Physical education frequency: effects on fitness and perceived competence in fifth grade students

Nicole Sutton Donally

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Physical Education Frequency: Effects on Fitness and Perceived Competence in Fifth Grade Students

By

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B.S., Western Montana College of The University of Montana, 1997

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for the degree of

Master of Science

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Attitudes toward physical activity are developed early in life, and childhood physical activity behaviors may affect current health status as well as the predisposition to a variety of potential health risks later in life. As school-based interventions have been shown to be successful in increasing physical activity levels, the purpose of this study was to examine the effects of the frequency of physical education classes on physical fitness levels, body composition and perceived competence levels in fifth grade students.

Subjects included 48 fifth grade students who attended physical education classes three times per week and 53 fifth grade students who attended physical education classes one time each week. Subjects were chosen on similar school populations, physical education principles and objectives and the cooperation of participating teachers and administrators.

Data collection occurred during spring physical fitness testing and consisted of one-mile run/walk scores, the number of modified sit-ups completed in one minute, body mass index (BMI) using height and weight measurements and the Athletic Competence Subscale from Harter’s Self-Perception Profile for Children (Harter, 1985).

Results indicated that fifth grade students who attended physical education classes three times each week had significantly higher one-mile run/walk times and BMI scores than those student who attended physical education classes one time each week. No significant differences existed for modified sit-ups completed in one minute and students’ scores on measurements of perceived competence. Differences in elementary physical education curriculums and teaching emphasis, opportunities for aerobic activity outside of class, socioeconomic factors and regional differences may have accounted for unexpected results for the cardiovascular and body composition factors in this study.
Acknowledgments

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Introduction

According to research by Brustad (1996), children’s physical activity levels affect both their current health status and their predisposition to a variety of potential health risks. It is a widely accepted view that attitudes toward physical activity are developed early in life (Coulon & Reif, 1991; Fritz, 1997; Haywood, 1991; Marston, 1996; Sallis & McKenzie, 1991; Shephard, 1995). According to Marston (1996), if young children are placed in environments that not only provide opportunities to develop skills essential for active lifestyles but also allow them to observe adults valuing physical activity, they might be more likely to value active lifestyles when they enter adolescence and adulthood. An abstract entitled *Psychological Correlates of Children’s Physical Fitness* (Research Quarterly for Exercise and Sport, 1994) quotes findings suggesting that self-perceptions and attitudes developed during early and middle childhood may have enduring effects upon an individual’s physical activity behaviors. Nearly all children currently participate in some form of physical education classes, yet many school districts throughout the United States are responding to budget deficits by reducing their PE classes and members of their PE staff (Lantz, 1991).

Sallis, McKenzie and Alcaraz (1993) reference several studies suggesting that interventions in physical activity can be effective in promoting the fitness and health of children. The school system offers a unique opportunity for this intervention, providing a time, a facility, and a program for children to exercise (Koplan, Caspersen & Powell, 1989). Bar-Or (1987) supports the belief that school PE should be used as a “primary
target” for increased participation in, and appreciation of, physical activity. The American Association for Health, Physical Education, Recreation and Dance (AAHPERD) Guide to Physical Fitness Education and Assessment (1989) states:

There is strong evidence that the onset and rapid development of CHD [coronary heart disease] can begin during youth, leading to an irreversible condition. It is therefore important to encourage young people to adopt lifestyles that lead them to their physical best, thereby decreasing their risk of developing CHD while increasing their energy base through improved aerobic endurance (p. 7).

With the benefits of physical activity in schools so widely known, physical education classes should be at the forefront of school education programs, instead of facing threats of reduction or elimination at every turn. A 1991 study by Sallis and McKenzie stresses that school physical education is the only major institution that can address the health-related physical activity needs of virtually all children. They add that physical education in schools is the only preparation most children will have in how to develop an active lifestyle, so it is important to use physical education to increase motivation and teach relevant skills to all children to prepare them for lifetime physical activity.

The Centers for Disease Control’s Guidelines (1997) (along with the American Heart Association and the National Association for Sport and Physical Education, also cited in the Guidelines) recommend policies that require comprehensive, daily physical education for students in kindergarten through grade 12, noting that enrollment in daily
physical education has decreased. The CDC (1997) reports that regular participation in vigorous physical activity has been reported by 69 percent of young people aged 12 to 13, but only 38 percent of those aged 18 to 21. School-based interventions have been shown to be successful in increasing physical activity levels. Schools have a responsibility to provide students with opportunities to be active, along with an ordered sequence of educational experiences that lead them to choose active lifestyles as adults.

There is much debate over the type of physical education program that will fulfill these responsibilities. That topic is too detailed to include at this time and merits further study. However, Coulon and Reif (1991) offer a brief overview: "Such a program is based on the developmental level of the learner for the purpose of increasing physical fitness, developing motor skills, fostering an appreciation of movement, and encouraging students to engage in physical activity during free time."

With this goal in mind and incorporating a well-structured physical education program, the Surgeon General's (CDC, 1995) advice merits strong consideration, that "every effort should be made to encourage schools to require daily physical education in each grade and to promote physical activities that can be enjoyed throughout life."

Problem

Expanding on previous research (Greene & Ignico, 1995; Pieron, Cloes, Delfosse & Ledent, 1996; Sallis et al., 1993; other studies as cited in the Surgeon General's Report, CDC, 1995), the purpose of this study is to examine the effect of the frequency of physical education classes on physical fitness levels, body composition and perceived competence levels in fifth grade students. This study will attempt to show that after six
months of physical education classes, fifth grade students who attend physical education classes three times a week will show significantly higher scores on tests of physical fitness (specifically the one-mile run/walk and the number of modified sit-ups completed in one minute), will have significantly lower levels of body fat and will score significantly higher on Harter’s (1985) measurements of perceived competence over their fifth grade counterparts who attend physical education classes only one time per week.

Research Hypotheses

Hypothesis One: Fifth grade students who attend physical education classes at least three times per week will demonstrate significantly (p<.05) lower one-mile run/walk times than those who attend physical education classes one time per week.

Hypothesis Two: Fifth grade students who attend physical education classes three times per week will record a significantly (p<.05) higher number of curl-ups accomplished in one minute than those who attend physical education classes one time per week.

Hypothesis Three: Fifth grade students who attend physical education classes three times per week will have significantly (p<.05) lower levels of body fat, as calculated by body mass index (BMI) using height and weight measurements, than those who attend physical education classes one time per week.

Hypothesis Four: Fifth grade students who attend physical education classes three times per week will demonstrate significantly (p<.05) higher scores on the Athletic Competence subscale from Harter’s Self-Perception Profile for Children (SPPC) than those who attend physical education classes one time per week.
Significance of the Study

The information gathered in this study can have valuable implications regarding the fate of physical education classes in elementary schools. It may also be strong evidence for the importance of regular, frequent physical activity and the pursuit of physical fitness, as an integral part of the school curriculum as well as outside school hours. As stated by Koplan et al. (1989): “Physical fitness is determined by our genetics and our behavior. While we cannot change our genes, we can modify our behavior.”

Rationale of the Study

There is little available research investigating the benefits of frequent physical education in the schools (i.e. three times per week as opposed to one time per week). However, much literature exists to indicate the importance of regular physical activity, specifically pointing to improved health aspects at all ages. Evidence also suggests that healthy behaviors are learned in childhood. These conclusions support the need for additional research focusing on the frequency of physical education classes in the elementary schools and the resulting physiological and psychological effects on students.

