The Use of an Internal Locus of Control Scale as a Predictor of Exercise Adherence in Children Ages 6-12

by

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ABSTRACT

The U.S. Surgeon General has recommended that all Americans engage in regular physical activity throughout the lifespan as a way to maintain and improve health and reduce the risk of developing cardiovascular disease, diabetes, obesity, or other chronic conditions. The recommendation for children is a minimum of 60 minutes of moderate and intense physical activity everyday. As children enter adolescence their level of physical activity often decreases; and active adults were typically active adolescents. More than 50% of adults that begin a physical activity program discontinue the behavior within 9 months. Interventions to increase physical activity have looked at self-esteem and self-efficacy. Locus of control (LOC) is a concept that people either view their own behavior as influencing the events around them (internal) or other events controlling their fate or destiny (external). This study looked at locus of control as a predictor of exercise adherence and future exercise patterns in children ages 6-12 in Mesa, AZ. Locus of control as measured by the Child Nowicki-Strickland Internal External (CNSIE) scale differed by gender and by physical activity group at school at post-intervention. Self-reported physical activity as measured by the Physical Activity Questionnaire for Older Children (PAQ-C) showed differences in physical activity (PA) levels by gender for baseline school PA, by age group for baseline non-school PA, by gender and age group for post-intervention school PA, and by gender only for post-intervention non-school PA. A secondary objective was to assess if the Think Healthy About Nutrition and eXercise (THANX) after school program influenced participants' LOC or PA patterns.

This study found that the THANX program had no effect on LOC or PA level at any time point.

DEDICATION

This thesis is dedicated to my husband, Jaime, and to my children, Ben and Eliana. Thank you all for the sacrifices you made so that I could pursue new interests and opportunities. May you always be happy, healthy and active. I love you.

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INTRODUCTION

Overview

Health benefits and risk reductions associated with an active lifestyle have led the U. S. Surgeon General to recommend regular exercise throughout the lifespan. In spite of this recommendation, participation in, and adherence to regular physical activity in childhood, adolescence, and adulthood remains low (Dishman & Buckworth 1996; 1997). Research has shown that physically active children tend to be physically active adults (Janssen, Katzmarzyk, Boyce, Vereecken, Mulvihill, & Roberts,2005; Kjonniksen, Torsheim, & Wold, 2008) so increasing physical activity in childhood could lead to improved health at all ages, as the active behavior should continue throughout life throughout the lifespan.

There is a positive relationship between self-efficacy and physical activity levels, so one way to increase PA levels is to increase one's self-efficacy for living an active lifestyle (Booth, Owen, Bauman, Clavisi, & Leslie, 2000; Clark & Nothwehr, 1999; Sternfeld, Ainsworth, & Quesenberry, 1999; Sullum, Clark, & King, 2000; Bungum, Orsak, & Chang, 1997; Dishman & Ikes, 1981; Dishman, Ickes, & Morgan, 1980; Gale, Eckhoff, Mogel, & Rodnick, 1984). Self-efficacy is one's confidence in his or her ability to successfully engage in a behavior. A construct closely associated with self-efficacy is that of locus of control, which states that people either see themselves as in control of their lives (internal) or that outside forces and fate control their destinies (external) (Rotter, 1966; Trost, Owen, Bauman, Sallis, & Brown, 2002). Although the locus of control construct

is heavily utilized in social and health psychology to examine adherence, it remains underutilized in exercise and wellness research. Therefore, understanding the relationship between locus of control and the prediction of exercise adherence may facilitate intervention programs to reduce sedentary behavior at all stages of the lifespan.

Research Aim and Hypotheses

The primary objective of this study is to examine the relationship between internal locus of control and exercise adherence in a population of children ages 6-12 enrolled at Sequoia Elementary School in Mesa, Arizona. It is hypothesized that subjects with a greater internal locus of control will exhibit increased PA patterns and participate to a greater extent in future exercise and that subjects with a more external locus of control will be less active and less likely to engage in future exercise. A secondary objective is to examine whether voluntary participation in the Think Healthy About Nutrition and eXercise (THANX) after-school program influenced students' internal locus of control and physical activity behaviors. It is hypothesized that students that participate in the THANX program will show an increase in both internal locus of control and in physical activity.

Definition of Terms

Physical Activity (PA): Bodily movement produced by the contraction of skeletal muscles that results in a substantial increase over resting energy expenditure (USDHHS, 2008).

Exercise: PA consisting of planned, structured, and repetitive bodily movements that improve or maintain one or more components of physical fitness (USDHHS, 2008).

Locus of control: A construct from Julian B. Rotter's (1966) social learning theory of personality that individuals believe that they are in control of what happens to them, or that what happens to them is a function of chance, fate, or luck.

Child Nowicki-Strickland Internal-External Scale (CNSIE): A 40-item questionnaire requiring *yes* or *no* answers used to assess locus of control measuring internal versus external forces (Nowicki & Strickland, 1973).

Self-efficacy: The personal belief in one's ability to perform or accomplish a specific task or activity.

Self-motivation: The personal initiative an individual utilizes to start or continue an activity or behavior.

Self-esteem: A general regard for one's overall worth.

Delimitations

Study participants were comprised of a convenience sample of students at Sequoia Elementary School in Mesa, Arizona. One hundred sixteen boys and girls in grades 3 through 6 participated in the study. All participants had a signed parental consent form and a signed child assent form. All participants were able to read written, or understand spoken English or Spanish. One quarter of the participants were enrolled in the Think Healthy About Nutrition and eXercise (THANX) after school program, a free program for kindergarten through 6th grade

students created by Health Choice Arizona to improve children's quality of life by providing the resources, education, and support to increase their daily PA and nutritional awareness. This adult-supervised program took place every Monday through Thursday at Sequoia Elementary School from 3:00 p.m. – 5:15 p.m. The comparison group was comprised of Sequoia students that did not participate in the THANX program.

Limitations

All participants were enrolled at Sequoia Elementary School in Mesa, Arizona; therefore, the results may not be generalizable for other populations. The sample size is fairly small limiting the ability to apply the results to the population at large.

CHAPTER 2

REVIEW OF LITERATURE

Exercise Adherence

The U.S. Surgeon General has recommended that engaging in regular physical activity is a healthy behavior throughout the lifespan, as this reduces the risk of many chronic diseases and adverse health outcomes, including obesity, cardiovascular disease, and diabetes (USDHHS, 2010). The recommended amount of physical activity (PA) in which all healthy adults should engage is at least 150 minutes of moderate-intensity activity per week. Activities of moderate-intensity include, but are not limited to, brisk walking, water aerobics, gardening, bicycling on flat terrain, and dancing; it is an intensity in which the heart rate is elevated, however a person does not get out of breath quickly, can carry on a conversation, and may not perspire. For adults who wish to engage in more vigorous physical activity such as running or jogging, riding a bike faster than 10 miles per hour, aerobic dancing (such as in a "step" or "cardio" exercise class), swimming laps, or other activities in which a person's heart rate is elevated such that he or she is out of breath to the point of being unable to say more than a few words at a time, the recommended amount of activity is at least 75 minutes per week. It is possible to "mix and match" the intensity and duration of the activity in order to reach this total weekly level of activity. In other words, the recommendations can be met by engaging in both moderate- and vigorous-activity, and it can vary day by day or week by week. Additionally, if finding 20 or 30 consecutive minutes in which to exercise on a given day is not possible or

practical, the time can be accumulated by engaging in intermittent physical activity consisting of multiple bouts each day of at least 10 minutes each. The Surgeon General has also stipulated that even in the event that a person does not engage in the full recommended amount of weekly activity, any additional PA that is done above resting levels will result in health benefits. These guidelines are a minimum to help reduce the risks of chronic disease, and any activity above and beyond these minimum amounts in intensity, frequency, or duration provides additional health benefits (USDHHS, 2008).

The guidelines also recommend including resistance exercises at least 2 non- consecutive days each week to strengthen the muscles of the hips, legs, arms, chest, back, abdomen, and shoulders, and flexibility exercises at least 2 days each week to maintain and improve range of motion. Adults over age 65 should follow the key guidelines for all adults, plus include exercises that maintain or improve balance, particularly if they are at risk for falling. Children and adolescents should acquire 1 hour or more of daily physical activity. Most of these 60 minutes should be aerobic in nature of either moderate- or vigorous- intensity; usually this activity occurs in short bursts and may not be consecutive. A portion of the 60 daily minutes should include vigorous-intensity activity, muscle-strengthening activities, and bone-strengthening activities each at least 3 days per week. All activities for children should be age-appropriate and enjoyable to encourage and foster a love for play and movement, as children continue enjoyable behaviors into adolescence, and adolescents continue them into

adulthood. For all age groups, physical activities should be enjoyable and offer variety (USDHHS, 2008).

However, despite these recommendations and the proven health benefits associated with PA, only 41% of American adults are actually meeting or exceeding the Surgeon General's recommended amount of 150 minutes weekly of moderate-intensity physical activity, and 37% is not physically active at all (Schoenborn & Stommel, 2011). Studies show that activity levels decline from childhood to adolescence and in fact only 17% of students in grades 9-12 meet the recommendation of at least 60 minutes of activity daily and only 30% participate in daily physical education (CDC, 2010; CFLRI, 2006; Troiano, Berrigan, Dodd, Masse, Tilert, & McDowell, 2008). In a longitudinal study, only 4.4% of 15-29 year olds met the recommendations at least 5 days per week as adults if they were active adolescents, and only 3.6% of adults met the recommendation if they were inactive teenagers (Gordon-Larsen, Nelson, & Popkin, 2004). Engaging in PA in childhood is the best predictor of whether an individual will be active as an adolescent and later as an adult (Kjonniksen et al., 2008). Interventions to increase PA levels in the adult population have a 50% drop out rate at 6 months (Dishman & Buckworth, 1996; 1997). These attrition levels indicate that although individuals are able to change their behavior, they are unable to sustain the active behavior for the long term, even when aware of the benefits that PA provides. Clearly there are other psychological mechanisms at work that are not recognized or understood when designing PA interventions.

