</td>
<td>O</td>
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<tr>
<td>9. Football</td>
<td>O</td>
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<tr>
<td>10. Baseball/Softball</td>
<td>O</td>
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<tr>
<td>11. Soccer</td>
<td>O</td>
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<td>12. Tennis/Racquetball/ Badminton</td>
<td>O</td>
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<td>13. Basketball</td>
<td>O</td>
<td></td>
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<tr>
<td>14. Gymnastics/ Tumbling</td>
<td>O</td>
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<tr>
<td>15. Ice Hockey</td>
<td>O</td>
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<tr>
<td>16. Recess games like: jumping rope, frisbee, tag</td>
<td>O</td>
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<td></td>
<td>Snow activities like: sledding, playing in snow</td>
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<tr>
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<th>Exercises/Calisthenics</th>
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<th>Martial Arts like: Karate, Tae-Kwan-do</th>
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<th></th>
<th>Weightlifting</th>
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<tr>
<th></th>
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Appendix H: PASES Permission Letter and Scale

MICHIGAN STATE UNIVERSITY

August 15, 2012

Dear Ms. Chillag,

You have permission to use the Perceived Physical Activity Self-Efficacy Scale for your doctoral-level research at Grand Valley State University. Please feel free to place a copy into your dissertation. I wish you success with this important endeavor.

Sincerely,

[Signature]

Lorraine B. Robbins, PhD, RN, FNP-BC
Associate Professor
Michigan State University College of Nursing
Center for Nursing Research
900 Fee Road, Room B510A West Fee
East Lansing, MI 48824
Office: 617-352-3011
FAX: 517-355-5002
Cell: 734-804-2884
Email: robbins75@msu.edu
NAME: ______________________________________

Please show how true each statement is regarding how sure you are that you can exercise, be active, or do sports when you face certain barriers (problems).

<table>
<thead>
<tr>
<th></th>
<th>Statement</th>
<th>Not at all true</th>
<th>Not very true</th>
<th>Sort of true</th>
<th>Very true</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I'm sure that I can still do my exercise even if I feel self-conscious or concerned about my looks when I exercise.</td>
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<td>2</td>
<td>I'm sure that I can still do my exercise even if I am not motivated or feeling too lazy to exercise at the time.</td>
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<td>3</td>
<td>I'm sure that I can still do my exercise even if I am too busy.</td>
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<td>4</td>
<td>I'm sure that I can still do my exercise even if I have to exercise alone.</td>
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<td>5</td>
<td>I'm sure that I can still do my exercise even if I am afraid to fail.</td>
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<td>6</td>
<td>I'm sure that I can still do my exercise even if I am afraid to fail.</td>
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<tr>
<td><strong>I'm sure that I can still do my exercise even if</strong></td>
<td><strong>I have minor aches and pains from activity.</strong></td>
<td><strong>Not at all true</strong></td>
<td><strong>Not very true</strong></td>
<td><strong>Sort of true</strong></td>
<td><strong>Very true</strong></td>
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<tr>
<td>7.</td>
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<tr>
<td><strong>I'm sure that I can still do my exercise even if</strong></td>
<td><strong>I am tired.</strong></td>
<td><strong>Not at all true</strong></td>
<td><strong>Not very true</strong></td>
<td><strong>Sort of true</strong></td>
<td><strong>Very true</strong></td>
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<td>8.</td>
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<tr>
<td><strong>I'm sure that I can still do my exercise even if</strong></td>
<td><strong>I have a bad day at school.</strong></td>
<td><strong>Not at all true</strong></td>
<td><strong>Not very true</strong></td>
<td><strong>Sort of true</strong></td>
<td><strong>Very true</strong></td>
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<tr>
<td>9.</td>
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<tr>
<td><strong>I'm sure that I can still do my exercise even if</strong></td>
<td><strong>it is very hard work.</strong></td>
<td><strong>Not at all true</strong></td>
<td><strong>Not very true</strong></td>
<td><strong>Sort of true</strong></td>
<td><strong>Very true</strong></td>
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<td>10.</td>
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<tr>
<td><strong>I'm sure that I can still do my exercise even if</strong></td>
<td><strong>I face certain barriers or problems.</strong></td>
<td><strong>Not at all true</strong></td>
<td><strong>Not very true</strong></td>
<td><strong>Sort of true</strong></td>
<td><strong>Very true</strong></td>
</tr>
<tr>
<td>11.</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

*Scale reprinted with permission from Dr Lorraine Robbins, Michigan State University*
References