Limitations

Data collection will hinge on obtaining consent from the target students and their parents/guardians to participate in the study, including factors in the study that will meet with Internal Review Board (IRB) approval, and gathering physical fitness test scores from the physical educators. The testing for the dependent variables will occur during physical education classes, and cooperation must be ensured from the school.
administration, physical education specialists, parents and students. There is an inherent margin of error associated with the use of all equipment and measurement techniques. This will be minimalized with careful calibration and operation of all equipment, and the use of trained personnel prior to and during all testing procedures.

**Delimitations**

Subjects will be fifth-graders at elementary schools in western to central Montana who fall into one of two groups: those who participate in physical education classes three days per week, and those who participate in physical education classes only one day per week. Subjects may be involved in extracurricular athletic activities. Subjects who indicate health problems restricting them from full participation in physical education activity will not be included in the study. Subjects must attend physical education classes taught by a physical education specialist. A study by McKenzie, Sallis, Kolody and Faucette (1997) cites information stating that comparative studies typically show PE specialists provide more physically active physical education classes than nonspecialists.

**Definition of Terms**

*Athletic Competence:* An individual’s actual ability to complete an athletic task.

*Body Composition:* The relative percentages of body weight comprised of fat and fat-free body tissue.

*Body Mass Index:* An expression of the relationship of body weight (expressed in kilograms) to height (expressed in meters) for both males and females.
Cardiovascular Endurance: The ability to perform large muscle, dynamic, moderate-to-high intensity exercise for prolonged periods.

Frequent: In this study, relating to the occurrence of physical education classes three or more times per week.

Instructional Time: Time spent in physical education classes explaining and demonstrating skills.

Muscular Endurance: The ability of a muscle group to execute repeated contractions over a period of sufficient time duration to cause muscular fatigue.

Muscular Strength: The maximal force that can be generated by a specific muscle or muscle group.

Obesity: The percent body fat at which disease risk increases (any excess of 20% or more above the ideal weight, a body mass index greater than the 95th percentile for children of the same age and gender).

Perceived Athletic Competence: An individual’s perception of his/her athletic capabilities.

Perceived Competence: An individual’s perception of his/her capabilities.

Physical Activity: Any body movement produced by the skeletal muscles that results in a substantial increase over the resting energy expenditure.

Physical Education: Education through movement, a program that gives attention to the physical, mental and emotional domains.

Physical Education Specialist: Teachers of physical education that have a specialized physical education certificate.

Physical Fitness: A physical state of well being that allows people to perform daily
activities with vigor, reduce their risk of health problems related to lack of exercise and establish a fitness base for participation in a variety of physical activities.

*Stroke Volume:* The amount of blood the heart pumps with each contraction.

*VO2max:* Maximal oxygen uptake; a criterion measure of cardiovascular endurance.
Chapter Two: Review of Literature

This section will review existing literature regarding the effects of regular physical activity on health status, physical fitness levels and body composition. In addition, the relationship between perceived competence and participation in physical activity will be discussed.

Physical Activity and Health Status

Although no definitive information is available from the pretelevision era to establish that children are indeed becoming more sedentary, several researchers cite an increasing number of health concerns in today's children (Bar-Or, 1987; Greene & Ignico, 1995; Marston, 1996). One study (Andersen, Crespo, Bartlett, Cheskin & Pratt, 1998) found that boys and girls who watched four or more hours of television per day had the highest skinfold thickness and highest BMIs. The Surgeon General's 1996 Report on Physical Activity and Health found that participation in all types of physical activity declines strikingly as age or grade in school increases. The Report also warns that a highly technological society such as is found in the United States makes it increasingly convenient to remain sedentary and that it discourages physical activity in both obvious and subtle ways. Thus, children have the potential to fall into a vicious cycle as described by Rowland (1990), who expresses reservations that a lack of physical activity decreases the level of physical fitness, which in turn causes the child to avoid physical activity even more.
Yet advice is widely heard, although not well-taken. Robert Malina (in Bouchard, Shephard & Stephens, 1994) found that regular physical activity is generally viewed as having a favorable influence on the growth, biological maturation, and physical fitness of children and youth. Paffenbarger and Hyde (1984) maintain that exercise has a natural "preventive maintenance" effect to keep the body mechanisms running smoothly, and Sallis et al. (1993) cite evidence supporting the conclusion that both increased physical activity and physical fitness are associated with improved health indicators, even in children.

Study after study reveals that physical activity has innumerable benefits on the health of people of all ages. Sallis (1987) documents the effects of physical activity in children on cardiovascular disease (CVD) risk factors, as do Paffenbarger and Hyde (1984), who state that the cardiovascular health advantage of continuing adequate exercise was consistent over a broad range of life experiences and at all ages studied. Kohl, LaPorte and Blair (1988) state evidence that resting heart rate at baseline is an independent risk factor for cancer mortality. A following section on female risk factors found that a certain lifestyle becomes established with long term athletic training that somehow lowers the risk of cancers of the reproductive system and breast, and the same study also contained information that higher relative odds of colon cancer were demonstrated with increasing sedentariness. This is echoed by findings from Koplan et al. (1989), who advocate that physical activity can decrease the risk for colon cancer.

Physical activity can also have a preventive effect on other diseases. Siscovick, LaPorte and Newman (1985) cite findings that sedentary populations have a much higher prevalence of noninsulin-dependent diabetes, compared with active populations. This has
been supported by Hensley, Ainsworth and Ansorge (1993), and by Koplan et al. (1989), who also found that exercise can help decrease the risks of stroke and hypertension. Blair (1993) states that a lower risk of mortality and an increase in longevity also accompany a physically active way of life.

Physical Activity and Physical Fitness Levels

Rowland (1990) asserts that intuitively, individuals who are more active in their daily lives should also possess greater levels of physical fitness. Although long-term studies on physical activity in children are limited, Bouchard et al. (1994) found that physically active children show better responses to standardized motor, strength, and aerobic power tests than inactive children. While much controversy surrounds standardized tests as a measure of fitness, the American College of Sports Medicine (1995) directly relates improvements in cardiovascular endurance with the frequency, duration, and intensity of exercise. ACSM specific recommendations include exercising for 20 minutes each day, three days a week, at 60 to 80 percent of cardiovascular capacity. A 1991 study by Sallis and McKenzie documents several elementary physical education studies. One intervention of 90 minutes of aerobic activities per week for nine months improved mile run times from pretest to posttest. Another incorporated four half-hour sessions per week of calisthenics, running, and skill-oriented physical education, and again improvements were noted in run times.

Rowland (1990) relates a study of high-active and low-active 9- to 10-year-old girls, in which the high-active group scored significantly better on tests for VO2max. A similar study by Sallis et al. (1993) found that more active children could run the mile in
less time than could those who were less active. According to the Consensus Statement on Exercise, Fitness and Health (Bouchard, Shephard, Stephens, Sutton & McPherson, 1990), the dimensions of the heart increase with habitual physical activity. Stroke volume increases as well, a factor which determines the maximal oxygen transport capacity and affects cardiovascular performance.