Childhood Inactivity

Sedentary behavior in childhood and adolescence is on the rise. Many youth no longer ride their bikes around their neighborhoods, play at the local park, or even walk to school or the bus stop. The "built environment" of our society and culture has made active transport undesirable, impractical and often even dangerous. Many areas have no sidewalks, bike paths, cross walks, or stop lights, so even children that would like to walk or ride their bike to school are forbidden doing so by their parents for reasons of safety. Additionally, pressure on teachers and principals to improve standardized test scores and meet and exceed state and national standards in the core subjects of reading, writing, and math, coupled with school budget cuts have all but eliminated time for recess and playground supervision (Center for Education Policy, 2007). Despite studies that show that PA actually improves students' academic performance and allows children to focus and concentrate on their lessons, administrators siphon precious minutes in the school day and school year from P.E. and recess and redirect them to "time on task" and "seat time" spent studying the core subjects in an effort to avoid being classified as a lower achieving school which can ultimately result in funding cuts and punitive actions taken against the administration and teachers.

In addition to the reduced time in school dedicated to PA, outside of school hours only 39% of children ages 9-13 participated in organized PA, and only 77% reported any leisure-time PA at all (CDC, 2004). Time out of school is increasingly spent driving from one place to another, watching television, playing video games, texting, and surfing the internet on devices such as computers,

cellular telephones, and tablets rather than playing with other children in a natural outdoor setting free of these modern technological tools. In fact, school-age children spend more than 5 hours per day in front of screens, roughly the same amount of time that they spend in the classroom (Jordan, 2010). Many studies show that screen time activities replace PA and thus increases overweight and obesity (Hume, Singh, Brug, van Mechelen, & Chinapaw (2008); however Eisennman, Bartee, Smith, Welk, & Fu (2008) found children with low amounts of screen time did not necessarily have greater PA levels and thus did not have a decreased risk of being overweight or obese.

Given all of the reasons that children are inactive, perhaps the greatest risk factor associated with this sedentary behavior in children and adolescence is overweight and obesity (Andersen, Crespo, Bartlett, Cheskin, & Pratt, 1998; Eisenmann et al., 2008; Rey-Lopez, Vicente-Rodriguez, Biosca & Moreno, 2008), which increase the incidence risk of co-morbidities (Tortolero, Goff, Nichaman, Labarthe, Grunbaum & Hanis, 1997; Freedman, Serdula, Srinivasan & Berenson, 1999; Dietz, 1998; Weiss & Kaufman, 2008) including obesity into adulthood (Must, Jacques, Dallal, Bajema & Dietz , 1992). Although children usually do not develop chronic diseases such as cardiovascular disease, hypertension, diabetes, or osteoporosis during childhood, the risk factors for these diseases begin to develop during this time and can only be avoided by participating in regular PA (Biddle, Gorely, & Stensel, 2004). Physically active youth have greater cardiorespiratory fitness, stronger muscles, lower body fatness, stronger bones, and less anxiety and depression than their inactive peers. A lack of fitness results

in many children showing early signs of cardiovascular risk factors such as excess weight, higher blood cholesterol levels, type 2 diabetes and metabolic syndrome. Health benefits of engaging in regular PA during childhood and adolescence include healthy weight regulation (Kimm, Glynn, Obarzanek, Kriska, Daniels, Barton et al., 2005), proper growth of bones and tissues (Biddle et al., 2004), and a reduced risk of several chronic diseases (Hurtig-Wennloef, Ruiz, & Harro, 2007; Warburton, Nicol, & Bredin, 2006).

The "built environment" contributes to the increase in sedentary behavior as it makes active transport less attractive. Environmental changes including the "built environment", reduced time and space for outdoor recreation, neighborhood crime, traffic, or lack of street lighting have prevented children from being able to walk and play safely outdoors as a means of daily exercise (Sallis, Conway, Prochaska, McKenzie, Marshall & Brown, 2001). With the increase in open enrollment and charter schools, many children no longer live in the same neighborhood as their schools, and must be driven to and from school rather than engaging in the active transport activities of walking or bicycle riding to go to school.

Starting PA behaviors at a young age yields the greatest overall health gains (Janssen et al., 2005). Research shows that physically active children become active adults (Pate, Baranowski, Dowda & Trost, 1996). The relationship between sedentary behavior and chronic disease has been demonstrated in adults (Booth, Laye, Lees, Rector, & Thyfault, 2008; Katzmarzyk, Church, Craig, & Bouchard, 2009; Owen, Healy, Matthews, & Dunstan, 2010) and children

(Ekelund, Brage, Froberg, Harro, Anderssen, Sardinha, et al., 2006; Mark & Janssen, 2008; Sardinha, Andersen, Anderssen, Quiterio, Ornelas, Froberg., et al., 2008).

In spite of studies showing a positive correlation between PA in childhood and adolescence and strong academic achievement (Taras, 2005; Trudeau & Shephard, 2008) and favorable mental health outcomes (Biddle, Gorely, & Stensel , 2004). National and state policies mandating improvement in standardized test scores have resulted in increased time in core academic subjects and thus have created a barrier to PA promotion, as recess and physical education programs during the school day have been reduced or eliminated altogether (Metzler, 2002; Graham, Wilkins, Westfall, Parker, Fraser, & Tembo, 2002). Only 8% of elementary schools provide daily opportunities for PA or the weekly equivalent of 150 minutes for children to engage in PA at school. Research suggests that the rate of academic learning is enhanced in physically active students, thereby invalidating school boards' claims that physical education be denied due to lack of available curricular time (Shephard, 1997). When engaging in PA, the brain "wakes up" with increased blood flow to the brain improving the connections the neurons can make with one another, resulting in heightened senses, better focus and mood, decreased stress and fidgety behaviors, and increased motivation, invigoration and ability to concentrate (Ratey, 2008).

This coupled with a greater overall intake of nutrients compared to a sedentary student, the association between psychomotor and cognitive development, an outlet to relieve boredom facilitating the ability to focus and pay

attention to instruction later in the day, or enhanced self-esteem are all plausible reasons that PA could improve academic achievement. Self-esteem may be increased by improved motor skills or changes in body build induced by the PA, and children with higher self-esteem tend to be higher achievers in school, although the directionality of this tendency is unclear (Baumeister, Campbell, Krueger, & Vohs, 2003). Gentile, Twenge, and Campbell (2010) found that self-esteem assessments may have reached a ceiling, as 51% of participants are now scoring 35 and over (with 40 being perfect self-esteem), and therefore that existing self-esteem inventories may need to be revised. It is in this context that LOC may be a better measure.

Given that children spend most of their day at school, schools are an excellent place to teach and demonstrate positive PA behaviors while teachers and students interact (Baranowski, Mendlein, Resnicow, Frank, Cullen, & Baranowski, 2000; McKenzie, LaMaster, Sallis, & Marshall, 1999). Moreover, research shows that children who are inactive in school continue to be inactive outside of school, signifying a need for programmed activities both during and after school hours (CDC, 2000; Dale, Corbin, & Dale, 2000; Dietz, 2001).

Self-Esteem

Self-esteem is one's positive or negative regard for his or her overall worth. Researchers have used this concept to predict outcomes such as academic achievement, exercise behavior, and psychological well-being (Marsh, 1986). An increased emphasis on self-worth in American culture and *perceived* competence since 1980 has led to both children and college students scoring higher on the

Coopersmith Self-Esteem Inventory (SEI) and Rosenberg Self-Esteem scale (RSE) respectively. College students' responses to the RSE increased from 1968 to 1994 despite their decreased competency during the same period as measured by mean SAT scores, reduced physical activity levels, and increased stress. In fact, by 2008, 18% of the students that took the RSE scored a perfect 40, and 51% scored 35 or higher. These high scores for self-esteem indicate that the RSE may have reached a ceiling and the scale may need to be reworked in order to fully capture the highest possible degree of self-esteem that one can have (Gentile et al., 2010). They may also indicate that self-esteem is not an accurate predictor of performance.

Despite the huge increases in self-esteem during the last 30+ years, there is no evidence that societal problems or issues that should be tied to self-esteem have improved. For example, SAT and GRE scores are at historical lows, so much in fact that the SAT was re-normed in 1995. This happened while grade inflation became rampant with the proportion of A's increasing and C's decreasing (Dey, Astin, & Korn, 1992; Holtz, 1995). Another competency is appearance-related: Americans have become increasingly heavier while the media has simultaneously portrayed unrealistic thinness in women and muscle definition in men. Therefore, although our objective competencies of academic achievement and physical appearance have decreased, our subjective perceptions of our competencies have increased thus increasing our self-esteem (Twenge & Campbell, 2001). This could either suggest that a different measure may be a more accurate way to assess self-esteem, as students have clearly "learned" how

to answer the questions, or that better psychological indicators and/or predictors are needed.

Given the positive relationship between childhood exercise and adult exercise patterns, investigation into factors that influence youth participation in exercise is vital for public health experts to develop interventions and strategies designed to address, increase and maintain voluntary participation in PA throughout the life span. A range of demographic, psychological, behavioral, social, environmental, and PA characteristic variables are associated with exercise adherence (Bauman, Sallis, Dzewaltowski, & Owen, 2002; Trost, Owen, Bauman, Sallis, & Brown , 2002). Two consistently strong positive psychological correlates of PA are self-efficacy and self-motivation (Trost, et al., 2002). Unlike self-esteem, which is moderated by extrinsic forces, self-efficacy (SE) is intrinsic and posits that one is able to solve problems and set and achieve goals. Self-efficacy is linked to a similar construct, self-motivation, or the personal initiative an individual utilizes to start or continue an activity. Therefore, one's self-efficacy will influence the motivation and lead to action, thereby increasing self-esteem. Just as there is a positive relationship between increased self-efficacy and increased levels of PA (Booth et al., 2000; Clark & Nothwehr, 1999; Sternfeld, et al., 1999; Sullum et al., 2000), there is a positive correlation between increased self-motivation and increased attendance (Bungum et al., 1997; Dishman & Ikes, 1981; Dishman et al., 1980; Gale et al., 1984).

Self-Motivation

Self-Motivation (SM) is the personal initiative an individual utilizes to start or continue an activity or behavior. When someone is considering changing a behavior, they must have a reason for wanting to do so. In the area of health and wellness, key behavior change strategies are eating less, exercising more, losing weight, managing stress, and smoking cessation. Often the motivation behind the change is one of vanity, as we want to "look" better, whether for an upcoming event, or simply to please others. These are extrinsic motivators. What is interesting about SM is that if the impetus for the initial behavior change wanes, one must re-evaluate if there is another motivation pushing us to change. In the absence of self-motivation, people return to their previous, "comfortable", "normal" behavior. In a sense, if one is changing for himself or herself, the motivation is intrinsic and likely to continue, but if he or she is changing for someone else, the motivation is extrinsic and the behavior change is likely only temporary.