It should be noted that controversy exists regarding whether children have the capacity to increase cardiovascular endurance through training, and if training regimens exist that are designed to promote any increases in children. As Sallis et al. (1993) note, the average child appears to be active enough to meet average training guidelines. If children are habitually more physically active than adolescents and adults, a more intensive aerobic-training program may be required to induce significant improvements in cardiovascular fitness (Bouchard et al., 1994).

Muscular strength and endurance are important components of fitness because they are required in many daily activities (Bouchard et al., 1990). ACSM (1995) guidelines recommend that programs for the development of this component can help maintain or improve posture and prevent or reduce muscular low back pain.

Several studies document improvements in muscular strength and endurance following increased physical activity regimens. In a 10-week after-school program involving third and fourth grade students, subjects who participated in 30 to 35 minutes of aerobic games and exercises three times per week registered significantly greater improvements in muscular strength and endurance than the control group (Greene & Ignico, 1995). This is consistent with the AAHPERD (1989) conclusion that if fitness programs including activities designed to increase muscular strength and endurance are
implemented two to four times per week, significant improvements may be noted. A Belgian study (Pieron et al., 1996) found similar improvements after implementing daily physical education classes in elementary schools, and reports by Sallis et al. (1993) indicate that more active children did more sit-ups (a common indicator of muscular strength and endurance) than less active children on assessed measures of children’s physical fitness.

Physical Activity and Body Composition

Body composition is the relative percentages of body weight comprised of fat and fat-free body tissue. Several studies (AAHPERD, 1989; Bar-Or, 1987; CDC, 1997; Going, 1988; Plimpton, 1987) note a prevalence of obesity in today’s children, with obesity being defined as the level of body fat at which the risk of disease increases, specifically for coronary heart disease, as well as high blood pressure and diabetes mellitus. Auxter, Pyfer, and Huettig (1993) describe obesity as any excess of 20% or more above the ideal weight, and they emphasize that “there is impressive evidence that obesity in adults has its origin in childhood habits.” ACSM (1995) states that obesity-related health risks begin in the BMI range of 25 to 30 kg/m² for adults.

Another study (Gunnell, Frankel, Nanchahal, Peters & Smith, 1998) found that the increased risk of those with higher childhood BMI may reflect a continuation of their relative overweight status into adulthood, adding that “childhood overweight is associated with increased mortality risk in later life.” This is echoed by Solomon, Willett and Manson (in VanItallie & Simopoulos, 1995) who discuss data indicating a significant effect of adolescent obesity on later coronary disease and mortality.
Blair (1993) cites a study with findings that men and women who were sedentary at both baseline and follow-up (10 years later) were much more likely to experience significant weight gain. According to ACSM (1995), it is well-established that excess body fat is harmful to health. Bouchard et al. (1994) summarizes several small-scale laboratory studies indicating that percentage of body fat and fat mass are significantly correlated with blood lipid, lipoprotein, insulin levels, and blood pressure.

Most programs focused on reducing obesity levels involve a reduction in caloric intake, as well as an increase in energy expenditure through exercise. Due to concern about the effects of caloric restriction on normal growth, Rowland (1990) sees physical activity as a particularly attractive therapeutic modality. The Surgeon General’s 1996 Report on Physical Activity and Health states that physical activity may favorably affect body fat distribution. Reviews by Blair (1993) support the idea that increases in activity or fitness are inversely associated with weight change, and numerous studies have indicated that children who are more fit and more active tend to be leaner and have lower blood pressure levels, as cited by Sallis and McKenzie (1991). They also state that increasing physical activity in children could play a role in preventing further increases in childhood obesity.

A recently-published study (Gortmaker, Peterson, Wiecha, Sobol, Dixit, Fox & Laird, 1999) found that obesity prevalence among female students declined following a two-year school-based interdisciplinary intervention which included an increase in moderate and vigorous physical activity in middle-school students.

Measures of body composition may include the sum of skinfolds and body mass index (BMI). Skinfold thicknesses are associated positively with overall percentage of
body fat (Pate, 1991). One elementary physical education study (Sallis & McKenzie, 1991) found that 75 minutes per week of aerobic activities led to decreases in skinfolds. Utilizing height and weight measurements to compute the BMI for children has been done with high interage correlations (Simon, Sarkin, Sallis & McKenzie, 1998). Their study found that BMI was the highest and most stable correlation of body composition measures for boys, although they found that the sum of skinfolds also tracked well. They added that the level of tracking of body composition measures for girls was similar to that of boys, with BMI being the highest and most stable. Andersen et al. (1998) concur, citing that BMI is significantly related to the percentage of body fat and total body fat in boys and girls.

**Perceived Competence and Participation in Physical Activity**

Prevalent theory holds that regular physical activity involves more than just physiological benefits. Regular physical activity also contributes positively to mental health and to self-assessed physiological health (Bouchard et al., 1990). While Fox (1997) cautions that perceived competence changes are not necessarily reflected in actual changes in physical skill or fitness, Greene and Ignico (1995) cite studies that have reported increases in childhood self-concept due to physical activity intervention (although they maintain that scientific evidence describing relationships between physical activity and self-concept in children has been inconclusive, and even contradictory). However, a potential relationship exists between physical activity and perceptions of competence, although it has not been determined whether physical activity affects perceived competence or whether perceived competence affects participation in physical activity.
Kimiecik, Horn and Shurin (1996) agree that perceived physical competence, among other factors, is intimately linked to children’s motivation, choice of activities, or frequency of physically active behavior. A review of studies by Daley and Parfitt (1996) has noted that exercise has a positive influence on self-esteem and self-perceptions. Rowland (1990) also emphasizes evidence that exercise can affect changes in self-perception. He cites a review of studies revealing that, overall, physical fitness activities were significantly related to improvements on test scores of self-concept. This held true for healthy children as well as for those who were emotionally disturbed, mentally retarded or perceptually handicapped, although the effect was greater in the latter three groups.

From the standpoint that participation in physical activity relies heavily on perceptions of competence, the Surgeon General’s Report (CDC, 1996) found that consistent influences on physical activity patterns among adults and young people include confidence in one’s ability to engage in regular physical activity (e.g., self-efficacy) and perceptions of physical or sport competence. Results of one study (Williams & Gill, 1995) revealed that task goal orientation, perceived competence, and interest significantly related to effort. Kimiecik et al. (1996) note that the degree to which children participate in physical activity is most strongly related to their perceptions concerning their fitness competence. Another study (McKiddie & Maynard, 1997) relates how children’s perceptions of their ability will influence their achievement motivation. Brustad (1991) emphasizes that to voluntarily engage in physical activity, children must possess favorable self-perceptions regarding their personal capacities in this domain. And the Consensus Statement on Physical Activity, Fitness, and Health (Bouchard et al., 1994) found that
efficacy cognitions have consistently been shown to be important determinants of physical activity and exercise behavior.

According to Fox (1997), developments in physical self-perception instrumentation have produced much richer profiles, allowing, among other things, documentation of links between the physical self and related behaviors. Harter’s (1985) Self-Perception Profile for Children (SPPC) falls under this category. Whitehead and Corbin (1997) write that Harter’s early work necessarily required considerable development of instrumentation, adding that the publication of her findings has enabled a wider understanding of the development and role of self-worth. Harter’s Competence Motivation Theory (1978) suggests that the perceptions individuals hold of themselves may affect motivational influences to participate in sport and exercise. She predicts that those high in perceived physical competence will be more likely than others to participate in physical activity and sport (Biddle, 1997).