Self-Efficacy

Self-Efficacy (SE) is one's confidence in his own ability to perform or accomplish a specific task or activity (Bandura, 1991). The important thing to keep in mind with SE is that it is behavior specific. In other words, someone may have low SE for running a mile, however he may have high SE for climbing a mountain. SE can be learned in a variety of ways. Breaking large tasks down into achievable steps and setting goals to accomplish them is one way that SE can increase. Another way is through vicarious learning: watching similar others

complete the task gives one pause to consider the possibility of also being able to complete the task. SE is often confused with self-esteem. While someone with high self-esteem may in fact have high SE in some activities, it is likely that there are activities or tasks for which someone with high self-esteem may have low SE. In fact, it is also probable that having high SE in many activities will boost one's self-esteem.

Locus of Control

Locus of control (LOC) is the way that someone views their ability to control their life and the things that happen to them. A person with a strong internal LOC has a perception that they control their own destiny, that their situation is largely determined by the effort that they put in, whereas a person with an external LOC perceives that their fate is determined by circumstances beyond their control. Generally speaking, children have a more external LOC, and as we grow older our LOC becomes more internal. This is largely due to the fact that people have a greater ability to influence things going on in their lives as they age, and they have more choices available to them. One's LOC is an indicator of how they view the world and their role in determining how their life will unfold. Usually a strong internal LOC is an important attitude to have for people who want to be successful. These people tend to be self-motivated, work harder, and persevere longer in order to get what they want. Research has shown that "internals" tend to be happier, less depressed, and less stressed than "externals". It is possible for people to change their LOC to become more internal by setting realistic and achievable goals and working towards them. This

builds self-confidence and ultimately allows a person to see that they are in control of their own life.

Perceived control and general expectations regarding whether outcomes are controlled by one's behavior or other external forces is a construct closely associated with self-efficacy (Rotter, 1966). Perceived control emerged from research on locus of control, which underlies Rotter's social learning theory of personality. It is theorized that an internal locus of control (LOC) supports self-directed courses of action (self-motivation), whereas an external locus of control should discourage them. Those exhibiting a higher internal locus of control should therefore possess greater self-efficacy and self-motivation to exercise. Although the locus of control construct is heavily utilized in social and health psychology to examine adherence, it remains underutilized in exercise and wellness research.

Sherman (1984) conducted a longitudinal and cross-sectional study that showed internality is a function of age with 8-year olds being more external and 12 year olds being more internal. The longitudinal portion of the study showed that as children age, they become more internal.

The Nowicki-Strickland Locus of Control Scale (CNSIE) has been used to assess LOC differences by race, age, and gender. Tyler and Holsinger (1975) found that American Indians were more external than whites and that older children were more internal than younger children. Finlayson and Rourke (1978) found that perceived locus of control is related to motivation, but they were unable to conclude whether perceived LOC is related to treatment outcome.

Kong and Shen (2011) wanted to explain whether LOC could be temporarily activated through message framing; they found that by manipulating LOC messages, subjects could actually respond in ways contrary to their actual LOC.

Barling (1979) found a curvilinear relationship between verbal ability and the reliability of the Nowicki-Strickland Locus of Control Scale. This could be a confounding variable in the reliability of the CNSIE. He believed that the verbal proficiency required of subjects for the CNSIE created ambiguity on some of the items and that this may have reduced the consistency of the responses. Another explanation provided was that implicit demand characteristics were more salient for children with above-average verbal IQs as they were significantly more internally oriented than their less verbally proficient counterparts.

Instruments to Measure Physical Activity

Chinapaw, Mokkink, van Poppel, van Mechelen, & Terwee (2010) published a review article on Physical Activity Questionnaires for youths. The researchers concluded that a reasonable "gold standard" for measuring PA in children does not exist, and that no instrument available had both acceptable reliability and validity.

Biddle, Gorely, Pearson, & Bull (2011) conducted an assessment of self-reported physical activity instruments in young people for population surveillance. In 437 papers using physical activity assessment instruments, 89 physical activity measures were identified, and 20 received detailed assessment. The 3 instruments that received support from the majority of the expert panel

included the Physical Activity Questionnaire for Children/Adolescents, the Youth Risk Behavior Surveillance Survey, and the Teen Health Survey.

The Physical Activity Questionnaire for Older Children (PAQ-C) assesses the physical activity behaviors of children aged 8-14 during school, after school, during lunch, during recess, and over the weekend during the previous week. The 10 question pencil and paper survey asks if the student engaged in an activity during the previous 7 days, and if so how often, with choices ranging from not at all to 5 or more times. A 5-point Likert-type scale is used to score each item, and an overall score is determined by the mean of each scored item. Higher scores reflect greater levels of PA (Crimi, Hensley, & Finn 2009). The PAQ-C has moderately high validity as reported by Kowalski, Crocker, & Faulkner (1997) and test-retest reliability and internal consistency values. The low cost test is widely used in research to assess habitual moderate- to vigorous- intensity PA in both large and small populations. The survey was developed for use in the Saskatchewan Pediatric Bone Mineral Accrual Study (Trost et al., 2002). As many of the questions on the PAQ-C ask about activities and behaviors at recess, during lunch, during P.E., right after school, in the evening, and on the weekend, the questionnaire has validity if used during the school year, but not during the summer break (Biddle et al., 2011). A modified version of this assessment is the Physical Activity Questionnaire for Adolescents, and is used for children ages 14-20. The PAQ-A has similar validity and reliability.

CHAPTER 3

METHODS

Participants and Study Design

This study was conducted with 116 children that attend Sequoia Elementary School in Mesa, Arizona. All 225 students in grades 3 through 6 received a parental consent form explaining the study included in their weekly homework packets. Students that returned a signed parental consent (n=120) form were given a child assent form, and students that signed the assent form were enrolled in the study. The Institutional Review Board of Arizona State University approved this study. Thirty-six of the participants were enrolled in the THANX after school program, therefore the study is a quasi-experimental nonequivalent group design. The pre-test of the two questionnaires was given on September 26-27, 2011 to determine baseline data, and the same questionnaires were repeated on January 23-24, 2012 as a post-test. Subjects completed the Physical Activity Questionnaire for Children (PAQ-C) about their participation in PA over the prior week, and the Child Nowicki Strickland Internal External scale (CNSIE). Both questionnaires were completed during the students' 40-minute weekly health class. Parental consent forms were signed and returned the week prior to baseline testing, and child assent forms were completed the day of baseline testing. Due to the demographics of the population, all forms and surveys were available in English and Spanish. Although 10% of the parental consent forms were completed in Spanish, only one student completed the

Spanish language questionnaires in September. In January, this student completed the questionnaires in English.

Child Nowicki-Strickland Internal-External (CNSIE) Locus of Control Scale

The Child Nowicki-Strickland Internal-External Scale (CNSIE) is a 40-item questionnaire requiring yes or no answers used to assess locus of control as a generalized expectancy of control measuring internal versus external forces. The CNSIE has been used since 1969 to assess a child's perception of a connection between his or her actions and their consequences. The test is appropriate for children aged 9-18. This test has been validated repeatedly for internal consistency and test-retest reliability.

Physical Activity Questionnaire -- Child (PAQ-C)

The PAQ-C is a 7-day recall questionnaire designed for children aged 8-14 and intended to measure moderate-to-vigorous physical activity. It requires respondents to check boxes according to the frequency with which they participated in the activity over the last 7 days. The frequency scale ranges are 0 times, 1-2 times, 3-4 times, 5-6 times and 7 times or more during the previous week. Questions are asked about PA in P.E. classes, during recess and lunch time, immediately after school, in the evenings, and on the last weekend. For these items, responses for activity levels during physical education class, recess, and lunch time include 5 choices indicating the overall PA intensity levels; the questions about PA immediately after school, in the evening, and on the weekend ask how many times the student played games or did other PA that was "very active" with choices between 0 times and 6 or more times. Then the child is asked

about how physically active he was during his free time for the previous week, including a day-by-day assessment of how often they were active each day. The PAQ-C has been validated using objective assessment of PA during the school year.

Protocol Procedures – CNSIE and PAQ-C Questionnaires

Students that returned a signed parental consent form were given a packet containing the child assent, CNSIE, and PAQ-C questionnaires. In an effort to keep the class working at the same pace and ensure that everyone understood the questions, one investigator read each item on the questionnaires aloud while the students marked their questionnaires accordingly. A second investigator circulated around the classroom to answer any questions that arose as the questionnaires were completed. The questions were read aloud in Spanish to the student that required the Spanish versions of the questionnaires. Questionnaires were completed by grade level during the health class, therefore no students were in groups larger than 40 while completing the questions.

Statistical Analysis

All statistical analyses were performed using the IBM SPSS Statistical Analysis system version 20.0 software. One-way analyses of variance (ANOVAs) were run to measure whether participation in the THANX program, age, gender, or race influenced internal locus of control or physical activity. Further linear regression models were run to measure covariance of these factors on LOC and PA. All data is reported as the mean $\pm$ the standard deviation. Data with a p-value ≤ 0.05 was considered significant. A dropout rate of 10% was anticipated due to

incomplete data due to student absence or attrition on the second data collection date. Students that completed baseline data but were absent on the second data collection date had their baseline scores copied for statistical purposes.

One hundred ten (110) students answered every question on both surveys at baseline, and 90 of these had complete data on all questions again at post-testing. Only these 90 students with complete data at both baseline and post are included in analyses, as omitted questions could have resulted in a more internal LOC score on the CNSIE, and under reporting of PA.

After computing the mean, median, and 25th and 75th percentile scores for LOC at baseline and post-intervention, students were reclassified into an LOC group by quartiles. Those that scored at or below the 25th percentile of 15 were classified as "internal", and those that scored at or above the 75th percentile of 19.25 were classified as "external". Therefore, if a student's LOC changed, it was possible to be classified as "internal" at one of the two time points, and "external" at the other.

PA scores were calculated by assigning a value from 0 to 4 for the questions related to PA during physical education, recess, lunch, immediately after school, in the evening, on the weekend, and for free time over the prior week, both at baseline and at post-test, with "0" indicating sedentary behavior, "1" light activity, "2" moderate activity, "3" moderately high activity, and "4" highly active behavior. A composite school time PA score was created by summing the scores for PA level during physical education, recess, and lunch, with possible scores ranging from 0 (sedentary at all 3 occasions) to 12 (very

active at all 3 occasions). A composite non-school time PA score was created by summing the scores for PA level immediately after school, in the evenings, on the weekend, and in free time over the previous 7 days, with possible scores ranging from 0 (sedentary at all 4 occasions) to 16 (very active during all 4 occasions). Using these continuous scores, students that fell in the bottom 25th percentile were classified as having low activity relative to their peers, and those in the 75th percentile as high activity relative to their peers.

Due to age requirements and cut-off dates for starting kindergarten, when a child's birthday falls relative to the cut point, and the ability for children with "late" birthdays to test-in to kindergarten as a 4 year old, it is possible for a single grade to be comprised of children with 3 different ages, particularly at the beginning of the school year. This study was conducted with 3rd through 6th graders, therefore the ages of the children ranged from 7 to 12, with only 1 seven-year-old in 3rd grade and 4 twelve-year olds in 6th grade at the September data collection date. For statistical purposes, the 7-year-old's data was combined with that of the 8-year olds, and the 12-year-olds' data was combined with that of the 11-year olds, as they were only a few months apart chronologically.

CHAPTER 4

RESULTS

One hundred twenty students had signed parent consent forms. One hundred eleven students completed the surveys at baseline; 103 completed the questionnaires at post-testing. There were 4 students with signed parent consent that were absent on both data collection dates and were omitted from statistical analyses. Only 90 students had complete questionnaires at both baseline and post and were included in data analyses.

Demographics

Twenty-six (29%) of the students were enrolled in the THANX after school program. Sixty-four students (71%) were not enrolled in THANX.

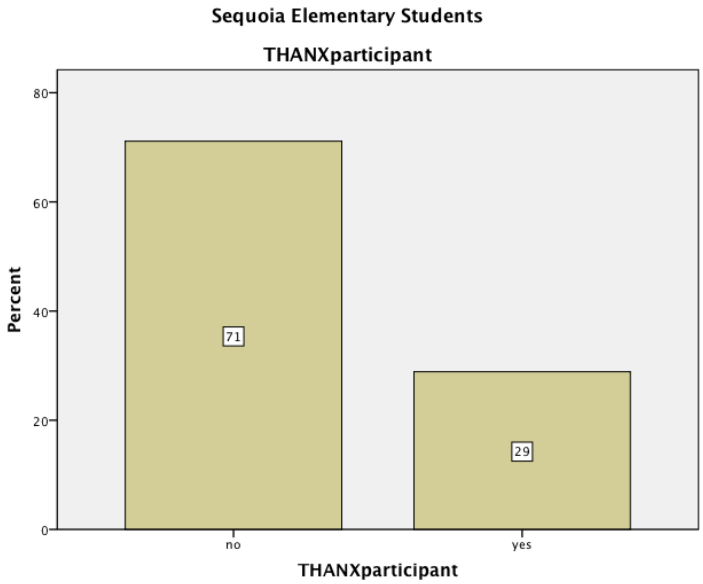

Figure 1. Study participants by participation in the THANX program.

There were 53 males (59%) and 37 females (41%).

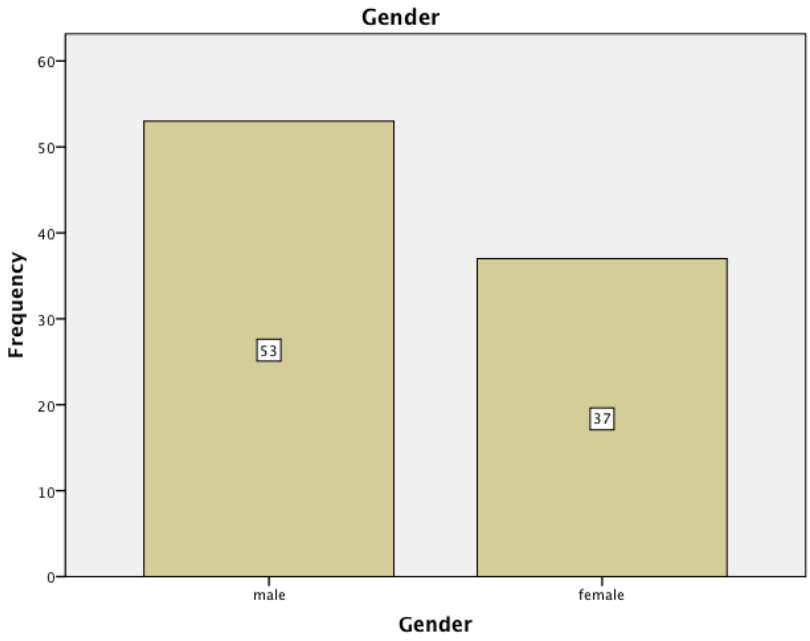

Figure 2. Study participants by Gender.

There was 1 seven-year-old (1%), 19 eight-year-olds (21%), 21 nine-year-olds (23%), 32 ten-year-olds (36%), 14 eleven-year-olds (16%), and 3 twelve-year-olds (3%). For statistical purposes, the seven-year old was combined with the eight-year-old group, and the twelve-year-olds were combined with the eleven-year-old group.

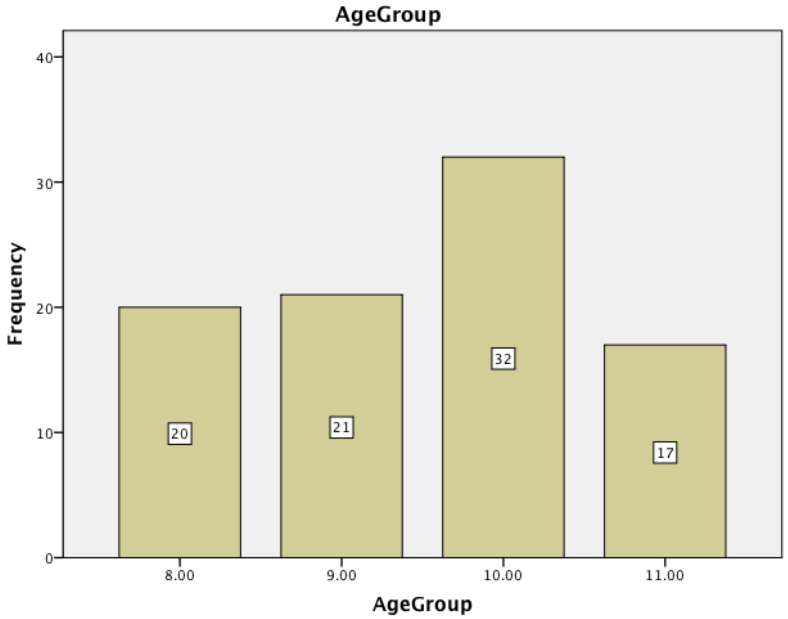

Figure 3. Study participants by age group.

Nineteen (21%) students self-identified their race/ethnicity as "White." Forty-four (49%) of students self-identified their race/ethnicity as "Hispanic." Twenty-seven (30%) of students self-identified their race/ethnicity as "Other."

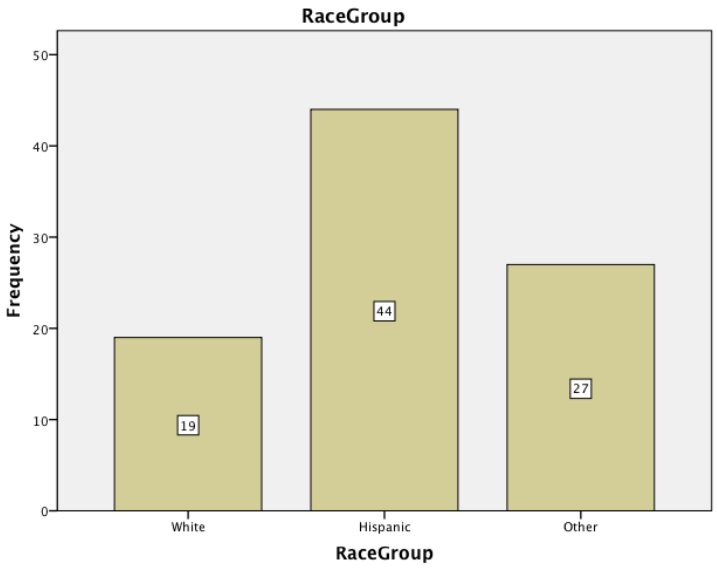

Figure 4. Study participants by Race group.

Based on the 25th percentile LOC score of 15, and the 75th percentile LOC score of 19.25, students were divided into an "internal" group if their LOC score was 15 or below (n=31), a "mid-LOC" group if their LOC score was between 15 and 19.25 (n=37), or an "external" LOC group if their LOC score was 19.25 or above (n=22). This grouped the students by LOC score to indicate if they were more "internal" or "external" relative to their peers for later analysis with regards to PA. The *internal*/*external* locus of control group was repeated at post-testing, with 30 students (33%) classified as *internal*, 32 students (36%) classified with a mid-LOC, and 28 students (31%) classified as *external*.

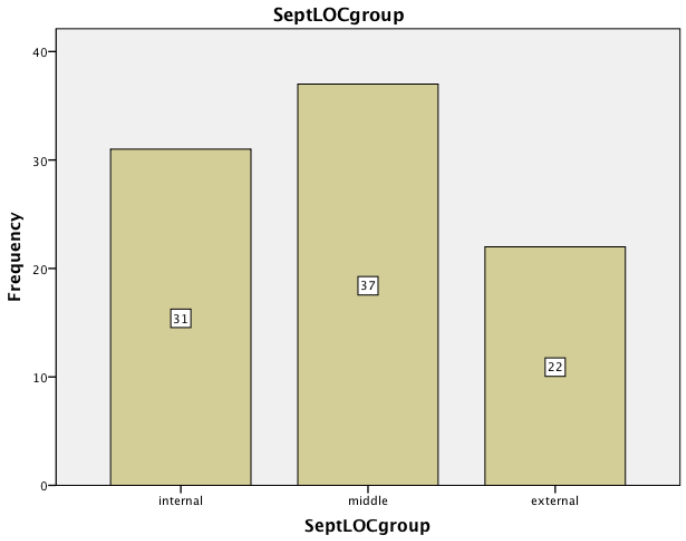

Figure 5. Study participants by LOC group.