Several studies utilize variations of Harter’s (1985) SPPC. A study by Worth-Gavin and Herry (1996) focusing on the generalizability of the SPPC suggests the potential of this instrument to serve as a useful tool for researchers and educators within various cultural and linguistic environments. Kimiecik et al. (1996) found that children’s cognitions and beliefs about themselves in relation to fitness activities (specifically perceived fitness competence) are significantly related to their self-reported moderate-to-vigorous physical activity.

A study by Papaioannou (1997) focused on students who did and did not participate in out-of-school sport activity, finding that those who were *not* involved had lower scores on measures of perceived physical competence. Fourth and fifth grade
participants in organized sport reported significantly higher levels of self-esteem than non-participants, as cited by Weiss and Ebbeck (1996). Hatfield, Vaccaro and Benedict (1985) conducted measures of self-concept on nine- to eleven-year-olds before and after eight weeks of participation in a guided exercise program of precision rope jumping, finding a significant improvement in self-concept after engaging in the program. And another study (Schumaker, Small & Wood, 1986) found that high school athletes had significantly higher self-concept scores than nonathletes. Indirect results discovered by Williams and Gill (1995) stated that feelings of competence lead to greater intrinsic interest, which in turn lead to greater effort. However, Sarlin, Telama, Bovellan and Romppainen (1990) found no differences in perceived competence between first- and second-grade students who participated in one physical education lesson each week and those who attended five physical education classes a week.

There has been some discussion regarding the effect of gender on levels of perceived competence in children. However, one study performed with younger participants did not demonstrate any gender differences (McKiddie & Maynard, 1997), while Brustad (1996) found that fourth-, fifth-, and sixth-grade boys had higher levels of perceived physical competence than girls. In Self-Perceptions of Athletic Competence and Physical Appearance Among Children (Research Quarterly for Exercise and Sport, 1994), boy-girl differences in perceptions of athletic competence were significant at grades 3 and 4 but not at grades 5 and 6, although a study by Williams and Gill (1995) found that males tended to score higher on perceptions of competence in grades 6, 7 and 8. From information gathered in cited studies, the researcher will assume that gender differences

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will not occur on measures of perceived competence in the fifth-grade students used for this study.

In this study, perceptions of competence will be deemed interchangeable with self-perceptions, self-concept, self-esteem, and self-efficacy. As Weiss and Ebbeck (1996) state:

Improvement in physical ability produces positive self-efficacy which subsequently increases perceived physical competence which, in turn, enhances self-esteem. Self-esteem might also be enhanced as a function of greater physical acceptance which results from increased perceived competence (p. 369).
Chapter Three: Methodology

Setting

Data collection occurred in fifth grade regular and physical education classrooms in western and central Montana.

Subjects

This study involved sampling of fifth graders from southwestern and south-central Montana, with approximately half of the subjects attending physical education classes three times per week and the other half attending PE classes one time per week.

Of 222 potential subjects, 122 students returned completed consent forms. Of these, 21 were disqualified due to incomplete data. The final study included fifth-grade students who had physical education classes three times per week (n=48) and fifth-grade students who had physical education classes one time per week (n=53). The schools were chosen on similar school populations, physical education principles and objectives and the cooperation of participating teachers and administrators.

Those students who attended physical education classes three times per week came from three classrooms in two elementary schools in south-central Montana. The population of the town was 7,509 in 1996 (Estimates of the Population of Places, 1996), with a current fifth grade population of 127 students. The same physical educator was responsible for instruction in both schools. Physical education consisted of individual and team sports, including games, stunts/tumbling, dancing, track and field, orienteering, modified volleyball, floor hockey and basketball, as well as a variety of motor skill
acquisition. Fitness activities included walking/running, circuit training and rope jumping, which were practiced on a consistent basis. A physical fitness test was conducted by the physical educator in the fall and again in the spring.

Those students who had physical education classes one time each week came from four classrooms at one elementary school in southwestern Montana. The 1996 population of this town was 4,382 (Estimates of the Population of Places, 1996), but the current fifth grade population is 95. Once again, the same physical educator served all involved classes. Physical education in this school stressed physical fitness and consisted of a variety of team sports, including relays, basketball skills, flag football, soccer, whiffleball, kick ball, hockey and others. Fitness activities included exercises for flexibility and muscle strength and endurance, and students participated in running on a consistent basis. A physical fitness test was conducted by the physical educator four times throughout the school year.

All classes were taught by a certified physical education specialist. Because of the nature of sampling for this study, the results may be generalized to populations of fifth grade students with similar geographic and economic factors as fifth grade students in western and central Montana. Fitness measures were collected by the physical education instructors, with the self-perception survey administered in the classroom by the primary investigator.

**Component 1: Cardiovascular Endurance**

Cardiovascular endurance was assessed using the one-mile run/walk testing protocol and instructions established by AAHPERD (1989). Students were instructed to
run/walk one mile at the fastest pace possible. Walking was permitted, but emphasis was placed on moving at the fastest pace that could be sustained for the entire one-mile distance. Students were given opportunities to practice running/walking for the required distance during physical education classes prior to the test day. Students stretched prior to beginning the test. As each student crossed the finish line to complete the test, elapsed time was recorded by the tester. Students completing the test were given adequate opportunity to cool down by walking slowly, followed by stretching. The one-mile run/walk was scored in minutes and seconds.

Standards for the one-mile run/walk have been established by AAHPERD (1989) and are included in Appendix A. Marshall, Sarkin, Sallis and McKenzie (1998) state that the mile run is the most reliable \((r=0.95)\) and valid \((r=-0.73)\) field test of aerobic capacity in children.

**Component 2: Muscular Strength and Endurance**

Muscular strength and endurance was measured by the number of modified sit-ups each student performed in one minute. Students lay on their backs with knees bent, feet on the floor, heels 12-18” from the buttocks. Arms were crossed and held against the chest with the hands on the opposite shoulders and the chin tucked to the chest. Feet were held by a partner who was instructed to keep the student’s feet in contact with the testing surface. On the command “Ready, go!” the student curled to a sitting position, keeping the arms in contact with the chest. A sit-up was completed each time the elbows touched the thighs. The student returned to the down position by “uncurling” until the midback made contact with the testing surface. Students were encouraged to repeat as
many correct modified sit-ups as possible in the one-minute time limit. Resting between modified sit-ups was allowed in either the up or down position. The number of correct modified sit-ups was counted by both the student and the partner holding the feet.

Validity and reliability for this test are documented in the Fitnessgram Technical Reference Manual (1988). According to the Manual, "the curl-up test possesses logical (i.e., content and construct) validity as a test of abdominal strength/endurance," and reliability coefficients are as high as .94. Fitness standards for the modified sit-up, as set forth by AAHPERD's guide to Physical Fitness Education and Assessment (1989) can also be found in Appendix A.

Component 3: Body Composition

Body composition was determined utilizing body mass index (BMI), which assesses weight relative to height. BMI is calculated by dividing body weight in kilograms by height in meters squared (wt/ht²). Height in inches and weight in pounds was collected by school personnel, and measurements were rounded to the next highest whole number prior to being entered into the weight and height equation.

According to ACSM (1995), BMI is a relatively good indicator of total body composition in population-based studies and is related to health outcomes. To determine the validity of BMI as a measure of fatness independent of age for both sexes, Pietrobelli (1998) found that BMI was strongly associated with total body fat (0.85 for boys, 0.89 for girls) and percent of body weight as fat (0.63 for boys, 0.69 for girls). Using 198 children and adolescents between 5 and 19 years of age, the results supported the use of BMI as a fatness measure in groups of children and adolescents. In addition, AAHPERD (1989)
discusses findings indicating that changes in skinfold measurements and BMI were shown to be moderately correlated, although Twisk, Kemper, van Mechelen, Post and Lenthe (1998) warn that results obtained with BMI as indicators of body fatness should be interpreted cautiously.

Due to the ease of data collection and for comparison purposes only, the primary investigator chose to use BMI as a measure of body composition instead of skinfold measurements.

AAHPERD lists fitness standards for body composition, which can be found in Appendix A.

Component 4: Perceptions of Physical Competence

Perceived physical competence was assessed using the Athletic Competence subscale of the Self-Perception Profile for Children (Harter, 1985). This scale, which can be found in Appendix B, assesses the degree to which individuals view themselves as competent in games and sports skills, and it consists of six items organized in a structured alternative format. First, children were asked to choose which of two kids they were more like (e.g., “Some kids feel that they are better than others their age at sports, but other kids don’t feel they can play as well”), and then to mark whether this statement was sort of true or really true for them. Scores were represented on a 4-point Likert scale, ranging from 1 (low perceived competence) to 4 (high perceived competence). Total scores can range from 6 to 24 points. The Athletic Competence subscale has demonstrated reliability coefficients up to .86 (Harter, 1985). Previous work by Harter (1982) documents validity coefficients of .80.
Research Design

In cooperation with elementary school administrators in western and central Montana, elementary physical education instructors were contacted as to the class size, frequency of days and curriculum content of their fifth grade physical education programs. The objective was to identify two groups of students who shared similarities among the previously-mentioned factors, who mainly differed in the amount of physical education instruction they received each week. Upon identifying qualifying classes, those teachers and administrators whose classes were included in either of the two groups were given written information regarding the nature and purpose of the study.

In March 1999, the primary investigator visited each class and sent consent forms home with the students. Parents were given a description of the study, including the variables to be measured, with instructions to return the consent form to the child’s physical education teacher (see Appendix C).

Cardiovascular Endurance Testing began in late March for cardiovascular endurance and muscular strength and endurance. The children were required to complete the one-mile run/walk on an outdoor course that was accurately measured and marked. Before completing the run, the children were instructed regarding appropriate pacing and running tactics and were led through a warm-up routine consisting of stretching exercises. The physical education instructor kept track of the laps completed for each child, provided encouragement for maximal effort, and recorded the time required to complete the mile in minutes and seconds.

Muscular Strength and Endurance The number of modified curl-ups the student completed in one minute measured muscular strength and endurance. A partner
anchored the feet during the curl-ups, and the student and partner both counted the number of curl-ups completed in one minute.

**Body Composition** Testing for body composition also occurred in late March. In a private area, the physical education instructor weighed each child and recorded height as the child stood against a measuring tape affixed to the wall. The primary investigator took measurements of students who were missed during recording by the physical education instructor. Scores were kept confidential, and were later converted into BMI (Body Mass Index).

**Perceived Physical Competence** Testing occurred in late March for self-perceived physical competence as well. Surveys were administered by the primary investigator in a classroom during the physical education class period, with non-participants continuing on to regular physical education class. The importance of answering each question honestly was stressed, and students were reminded that there were no wrong answers and that their responses would remain confidential. The investigator explained the format of each questionnaire. The option was presented for each item to be read aloud by the investigator, with some classes choosing to read the questions to themselves. Students were encouraged to answer each question as it was read. Upon completion of the questionnaire, students were asked to turn their surveys over and list their individual and group sports activities during the summer and school year. This information was collected to control for physical activity outside of the physical education classroom.
Statistical Procedures

The primary purpose of this study was to determine whether the frequency of physical education classes could be related to scores in specific areas. Specifically, it was hypothesized that students who attend physical education classes three times per week would have lower one-mile run/walk times, complete a higher number of modified sit-ups in one minute, have lower BMI, and score higher in perceived athletic competence compared to students who attend physical education classes one time per week. A GB-Stats program was utilized to calculate means, and a Student t-test tested for significance. Group means and standard deviations were presented in each of the dependent variable areas, and data were separated by gender within the groups as well.
Chapter Four: Results

Data was collected on 101 fifth-grade students. Their descriptive data is found in tables 1-4.

Hypothesis One

*Fifth grade students who attend physical education classes at least three times per week will demonstrate significantly lower one-mile run/walk times than those who attend physical education classes one time per week.* Table 1 indicates how each set of subjects scored on the one-mile run/walk.

Table 1

<table>
<thead>
<tr>
<th>Subjects’ Mean One-Mile Run/Walk Scores</th>
<th>(in minutes and seconds)</th>
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<tbody>
<tr>
<td></td>
<td>all</td>
</tr>
<tr>
<td>3x/week</td>
<td>10:47</td>
</tr>
<tr>
<td>1x/week</td>
<td>9:48*</td>
</tr>
</tbody>
</table>

*=significant differences between groups (p<.05)

As the variances for the two groups were different, a separate variance t-test (one-tailed) was run on these scores at the p=.05 level of significance to determine if the differences were statistically significant. The students who attended physical education classes three times a week had significantly higher one-mile run/walk times than those students who attended physical education classes one time a week (p=.03). This was the
direct opposite of what was hypothesized, and therefore the hypothesis was not supported.

Hypothesis Two

*Fifth grade students who attend physical education classes three times per week will record a significantly higher number of curl-ups accomplished in one minute than those who attend physical education classes one time per week.* Table 2 indicates how each set of subjects scored on the modified curl-up assessment.

Table 2

<table>
<thead>
<tr>
<th>Subjects' Mean Modified Curl-up Scores</th>
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<th>females</th>
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<tr>
<td>3x/week</td>
<td>42.5</td>
<td>42.3</td>
<td>42.6</td>
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<tr>
<td>1x/week</td>
<td>44.4</td>
<td>46.1</td>
<td>43.1</td>
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</tbody>
</table>

A Student t-test (one-tailed) was run on these scores at the $p=.05$ level of significance to determine if the differences were statistically significant. Although students who attended physical education classes three times per week scored *lower* on modified curl-ups than students who attended physical education classes one time per week, the difference was not significant ($p=.17$). This hypothesis was not supported.

Hypothesis Three

*Fifth grade students who attend physical education classes three times per week will have significantly lower levels of body fat, as calculated by body mass index (BMI)*
using height and weight measurements, than those who attend physical education classes one time per week. Table 3 indicates BMI scores for each group of subjects.