Locus of Control (LOC)

The mean score for Locus of Control at baseline was 17.2 ± 4.2. The mean LOC score for students enrolled in the THANX program was 16.6 ± 5.1 at baseline. The mean Locus of Control (LOC) score for students not enrolled in the THANX program was 17.4 ± 3.7 at baseline. There is no mean difference in LOC scores by THANX participation at baseline (p=0.380). At baseline, 8-year-olds had a mean LOC score of 18.3 ± 4.0, 9-year-olds had an LOC score of 17.9 ± 4.2, 10-year-olds had a mean LOC score of 16.1 ± 4.2, and 11-year-olds had a mean LOC score of 17.1 ± 3.7. There is no mean difference in LOC score at baseline by age group (p=0.260). Males had a mean LOC score at baseline of 16.5 ± 4.5. Females had a mean LOC score at baseline of 18.1 ± 3.4. There is no significant mean difference in LOC score at baseline by gender (p=0.073). By race/ethnicity at baseline, self-identified Whites had a mean LOC score of 17.7 ± 5.1, Hispanics had a mean LOC score of 17.6 ± 3.5, and other races had a mean LOC score of 16.2 ± 4.2. There is no mean difference in LOC score at baseline by race (p=0.299). By September school PA group, the very active students had an LOC at baseline of 18.5 ± 4.5, the moderately active students had an LOC of 16.5 ± 3.8, and the inactive students had an LOC score of 16.3 ± 3.7. There was no mean difference in LOC score at baseline by September school PA group (p=0.074). By September home PA group, the very active students had a mean LOC score of 17.3 ± 4.2, the moderately active students had an LOC score of 16.2 ± 4.2, and the inactive students had an LOC score of 18.2 ± 3.8. There was no mean difference in LOC score at baseline by September home PA group.

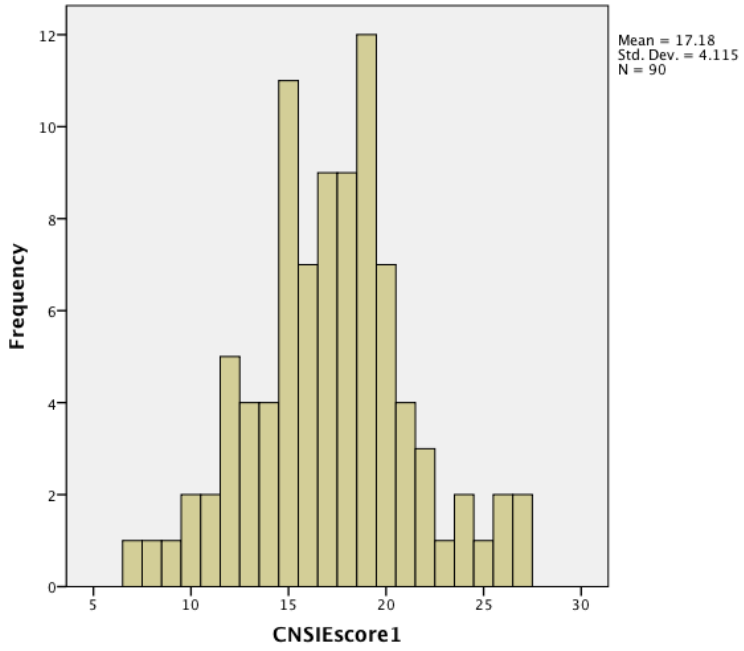

Figure 6. September LOC scores.

At post-test, the mean score for Locus of Control was 17.1 ± 4.0. The mean LOC score for students enrolled in the THANX program was 16.4 ± 4.4. The mean Locus of Control (LOC) score for students not enrolled in the THANX program was 17.0 ± 3.9. There was no mean difference in LOC scores by THANX participation at post-testing (p=0.536). Eight- year-olds had a mean LOC score at post-testing of 17.6 ± 3.8; nine-year-olds had a mean LOC score of 16.8 ± 3.3; ten-year-olds had a mean LOC score of 16.9 ± 4.7; eleven-year-olds had a mean LOC score of 15.6 ± 3.7. There was no mean difference in LOC score by age group (p=0.506). Males had a mean LOC score at post-testing of 16.0 ± 4.1. Females had a mean LOC score at post-testing of 17.9 ± 3.7. There was a significant difference in LOC score at post-testing by gender (p=0.031) with males being more internal and females being more external. White students had a post-LOC score of 16.8 ± 3.7, Hispanics had a mean post-LOC score of 17.0 ±

3.6, and other races had a mean post-LOC score of 16.5 ± 4.9. There was no difference in post-LOC score by race (p=0.873). By September school PA group, the very active had a post-LOC score of 17.5 ± 4.0, the moderately active had a post-LOC score of 15.4 ± 4.1, and the inactive had a mean post-LOC score of 17.8 ± 3.0. There was a mean difference in LOC score at post-test by September school PA group (p=0.035). By September home PA group, the very active had a mean post-LOC score of 16.9 ± 3.9, the moderately active had a mean post-LOC score of 15.9 ± 4.3, and the inactive had a mean post-LOC score of 17.7 ± 3.8. There was no mean difference in post-LOC score by September home PA group.

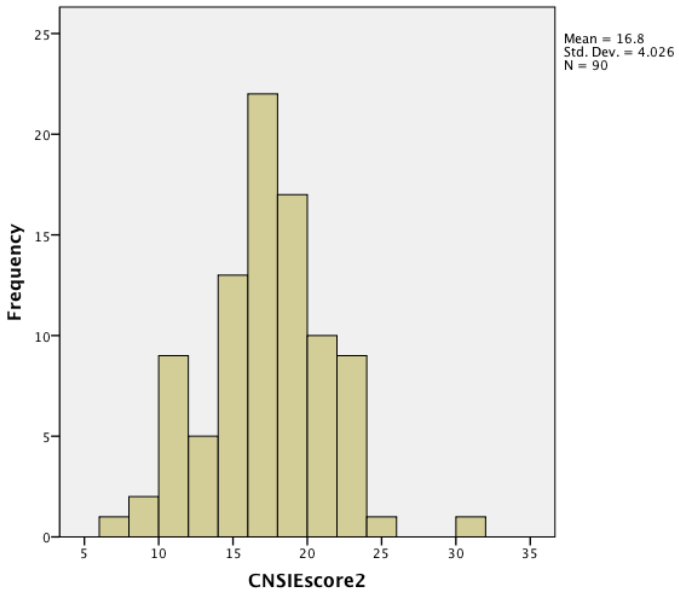

Figure 7. January LOC scores.

Table 1.

Locus of Control (CNSIE) Scores by Characteristic.

Variable	Total n (%)	LOC Score - September	Sig.	LOC Score - January	Sig.
	90 (100%)	17.2 ± 4.2		17.1± 4.0	
THANX			p=0.380		p=0.536
yes	26 (29%)	16.6 ± 5.1		16.4 ± 4.4	
no	64 (71%)	17.4 ± 3.7		17.0 ± 3.9	
Age Group			p=0.260		p=0.506
8	20 (22%)	18.3 ± 4.0		17.6 ± 3.8	
9	21 (23%)	17.9 ± 4.4		16.8 ± 3.3	
10	32 (36%)	16.1 ± 4.2		16.9 ± 4.7	
11	17 (19%)	17.1 ± 3.7		15.6 ± 3.7	
Gender			p=0.073		p=0.031
Male	53 (59%)	16.5 ± 4.5		16.0 ± 4.1	
Female	37 (41%)	18.1 ± 3.4		17.9 ± 3.7	
Race			p=0.299		p=0.873
White	19 (21%)	17.7 ± 5.1		16.8 ± 3.8	
Hispanic	44 (49%)	17.6 ± 3.5		17.0 ± 3.6	
Other	27 (30%)	16.2 ± 4.2		16.5 ± 4.9	
September School PA Group			p=0.074		p=0.035
High	32 (36%)	18.5 ± 4.5		17.5 ± 4.0	
Medium	34 (38%)	16.5 ± 3.8		15.4 ± 4.1	
Low	24 (27%)	16.3 ± 3.7		17.8 ± 3.0	
September Home PA Group			p=0.158		p=0.210
High	29 (32%)	17.3 ± 4.2		16.9 ± 3.9	
Medium	32 (36%)	16.2 ± 4.2		15.9 ± 4.3	
Low	29 (32%)	18.2 ± 3.8		17.7 ± 3.8	

Physical Activity Level at School

In order to assess the overall physical activity level of students during school, scores for PA level during physical education, recess, and lunch were summed, creating a scale of 0-12, with 0-2 indicating very inactive behaviors most of the time, 3-5 indicating lightly active behaviors most of the time, 6-8 indicating moderately active behaviors most of the time, 9-and 12 indicating very active behaviors most of the time during the three time periods. At baseline, the overall composite mean PA scores for school time activity during physical education, recess, and lunch was 7.8 $\pm$ 2.2. The mean PA during school PA score for THANX participants was 7.8 $\pm$ 2.8. The mean PA during school score for students not enrolled in THANX was 7.8 $\pm$ 2.0. There was no mean difference in PA scores during school by THANX participation (p=0.945). Eight-year-olds had a mean school time PA score of 8.1 $\pm$ 2.6; nine-year-olds had a mean school time PA score of 8.3 $\pm$ 2.0; ten-year-olds had a mean school time PA score of 7.5 $\pm$ 2.2; eleven-year olds had a mean school time PA score of 7.5 $\pm$ 2.1. There was no significant mean difference in school time PA score by age at baseline (p=0.497). Males had a mean PA during school at baseline of 8.4 $\pm$ 2.0. Females had a mean PA score during school at baseline of 7.1 $\pm$ 2.5. There was a mean difference in PA level at school at baseline by gender (p=0.006). White students had a mean school PA score at baseline of 8.2 $\pm$ 2.1, Hispanics' baseline school PA score was 7.8 $\pm$ 2.2, and other races had a baseline school PA score of 7.7 $\pm$ 2.4. There was no mean difference in September school PA by race. Students classified as *internal* had a mean PA during school score of 7.3 $\pm$ 1.9. Students classified as

middle-LOC had a mean PA school score of 8.0 ± 2.2. Students classified as *external* had a mean PA during school score of 8.3 ± 2.5. There was no mean difference in PA level during school by LOC grouping (p=0.257).