Table 3

<table>
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<th></th>
<th>all</th>
<th>males</th>
<th>females</th>
</tr>
</thead>
<tbody>
<tr>
<td>3x/week</td>
<td>18.67</td>
<td>19.10</td>
<td>18.30</td>
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<tr>
<td>1x/week</td>
<td>17.56*</td>
<td>17.3*</td>
<td>17.72</td>
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</tbody>
</table>

*=significant differences between groups (p<.05)

A one-tailed student t-test was conducted at the p=.05 level of significance to determine if the differences between the collected scores were statistically significant. Students who attended physical education classes three times per week actually had significantly higher BMIs than students who attended physical education classes only one time per week (p=.04). This was again directly opposite of the hypothesized results, and this hypothesis was rejected.

Hypothesis Four

Fifth grade students who attend physical education classes three times per week will demonstrate significantly higher scores on the Athletic Competence subscale from Harter's Self-Perception Profile for Children (SPPC) than those who attend physical education classes one time per week. Subjects’ scores on their perceptions of athletic competence can be found in Table 4.
Table 4

Subjects’ Mean Perceived Athletic Competence Scores

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<th></th>
<th>all</th>
<th>males</th>
<th>females</th>
</tr>
</thead>
<tbody>
<tr>
<td>3x/week</td>
<td>2.99</td>
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<tr>
<td>1x/week</td>
<td>2.97</td>
<td>3.01</td>
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</table>

For this Likert-scale questionnaire, a Mann-Whitney U test was conducted at the p=0.05 level of significance to determine if the differences between the collected scores were significant. Although those students who attend physical education class three times a week had higher levels of perceived competence overall than students who attend physical education class once a week, the differences were not significant (p=0.33). Neither the male nor female populations differed significantly, and therefore this hypothesis was rejected.
Cardiovascular Endurance

The purpose of this preliminary study was to examine the effect of multiple physical education classes on fitness levels and perceived competence in fifth grade students. This study demonstrates that those students who attend physical education classes one time each week have significantly (p=.03) better scores on tests for cardiovascular endurance (table 1) than those students who attend physical education classes three times per week. This result was the opposite of what was hypothesized, although Greene and Ignico (1995) found that a 10-week fitness intervention did not cause a significant difference in cardiovascular endurance between the experimental and control groups. Hatfield et al. (1985) also found no change in cardiovascular fitness following an eight-week jump-rope program. Several factors may have influenced the results of this physical education study, including study sample, teacher emphasis and outside activities.

Although the two sample populations came from similar-sized schools, regional effects may have influenced the results. Those students who attend physical education one day each week live in a predominantly agricultural region. These students may spend much of their summers and free time participating in outdoor activities related to agriculture. On the other hand, those students who attend physical education classes three days each week live in a town that has evolved around the railroad business. The children from this town may be less likely to spend free time outdoors.
For this reason, it may have been more appropriate to track improvements in cardiovascular fitness over the course of the school year. Pieron et al. (1996) point out that tracing pupil's development, from the starting level at the beginning of the school year, appears to allow isolation of the part played by children's activities within the school environment. Even allowing for outside aerobic activities during the school year, different results may have been obtained if fitness measurements were taken at the beginning and the end of the school year. This may have painted a more accurate picture of how participation in multiple physical education classes each week affects children over the course of six months, while allowing for existing fitness levels at the beginning of the school year.

Every physical education instructor has different methods and theories of teaching. Although for this study every attempt was made to find two groups of physical education students who received similar instruction, physical education teachers are not exactly the same. Sallis and McKenzie (1991) conclude, based on an overview of studies, that the majority of children are not very active during scheduled PE time. While students who have physical education classes three times a week may spend more actual time in PE class, their instruction may have a game-oriented emphasis, with little cardiovascular engagement. On the other hand, students who attend physical education class once a week may spend half or more of their 40-minute class period engaging in cardiovascular exercises, with less time spent on games. In this manner, those students who have PE class once a week may actually receive more cardiovascular exercise, which would improve their subsequent performance on tests of cardiovascular endurance. In addition, the instructor of those who attend physical education classes one day a week may
emphasize the importance of being fit and exercising outside of class more so than the instructor who teaches the children PE three days a week.

During administration of Harter’s questionnaire, subjects were asked to list those individual and group aerobic sports activities in which they participated outside of physical education class. This list included activities from the summer prior to the current school year and all after-school aerobic sports activities sponsored throughout the school year. Students who attended physical education classes only one time each week participated in a total of 204 outside sports activities, compared to only 172 by those students who had PE three times each week.

According to Pieron et al. (1996), participation in sports activities outside of school may influence the results of the children in these classes. They continue on to say that the emphasis upon competition found in sports clubs is generally reflected in higher performance requirements in a particular sport. Therefore, according to their study, this encourages participants to increase the intensity of practice. As found in these results, students who attend PE classes only one time each week also participate in more aerobic activity outside the physical education classroom. This participation in a competitive setting, where students are encouraged to improve performance, may have a direct result on their tests for cardiovascular endurance.

Muscular Strength and Endurance

This study demonstrates that no significant differences (p=.17) exist in the amount of modified curl-ups completed by students attending physical education classes three times each week and the number completed by students attending physical education
classes one time each week (table 2). This did not support the hypothesis, which predicted that the students who attended PE class three times each week would have a significantly higher number of curl-ups.

Findings by Greene and Ignico (1995) supported the existing hypothesis, as their study of a 10-week fitness intervention showed significant improvements in the number of sit-ups completed by the experimental group when compared to the control group. However, muscular strength and endurance may be subject to the same outside factors as cardiovascular endurance. The regional differences of agriculture versus industry may affect muscular strength and endurance, as students from an agricultural area (who attend physical education classes one day a week) may engage in activities that work the torso and abdomen and that increase muscular strength and endurance. This may balance out the muscular strength and endurance that is developed in class by those students who attend PE classes three days a week, who don’t spend as much time participating in outdoor activities. As a result, both groups may have similar scores on measures of muscular strength and endurance.

Instructor methods may play a part in this difference as well. The possibility exists that students who attend physical education classes one time each week spend the same amount of time in one class working on muscular strength and endurance activities as those students who spend three days a week in physical education classes.

In the same way as outside activities potentially impact cardiovascular fitness, muscular strength and endurance may be affected as well. Most aerobic sports activities require a warm-up of a cardiovascular nature, followed by flexibility and muscle strengthening exercises. Since the students in this study who have PE one day a week
engage in more outside aerobic activities than the students who have PE three days a week, it is possible that through those activities they receive more opportunities to work on muscular strength and endurance, which in turn balances out the improvements made in the same areas of fitness as those who attend physical education classes three days a week.

**Body Composition**

Results of this study indicate that students who attend physical education classes three times per week have significantly (p=.04) higher levels of body fat than those students who attend PE classes one time each week (table 3). This was directly opposite of the hypothesis, which predicted that students receiving physical education three times a week would have significantly lower levels of body fat than those receiving physical education one time each week.

These significant findings are in contradiction with a 1998 study (Harrell, Gansky, McMurray, Bangdiwala, Frauman & Bradley) which implemented an aerobically-oriented physical activity program (as well as health and nutrition information) three times a week. While skinfolds were slightly but significantly lower than the control group in both intervention groups, there were no significant changes in BMI throughout the three groups.

However, Gortmaker, Peterson, Wiecha, Sobol, Dixit, Fox and Laird (1999) found that obesity prevalence among female students was significantly reduced following a two-year intervention, while there was no significant difference in outcome for males. Obesity in this study, which altered key physical activity and dietary risk factors, was measured using body mass index as well as triceps skinfolds. Using the same format as this study,
results of the primary physical education study may have been different if baseline data had been collected at the beginning of the school year. This would have isolated any differences that occurred due to the frequency of the physical education classes, while allowing for existing fitness levels at the beginning of the school year.

Other factors that affected the previous two fitness variables may have played a part in the BMI results as well. Regional differences may lead the students who attend physical education classes one time each week to engage in more outdoor, labor-intensive activities, compared to those students who attend PE classes three times each week. Sallis (1987) references a study finding that physical activity has an effect on reductions in obesity, and the Surgeon General’s Report (CDC, 1996) states that physical activity may favorably affect body fat distribution. And Paffenbarger and Hyde (1984) write that exercise is known to affect body mass consistencies, among other factors.

Teacher emphasis on aerobic exercise, as well as time spent in the physical education classroom on cardiovascular and muscular strength and endurance activities, may affect body composition. And participation in aerobic activities outside the school setting may have caused the difference in results as well.

Another factor that may impact the fitness of children is existing socioeconomic status. According to Brustad (1996), “socioeconomic level may be a particularly important mediating variable affecting the physical activity involvement of parents and children.” A study by van de Mheen, Stronks, Looman and Mackenbach (1998) found that the risk of overweight is higher in those who were raised in a lower childhood socioeconomic group, and that the risk of no physical exercise is much higher in these groups. Another study (Guillaume, Lapidus & Lambert, 1998) also suggests that a poor
socioeconomic status of a family is associated with undesirable food habits and low physical activity of the children, both predisposing for obesity. While those students who attend physical education classes three times a week are not at the poverty level, 1993 data (Small Area Income & Poverty Estimates Program, 1999) for this town lists the median household income as $24,365. Compared to the median household income for those students who attend PE one day each week ($26,181), those students receiving PE three days a week have a 7% lower household income. Reflecting on those studies by van de Mheen et al. (1998), Guillaume et al. (1998), and others, this decreased socioeconomic status may lead those children who attend PE three days a week to be less active outside of school, which may cause higher levels of body fat.

**Perceived Physical Competence**

Results of this study (table 4) demonstrate that students who have physical education three times a week do not score significantly higher on measures of perceived competence than students who have PE one time each week (p=.33). This supports research by Sarlin et al. (1990), who found no difference between the control and experimental groups in perceived competence. Following an intervention of daily physical education in the experimental group, the authors conclude it cannot be said that daily physical education raised the children’s perceived physical competence.

A study by Hatfield et al. (1985), however, found a significant improvement in self-concept scores after engaging in an eight-week precision jump-rope program. And a review of studies by Daley and Parfitt (1996) has noted that exercise has a positive influence on self-esteem and self-perceptions.
One possible explanation for not finding significant differences between the two groups of students involves the amount of time each group spends in physical activity. Although those students who attend physical education classes three times each week may score at a certain level on measures of perceived competence due to the frequency of their bouts of physical exercise in class, those students who attend PE once a week may score at or near that same level due to their increased involvement in aerobic activities outside of school. Weiss and Ebbeck (1996) found that fourth and fifth grade participants in organized sport reported significantly higher levels of self-esteem than non-participants. This may indicate higher ratings of perceived competence in those students who participate in outside aerobic activities more frequently.
Chapter Six: Conclusions

Although the findings from this study are contrary to what the primary investigator believes to be true, these results are not sufficient reason to abandon these beliefs. This study was a primary step toward studying the effects of the frequency of elementary physical education, and the responsibility now falls on another investigator to narrow the subject further.

It contradicts the instincts of the primary investigator, as well as information gathered during a review of literature, to suppose that fewer elementary school physical education classes each week promote higher fitness levels in students. It is evident to the primary investigator that more than the frequency of physical education classes is responsible for fitness measures and perceived athletic competence in elementary school children. There were factors in this study that were not feasible for the primary investigator to control, including the out-of-school environments of the subjects and the specific, isolated effects of the physical education class. Several other factors may have impacted childrens' physical fitness measures in addition to the frequency of PE classes. These unanticipated factors include differences in curriculums and teaching emphasis, opportunities for aerobic activity outside of class, socioeconomic factors and regional differences. The primary investigator would not be able to abandon the original hypotheses regarding frequency set forth at the onset of this study without testing for the effects of these factors. While the content of an elementary physical education program is certainly important, the frequency of classes must play a part in the resulting physical fitness measures in students as well.
In spite of the results of this study, a final justification for frequent physical education is that school physical education is the only preparation most children will have in how to develop an active lifestyle (Sallis & McKenzie, 1992). This is echoed by Schiemer (1996), in that “quality physical education programs help students develop an active lifestyle by encouraging physical activity outside the scheduled physical education class.”

Implications for Future Research

Although the results of this study disproved each existing hypothesis set forth at the beginning of the research project, several factors emerged that may provide direction for future research. The fact that fifth grade students who attend physical education classes three times a week didn’t score significantly better on measures of fitness and perceived competence than students who attend PE once a week indicates that other factors may have an effect on students in physical education classrooms. The content of a physical education program may be more beneficial than frequency when dealing with elementary school physical education.

For this reason, the primary investigator suggests that both groups of subjects be taught by the same physical educator, using the same curriculum. Both groups should ideally be from the same school, or at least the same town. This will help control for influential variables such as regional effects, instructor emphasis and objectives, aerobic activities outside of the school setting and socioeconomic status.

In addition, the investigator would recommend that baseline testing for fitness and perceived competence take place at the beginning of the school year, as well as toward the
end of the school year. This would allow for existing fitness levels at the beginning of the study, and would isolate more fully the effects of multiple physical education classes on fifth grade students.
## Appendix A

### Health Fitness Standards

#### Health Fitness Standards - Girls

<table>
<thead>
<tr>
<th>Age</th>
<th>One-Mile Run</th>
<th>Skinfolds</th>
<th>BMI</th>
<th>Sit &amp; Reach (cm)</th>
<th>Sit-ups</th>
<th>Pull-ups</th>
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#### Health Fitness Standards - Boys

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<th>Age</th>
<th>One-Mile Run</th>
<th>Skinfolds</th>
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Appendix B

Harter's Athletic Competence Subscale

**What I Am Like**

<table>
<thead>
<tr>
<th>Really True for Me</th>
<th>Sort of True for Me</th>
<th>SAMPLE SENTENCE</th>
<th>Sort of True for Me</th>
<th>Really True for Me</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some kids would rather play outdoors in their spare time</td>
<td>Other kids would rather watch T.V.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Some kids do very well at all kinds of sports **BUT** Other kids don't feel that they are very good when it comes to sports

2. Some kids wish they could be a lot better at sports **BUT** Other kids feel they are good enough at sports

3. Some kids think they could do well at just about any new sports activity they haven't tried before **BUT** Other kids are afraid they might not do well at sports they haven't ever tried

4. Some kids feel that they are **better** than others their age at sports **BUT** Other kids don't feel they can play as well

5. In games and sports some kids usually watch **BUT** Other kids usually play instead of play rather than just watch

6. Some kids don't do well at new outdoor games **BUT** Other kids are good at new games right away
Appendix C

Informed Consent Statement

Your child’s participation is requested in a research study conducted by a University of Montana graduate student. The University of Montana supports the practice of protection for research subjects. The following information is provided so that your child can decide whether or not to participate in the present study. Your child should be aware that even if he/she agrees to participate, he/she is free to withdraw at any time without question.