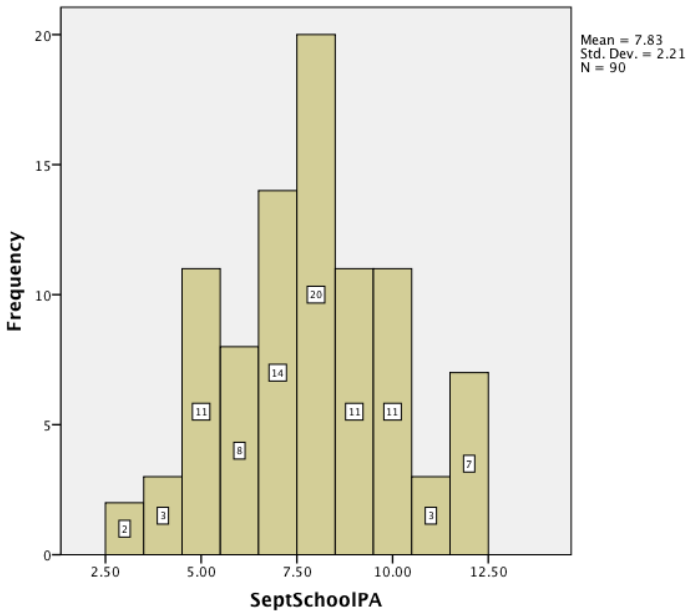

Figure 8. September school PA scores.

At post-testing, the overall mean PA scores for school time activity including physical education, recess, and lunch was 7.6 ± 2.2. The mean PA score for THANX participants was 7.2 ± 2.6. The mean PA score for students not enrolled in THANX was 7.8 ± 2.0. There was no mean difference in PA scores during school by THANX participation (p=0.248). Eight-year-olds had a post-test mean school time PA score of 8.2 ± 1.9; nine-year-olds had a mean school time PA score of 8.4 ± 2.0; ten-year-olds had a mean school time PA score of 7.0 ± 2.3; eleven-year-olds had a mean school time PA score of 7.1 ± 2.2. There was a significant mean difference in school time PA score at post-test by age (p=0.042), with post-hoc analysis using Fisher's Least Significant Difference (LSD) showing

a mean difference in school time PA score between eight- and ten-year olds (p=0.044) and nine- and ten-year-olds (p=0.016). Males had a mean PA score during school at post-testing of 8.3 ± 2.0. Females had a mean PA during school score of 6.7 ± 2.2. There was a mean difference in PA score during school at post-testing by gender (p<0.001). White students had a mean post school PA score of 8.1 ± 2.0, Hispanics had a mean post school PA score of 7.3 ± 1.8, and other races had a mean post school PA score of 7.7 ± 2.9. There was no mean difference in post-school PA by race (p=0.432). Students in the initial *internal* LOC group had a PA score during school at post-testing of 7.2 ± 2.3. Students in the baseline *middle-LOC* group had a school PA score of 7.9 ± 2.2. Students in the *external* LOC group had a post-testing PA score during school of 8.3 ± 2.5. There was no mean difference in school time PA score post-test by baseline LOC group (p=0.453).

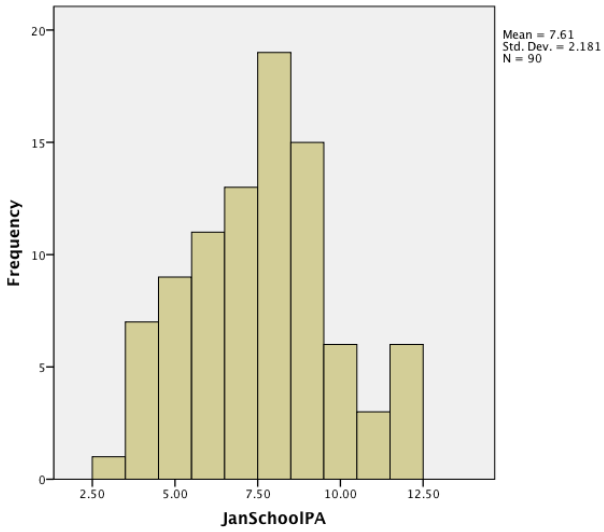

Figure 9. January school PA scores.

Table 2.

School Physical Activity Scores by Characteristic.

Variable	Total n (%)	September School PA Score	Sig.	January School PA Score	Sig.
	90 (100%)	7.8 ± 2.2		7.6 ± 2.2	
THANX			p=0.945		p=0.248
yes	26 (29%)	7.8 ± 2.2		7.2 ± 2.6	
no	64 (71%)	7.8 ± 2.0		7.8 ± 2.0	
Age Group			p=0.497		p=0.042
8	20 (22%)	8.1 ± 2.6		8.2 ± 1.9	
9	21 (23%)	8.3 ± 2.0		8.4 ± 2.0	
10	32 (36%)	7.5 ± 2.2		7.0 ± 2.3	
11	17 (19%)	7.5 ± 2.1		7.1 ± 2.2	
Gender			p=0.006		p<0.001
Male	53 (59%)	8.4 ± 2.0		8.3 ± 2.0	
Female	37 (41%)	7.1 ± 2.5		6.7 ± 2.2	
Race			p=0.769		p=0.432
White	19 (21%)	8.2 ± 2.1		8.1 ± 2.0	
Hispanic	44 (49%)	7.8 ± 2.2		7.3 ± 1.8	
Other	27 (30%)	7.7 ± 2.4		7.7 ± 2.9	
September LOC Group			p=0.257		p=0.453
Internal	31 (34%)	7.3 ± 1.9		7.2 ± 2.3	
Middle-LOC	37 (41%)	8.0 ± 2.2		7.9 ± 2.2	
External	22 (24%)	8.3 ± 2.5		8.3 ± 2.5	

Physical Activity Level at Home

In order to assess the overall activity level of students during non-school hours, scores for PA level immediately after school, in the evening, on the weekends, and for overall free time activity for the prior week were summed, creating a scale of 0-16, with 0-3 indicating very inactive behaviors, 4-8 indicating lightly active behaviors, 9-12 moderately active behaviors, and 13-16

indicating very active behaviors during the 4 time frames. At baseline, the overall mean PA scores for non-school time activity was 9.0 ± 4.1. The mean PA score for non-school hours for THANX participants was 9.0 ± 3.8. The mean PA score for non-school hours for students not enrolled in THANX was 8.9 ± 4.2. There was no mean difference in PA scores during non-school hours by THANX participation (p=0.916). Eight-year-olds had a mean non-school time PA score of 7.4 ± 4.0; nine-year-olds had a mean non-school time PA score of 7.9 ± 4.2; ten-year-olds had a mean non-school time PA score of 9.5 ± 3.8; eleven-year-olds had a mean school time PA score of 11.1 ± 3.7. There was a significant mean difference in non-school time PA score by age group (p=0.017), with post-hoc analysis using LSD showing a mean difference between 8- and 10-year-olds (p=0.053), 8- and 11-year-olds (p=0.004), and 9- and 11-year-olds (p=0.013). Males had a mean PA score at home of 9.0 ± 4.3. Females had a mean PA score of activity at home of 8.9 ± 4.1. There was no significant mean difference between PA score at home at baseline by gender (p=0.968). White students had a mean home PA score of 9.2 ± 4.9, Hispanics had a mean home PA score of 9.3 = 4.0, and other races had a mean home PA score of 8.3 ± 3.6. There was no difference in mean home PA score at baseline by race. Students classified as *internal* at baseline had a mean PA score for non-school PA of 9.1 ± 3.8. Students classified as *middle-LOC* group had a mean PA score for non-school PA of 9.7 ± 4.0. Students classified as *external* LOC group had a mean PA score for non-school PA of 7.5 ± 4.3. There was no mean difference in baseline PA levels outside of school by LOC group (p=0.111).

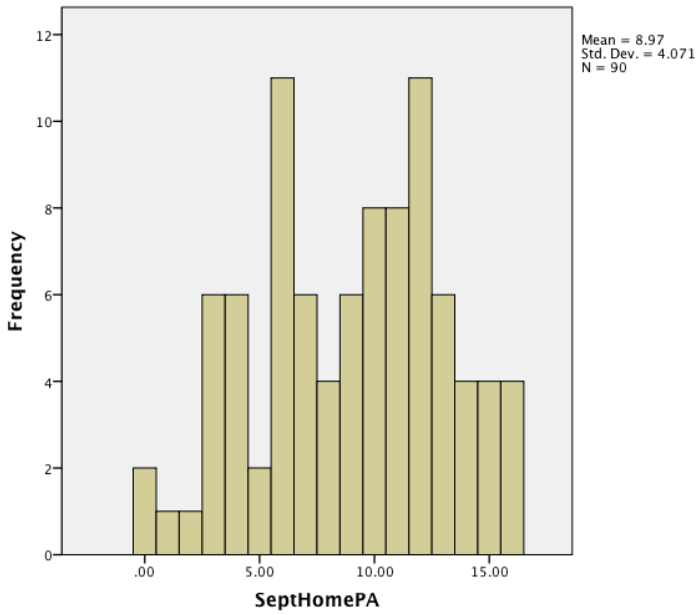

Figure 10. September home PA scores.

At post-test, the mean PA score for activity outside of school hours was 9.5 ± 4.2. Students that participated in the THANX program had a mean PA score of 9.3 ± 4.2. Students that did not participate in the THANX after-school program had a mean PA score for non-school hours of 9.6 ± 4.2. There was no mean difference in PA score for non-school hours post-intervention by THANX participation (p=0.736). Eight-year-olds had a mean non-school time PA score of 9.0 ± 5.0; nine-year-olds had a mean non-school time PA score of 9.8 ± 4.6; ten-year-olds had a mean non-school time PA score of 9.0 ± 3.8; eleven-year olds had a mean school time PA score of 10.9 ± 3.4. There was no difference in non-school time PA score by age group at post-testing (p=0.451). Males had a mean PA score for activity outside of school hours of 10.3 ± 4.4. Females had a mean PA score of 8.4 ± 3.7. There was a mean difference in PA outside of school hours at post-test by gender (p=0.036). White students had a mean post-home PA score

of 10.2 ± 4.7, Hispanics had a mean post-home PA score of 9.4 ± 4.1, and students of other races had a mean post-home PA score of 9.4 ± 4.2. There was no difference in home PA score at post-test by race. *Internals* had a mean PA score of 9.4 ± 4.4, *middle-LOC* group had a mean PA score of 10.6 ± 3.8. *Externals* had a mean PA score of 8.2 ± 4.2. There was no mean difference in PA score during non-school hours by LOC grouping (p=0.055), however since it approached significance, further post-hoc evaluation using LSD showed mean differences in January home PA between *middle-LOC* group and *externals* (p=0.017).