This study focuses on the effects of frequent physical education classes on physical fitness and self-perceptions. Your child will be asked to fill out a questionnaire during a Health Enhancement class period. The survey questionnaire is the athletic competence subscale of Harter’s Self-Perception Profile for Children, and is comprised of six (6) questions. The purpose of the survey is to gather information on how the child feels about his/her athletic abilities. The questionnaire is on file with your child’s Health Enhancement teacher and you may view it at any time before or after the study.

Some of your child’s physical fitness test scores will be obtained from the Health Enhancement teacher for use in this study, specifically his/her one-mile run/walk time and the number of modified sit-ups completed in one minute. In addition, your child’s height and weight measurements will be collected. The purpose of gathering these fitness components is to gain information dealing with a child’s overall fitness level.

Your child’s participation in this study is solicited, but it is strictly voluntary. Be assured that your child’s name will not be associated in any way with the research findings. The survey questionnaire and the fitness measurements are confidential and individual responses will not be identified. The results will be reported in group form by age, gender, and school, and individual names will not be associated with results. Again, no name identification will occur with this information.

Although there is no foreseeable risk to your child, the following paragraph is required by The University of Montana: In the event that your child is injured as a result of this research, he/she should individually seek appropriate medical treatment. If the injury is caused by negligence of the University or any of its employees, you may be entitled to reimbursement or compensation pursuant to the Comprehensive State Insurance Plan established by the Department of Administration under authority of M.C.A., Title 9. In the event of a claim for such injury, further information may be obtained from the University Claims Representative or University Legal Counsel.

If your child is interested in participating in this study, please print your child’s name and sign your name on the spaces provided below. Your child will need to sign the form as well. No children can participate unless this form is signed and returned to your child’s Health Enhancement teacher. Students not participating in this study will be given alternative activities during the administration of the survey. Please do not hesitate to ask questions about this study.

Your participation is greatly appreciated.

Sincerely,

Nicole Sutton Donally, graduate student
Health and Human Performance
The University of Montana
Missoula, MT 59812
(406)243-6958

Parent/Guardian Signature: ____________________________________________________________

Child’s Name: _______________________________________________________________________

Child’s Signature: ___________________________________________________________________

Child’s Name: _______________________________________________________________________

Parent/Guardian Signature: _____________________________________________________________
Appendix D

IRB Summary

Nicole Sutton Donally
IRB Checklist
November 1998

1. The purpose of this study is to gather information to determine the influence of frequent physical education classes on fifth grade students’ one-mile run/walk times, modified sit-ups completed in one minute, percent body fat, and perceived physical competence levels. The study is undertaken to investigate if the frequency of elementary physical education classes (i.e. a minimum of three days per week as opposed to one day per week) has any bearing on physical fitness and perceptions of physical competence.

2. The subjects will be fifth grade students from elementary schools in western Montana. The age range will be approximately 10-12 years of age. They will be volunteers who come from members of the normal school population enrolled in Health Enhancement classes.

3. An informed consent letter will be passed out in class soliciting volunteers for the study. The letter will be taken home and if the parties agree to participate in the study, the letter will be signed by the parent/guardian, as well as the student, and returned to the child’s Health Enhancement teacher at school.

4. The students will complete the one-mile run/walk and modified sit-ups during a Health Enhancement class period at their elementary school location, and percent body fat measurements will be obtained at that time as well. These scores/measurements will be obtained from the Health Enhancement teacher by the researcher. The students will fill out the perceived competence questionnaire during their Health Enhancement class period.

5. The one-mile run/walk and modified sit-ups per minute are common components of physical fitness tests and are conducted by the Health Enhancement teacher four times per year in most schools. Subjects will complete these fitness tests as part of Health Enhancement class requirements. Percent body fat measurements involve the summation of skinfold thickness at the triceps and calf areas using calibrated skinfold calipers. Both of these sites are easily accessible when the student is wearing a t-shirt and shorts, such as is worn for Health Enhancement class. Three separate measures will be obtained and a final score will be obtained by adding the median scores of the two sites.

Subjects will fill out Harter’s Self-Perception Profile for Children. This questionnaire asks the students to designate how they view themselves in terms of scholastic competence, social acceptance, athletic competence, physical appearance, behavioral conduct, and global self-worth. The rating scale is a four-point scale. There are no right or wrong answers to this questionnaire. Children will complete the questionnaire privately and all results will be confidential (no names will be revealed or associated with the individual scores).

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6. The researcher hopes to find out if increased frequency of physical education classes leads to improved health benefits in elementary students, specifically an increase in physical fitness scores, a decrease in percent body fat, and an increase in perceived physical competence. The researcher also hopes to utilize the results to emphasize the importance of regular physical education classes for all elementary school students.

7. The researcher does not foresee any risks or discomforts related to the administration of the questionnaire; it is completed privately and there are no right or wrong answers. The physical fitness measurements are the responsibility of the Health Enhancement teacher and the researcher does not have a role in the administration of these measurements. The measurement of percent body fat may cause some students to feel uncomfortable and uneasy, and therefore will be done in private.

8. Any discomfort caused by measurement of percent body fat will be alleviated by not allowing other students to watch the recording of skinfold measurements. Students will be assured that at no time will measurements be made available for others to view and that their names will not be associated with the data collected, and that this is true for the physical fitness scores and the questionnaire as well. Information will be given that the questionnaire and the percent body fat measurement are not tests, but rather data gathering instruments to gather data on particular topics.

9. No names will be placed on the instruments. There is no need or want to look at individual scores, which is stated in the informed consent letter. The instruments will be coded to make sure the data are grouped together for analysis, and the link to the code will be destroyed once the scores are grouped together.

10. The written consent form is attached to this document.

11. N/A
Appendix E

Letter to Participating Schools

March 1, 1999

Verne Beffert, Superintendent
132 S. B St.
Livingston, MT 59047

Dear Mr. Beffert:

I am working on my thesis project for my Master’s degree at The University of Montana. I will be comparing different variables between fifth grade students who attend physical education classes three times per week and fifth grade students who attend PE classes one time per week. I will be studying the following variables:

1. Fitness scores of fifth graders: I will use one mile run/walk times and the number of modified situps completed in one minute. These will have already been collected by the physical education specialist.

2. Height and weight measurements of fifth graders: These will be collected by the school nurse and/or the physical education specialist.

3. The Athletic Competence subscale from Susan Harter’s (1985) Self-Perception Profile for Children: This is a series of six questions that will allow children to check a box indicating whether the statement is more or less like them. I will administer this subscale, which should take approximately 15 minutes. I have included the questionnaire for your review.

I would like to use some of the fifth grade students in your school district for my study. I have sent letters to the principals at Winans School, East Side School, and Washington School; however, I wanted to notify you of my request as well. If you have any questions regarding my measurements, please feel free to call or email me.

Thank you for your time and consideration!

Sincerely,

Nicole Sutton Donally
403 Quartz Road
Superior, MT 59872
(406)822-3454
e-mail: spr3454@montana.com
References


*Physical Best: The AAHPERD Guide to Physical Fitness Education and Assessment.* Reuton, VA: AAHPERD.