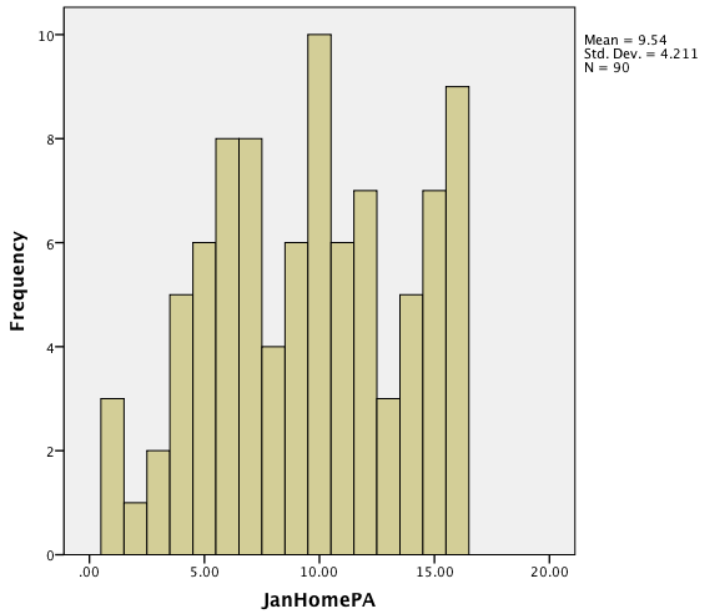

Figure 11. January home PA scores.

Table 3.

Home Physical Activity Scores by Characteristic.

Variable	Total n (%)	September Home PA Score	Sig.	January Home PA Score	Sig.
	90 (100%)	9.0 ± 4.1		9.5 ± 4.2	
THANX			p=0.916		p=0.736
yes	26 (29%)	9.0 ± 3.8		9.3 ± 4.2	
no	64 (71%)	8.9 ± 4.2		9.6 ± 4.2	
Age Group			p=0.017		p=0.451
8	20 (22%)	7.4 ± 4.0		9.0 ± 5.0	
9	21 (23%)	7.9 ± 4.2		9.8 ± 4.6	
10	32 (36%)	9.5 ± 3.8		9.0 ± 3.8	
11	17 (19%)	11.1 ± 3.7		10.9 ± 3.4	
Gender			p=0.968		p=0.036
Male	53 (59%)	9.0 ± 4.3		10.3 ± 4.4	
Female	37 (41%)	8.9 ± 4.1		8.4 ± 3.7	
Race			p=0.629		p=0.776
White	19 (21%)	9.2 ± 4.9		10.2 ± 4.7	
Hispanic	44 (49%)	9.3 ± 4.0		9.4 ± 4.1	
Other	27 (30%)	8.3 ± 3.6		9.3 ± 4.2	
September LOC Group			p=0.111		p=0.055
Internal	31 (34%)	9.1 ± 3.8		9.1 ± 3.8	
Middle-LOC	37 (41%)	9.7 ± 4.0		10.6 ± 3.8	
External	22 (24%)	7.5 ± 4.0		8.0 ± 4.2	

Changes in Physical Activity level at School

The overall mean change in PA during school activities was 0.2 ± 2.2. The overall change in mean PA during school hours for THANX students was 0.62 ± 2.3. The overall change in mean PA during school hours for non-THANX participants was 0.1 ± 2.1. There is no mean difference in change in PA levels

during school by THANX participation (p=0.276). Males had an overall change in PA at school of 0.1 ± 2.2. Females had an overall change in PA at school of 0.4 ± 2.1. There was no significant change in PA level during school by gender (p=0.506). *Internals* had a change in PA during school from baseline to post-test of 0.1 ± 2.0. *Middle-LOC* group had a change in school PA of 0.1 ± 1.8. *Externals* had a change in PA during school of 0.6 ± 2.2. There was no significant difference between LOC group for changes in PA during school (p=0.661). Eight-year-olds had a mean change in PA level during school of -0.1 ± 2.9; nine-year-olds had a mean change of -0.1 ± 2.3; ten-year-olds had a mean change in PA level during school of 0.5 ± 1.6; eleven-year-olds had a mean change of 0.4 ± 2.2. There was no mean difference in change of PA level during school by age (p=0.65).

Changes in Physical Activity level at Home

The overall mean change in PA during non-school hours was -0.6 ± 4.8. The overall change in mean PA during non-school hours for THANX students was -0.3± 4.7. The overall change in mean PA during non-school hours for non-THANX students was -0.7 ± 4.8. There is no mean difference in change in PA levels during non-school hours by THANX participation (p=0.697). Males had a mean change in PA during non-school hours of -1.3 ± 4.8. Females had a mean change in PA during non-school hours of 0.5 ± 4.8. There is no mean difference in change of PA level outside of school (p=0.069) by gender. *Internals* had a change in PA during non-school hours from baseline to post-test of -0.2 ± 4.2. *Middle-LOC* group had a change of non-school PA of -0.9 ± 4.0. *Externals* had a

change in PA outside of school of -0.5 ± 6.5. There was no significant difference between LOC group for changes in PA outside of school (p=0.836). Eight-year-olds had a mean change in PA level outside of school of -1.6 ± 5.4; nine-year-olds had a mean change of -1.9 ± 4.2; ten-year-olds had a mean change in PA level outside of school of 0.5 ± 4.3; eleven-year-olds had a mean change of 0.2 ± 3.8. There was no difference in mean change of PA level outside of school by age group (p=0.196).

Changes in Locus of Control Group

The mean difference in change of LOC group was -0.1 ± 1.0. THANX participants had a mean change of -0.04 ± 1.0. Non-THANX participants had a mean change in LOC of -0.1 ± 1.0. There was no significant change in Locus of Control group from baseline to post-test as measured by participation in the THANX program (p=0.809). Males had a mean change in LOC group of -0.1 ± 0.9; females had a mean change of LOC group of -0.1 ± 1.0. There was no mean difference in change in LOC group by gender (p=0.979). Eight-year-olds had a mean change in LOC group of 0.1 ± 1.2; nine-year-olds had a mean change of LOC group of 0.0 ± 0.8; ten-year-olds had a mean change in LOC group of -0.3 ± 1.0; and eleven-year olds had a mean change of 0.1 ± 0.7. There was no mean difference in change of LOC group by age (p=0.394). Whites had a mean change of LOC group of 0.2 ± 0.8; Hispanics had a mean change of LOC group of -0.1 ± 1.1; other races combined had a mean change in LOC group of -0.2 ± 0.9; there was no difference in change of LOC group by race (p=0.477).

Changes in Locus of Control

The overall mean change in LOC was 0.4 ± 4.9. For THANX participants the mean change was 0.2 ± 6.3; non-THANX students' change in LOC was 0.5 ± 4.2. There was no mean difference in change of LOC by THANX participation (p=0.275). Males had a mean change in LOC of 0.5 ± 4.7; females had a mean change in LOC of 0.2 ± 5.2. There was no mean difference in change of LOC by gender (p=0.794). *Internals* had a change in LOC of -2.4 ± 5.1; *middle-LOC* group had a change in LOC of 0.6 ≡ 3.1; *externals* had a change in LOC of 4.0 ± 4.7. There was a significant difference in change in LOC by LOC group (p<0.001). Post-hoc analysis showed differences between *internals* and *middle-LOC* (p=0.005), between *internals* and *externals* (p<0.001), and between *middle-LOC*s and *externals* (p=0.004). Eight-year- olds had a mean change in LOC of 0.7 ± 5.6; nine-year-olds had a mean change in LOC of 1.0 ± 4.2; ten-year-olds had a mean change in LOC of -0.8 ± 5.6; and 11-year-olds had a mean change in LOC of 1.5 ± 2.5. There was no mean difference in change of LOC by age group (p=0.364). Whites had a mean change in LOC of 0.9 ± 3.9; Hispanics had a mean change in LOC of 0.6 ± 5.1; other races combined had a mean change in LOC of -0.3 ± 5.2. There was no mean difference in change in LOC by race (p=0.642).

Regression Analysis

To analyze the effects that the interaction between THANX participation, gender, age, and race played on LOC, a linear regression model was conducted to determine how much of the variance in LOC score could be predicted by each of these factors. Based on this analysis, 10% of the variance of the September LOC

score and 9% of the January LOC score could be predicted by these factors, however only gender was statistically significant (p=0.05) and (p=0.02) respectively.

Table 4.

Variance in September LOC Scores.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.313[a]	.098	.056	3.999

a. Predictors: (Constant), RaceGroup, Gender, THANXparticipant, AgeGroup

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	25.218	4.151		6.075	.000
	THANXparticipant	-.732	.939	-.081	-.779	.438
	Gender	1.710	.865	.206	1.976	.051
	AgeGroup	-.754	.413	-.191	-1.825	.072
	RaceGroup	-.427	.302	-.148	-1.415	.161

a. Dependent Variable: CNSIEscore1

Table 5.

Variance in January LOC Scores.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.293[a]	.086	.043	3.938

a. Predictors: (Constant), RaceGroup, Gender, THANXparticipant, AgeGroup

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	22.590	4.088		5.527	.000
	THANXparticipant	-.609	.925	-.069	-.658	.512
	Gender	2.026	.852	.249	2.377	.020
	AgeGroup	-.651	.407	-.168	-1.598	.114
	RaceGroup	-.082	.297	-.029	-.275	.784

a. Dependent Variable: CNSIEscore2

For school PA scores, 10% of the variance of September school PA was predicted by these factors, yet only gender was statistically significant (p=0.008). Nineteen percent (19%) of the variance in January school PA was predicted by these factors, with gender (p=0.001) and age group (p=0.036) being statistically significant.

Table 6.

Variance in September School PA Scores.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.320[a]	.102	.060	2.14193

a. Predictors: (Constant), RaceGroup, Gender, THANXparticipant, AgeGroup

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	11.094	2.223		4.990	.000
	THANXparticipant	.136	.503	.028	.271	.787
	Gender	-1.265	.464	-.283	-2.728	.008
	AgeGroup	-.238	.221	-.112	-1.073	.286
	RaceGroup	-.164	.162	-.106	-1.015	.313

a. Dependent Variable: SeptSchoolPA

Table 7.

Variance in January School PA Scores.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.433[a]	.188	.150	2.01144

a. Predictors: (Constant), RaceGroup, Gender, THANXparticipant, AgeGroup

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	13.004	2.088		6.229	.000
	THANXparticipant	-.377	.472	-.079	-.798	.427
	Gender	-1.492	.435	-.338	-3.428	.001
	AgeGroup	-.444	.208	-.212	-2.133	.036
	RaceGroup	-.142	.152	-.093	-.937	.351

a. Dependent Variable: JanSchoolPA

For home PA, these factors predict 11% of the variance in September PA, yet only age group was statistically significant (p=0.002); for January, the factors predict 7% of the variance but only gender was statistically significant (p=0.026).

Table 8.

Variance in September Home PA Scores.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.333[a]	.111	.069	3.92809

a. Predictors: (Constant), RaceGroup, Gender, THANXparticipant, AgeGroup

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.655	4.077		-.651	.517
	THANXparticipant	-.025	.922	-.003	-.028	.978
	Gender	-.358	.850	-.044	-.421	.674
	AgeGroup	1.279	.406	.327	3.150	.002
	RaceGroup	-.123	.296	-.043	-.415	.679

a. Dependent Variable: SeptHomePA

Table 9.

Variance in January Home PA Scores.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.267[a]	.071	.027	4.15295

a. Predictors: (Constant), RaceGroup, Gender, THANXparticipant, AgeGroup

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	6.243	4.310		1.448	.151
	THANXparticipant	-.207	.975	-.022	-.212	.832
	Gender	-2.034	.899	-.239	-2.263	.026
	AgeGroup	.505	.429	.125	1.177	.242
	RaceGroup	-.192	.313	-.065	-.612	.542

a. Dependent Variable: JanHomePA

CHAPTER 5

DISCUSSION

Mean Locus of Control (LOC) scores of the Child Nowicki Strickland Internal External Scale (CNSIE) did not differ significantly from September to January. This could be due to the fact that only 4 months elapsed between the pre- and post-tests, which was not sufficient to see true changes. The present study is part of a longer project in which data will be collected at the end of the school year, which could provide ample time to denote changes. This held true by age, participation in THANX, gender, and race. Although LOC scores did not differ significantly from the two time points, LOC scores did differ significantly by gender: males were more internal and females were more external.

School time PA scores differed by gender at baseline and by gender and age group at post. Boys were more active than the girls at both time points, and younger children were more active than older children. This may be because both younger children and boys tend to use their free time to play and are not concerned with what they look like during or after playing; they just want to have fun. As children, particularly girls, enter adolescence they begin to become concerned with both their appearance and performance relative to their peers; those that are not naturally athletic or that lack exposure to sports compared to their peers are more likely to avoid the activity or behavior, opting instead to spend their time talking, standing around, or engaging in other more sedentary activities. As demands in the classroom and at home increase with age, older students may choose to finish incomplete assignments during school time

recreation so as to lessen the burden of homework after school, particularly if they are involved in other activities that typically practice 2 or 3 times a week such as soccer, baseball, football, karate, and dance, or if they have responsibilities around the home such as helping to care for their younger siblings. Additionally, at Sequoia, teachers have the discretion of allowing time for recess or not. Generally, kindergarten through 2nd grade students have two 15 minute recesses each day, and 3rd through 6th grade students have one recess, but not every day. Students' lunch period is 30 minutes, with the first 15 minutes designated as time to eat and the last 15 minutes as time to play if they have finished their lunch. Many students may also spend a significant amount of their lunch time waiting in line to purchase their lunch, thus running out of time to play afterwards.

Non-school PA varied by age group at baseline, and by gender and LOC group at post. Eight-year olds were significantly less active than 10- and 11- year olds, and 9-year olds were less active than 11-year olds. This may be fairly intuitive, as older children are given more freedom to go out and play with friends in neighborhood parks often without immediate adult supervision allowing for unstructured play. Safety and security issues may cause parents to be reluctant to allow their 8- or 9-year olds to play in the neighborhood unsupervised; in this case, if a parent was occupied at home, their child would have been there as well, likely being sedentary inside the house. Another possible reason for the difference in PA level is that older children are more likely to be involved with organized sports, whether in recreational or competitive leagues, than younger children who may still lack the gross motor skills and coordination required of

these sports. Younger siblings are often chronic spectators at their older brothers' and sisters' team practices and games, and frequently there are financial considerations when children begin playing in competitive leagues, resulting in fewer resources (money and time) available for the younger child to participate.

Although home PA scores did not differ by gender at baseline, in January the boys were significantly more active than the girls. These differences were found during overall free time PA during the prior week, but not specifically after school, in the evening, or on the weekend. There was only one activity on the PAQ-C that boys participated in significantly more than the girls and that was football. The week prior to post-testing, the National Football League (NFL) was in the last week of the playoffs holding the AFC and NFC championships, deciding who would move on to the Superbowl on February 5th. The media hype of the NFL during the week prior to testing could explain why boys were significantly more active during their free time, specifically playing football, than the girls. Family influence and role models could also explain gender differences; this study did not assess parental PA levels so there is no way of knowing if students that were more active also have more active role models in the home.

Overall, however, there was not much difference in leisure time PA levels from September to January, suggesting that children's level of overall free time PA remains relatively constant. However, since childhood PA predicts adolescence PA which in turn predicts adult PA, and since PA levels decline somewhat at each time point, it appears that prior activity, not LOC, is the best

predictor of future activity, for it is likely that as these students get older their PA levels will also decline even as their LOC becomes more internal.

The present study found that although boys were more internal and were generally more active than girls both at school and at home, and older children were more internal than younger children and were more active at home, younger, and thus more external, children were more active at school. Therefore it is likely gender and age that predict PA level, not LOC.

CHAPTER 6

CONCLUSIONS AND APPLICATION

Locus of control (LOC) is a phenomenon closely related to self-efficacy, one's confidence in their ability to complete a given task or behave in a certain fashion. The present study did not demonstrate that LOC predicted PA level or future PA. In fact, the best predictors current PA behaviors were age and gender, and of future PA behaviors were current PA behaviors. However, since LOC can be influenced by positive messages, interventions focusing on positive messages regarding PA and self-efficacy could serve to make children more internal and confident in their ability to engage in more physical activity thus meeting the recommended guidelines of at least 60 minutes of play every day. Fostering a joy for play and movement at a young age so as to make the behavior "normal" is the best way to predict PA behavior throughout the lifespan.

One reason that girls may have been more external than boys is that they are more likely to be "followers" rather than "leaders". Girls' actions tend to be more motivated by what others are doing, saying, or even thinking about them; they behave in ways because they are pushed and pulled. Even when considering settings such as the gym, women tend to participate more in group exercise classes, where the instructors and even the other women in the class push them to work harder, and men tend to participate in more individual settings such as running and weight lifting where they may set a personal goal of achieving a certain pace, distance, or weight.

There were no significant changes in LOC or PA levels from pre- to post-testing. Age and grade appear to be the strongest predictor of PA level with sharp declines around age 11, as children enter adolescence. Therefore interventions designed to target this age level and to increase or at the very least maintain their PA level could be beneficial for encouraging increased PA levels in adolescence, as these behaviors carry on into adulthood.

Gender proved to be the greatest determinant in PA level at school, with boys significantly more active than girls during recess and lunch, as well as in their overall PA for the week at post-test. Additionally, gender had significant mean differences in total school PA and total overall PA at post-test. Despite having access to PA, girls continue to lag behind boys in sports. This could be because physical education has traditionally taught men's team sports and women's team sports simply are not as prominent. Or it could be that there is simply a lack of physically active female role models for the girls to emulate. At Sequoia Elementary School in Mesa, AZ, although all of the general education teachers in the study were female, both physical education teachers were male. This sends a message to girls as well as boys that girls are supposed to study and boys are supposed to play. The demographics of the teachers at Sequoia Elementary are not unique. Stereotypes that boys are supposed to run around and get sweaty and girls are supposed to be concerned with their appearance are reinforced by the popular media; women are rarely shown sweating and exercising as a matter of fact.

In spite of laws like Title IX which have given girls more opportunities to participate in sports at school, girls still lack female role models in professional sports, and those that exist tend to participate in "women's" sports such as ice skating, gymnastics, tennis, and golf. Men dominate the sports news industry; they are the reporters covering sports that men play such as football, baseball, basketball, and hockey; very few sports reporters are women, and very rarely do men report on women's sports. In both the on- and off- seasons of each male dominated sport, the airwaves on multiple sports channels are filled with news about drafts, trades, projected playoff contenders, coaches, and scandals. However, women's sports do not have a single television channel dedicated to them, and on the sports channels that do exist, female stars are rarely mentioned, even in the days leading to a national or global championship or competition. The most attention women's sports receive is during the Olympics, and even then, the replay of the matches or competitions frequently takes place during late night hours when young girls are asleep and unlikely to watch.

Present physical activity is the greatest predictor of future physical activity, and as PA tends to decline from childhood to adolescence to adulthood, the best way to increase PA in adulthood is to increase it significantly in childhood. The best chance to improve the long-term health of the nation will take a generation to see the results. An investment in children, particularly young girls, to ensure that they meet the minimum recommendation of 60 minutes of play daily now will be an investment in the collective health future of the country as well. Schools are strapped not only for funding for teachers, books, and

facilities, but for time to encourage their students to be what they are: children. In their natural state, children will play; they will create; they will learn; and in doing so their self-efficacy will increase; their self-esteem will improve; and their locus of control will become more internal as they see connections between what they do and how this influences their lives.

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APPENDIX A

IRB APPROVAL

ASU Knowledge Enterprise Development

Office of Research Integrity and Assurance

To:	Jack Chisum 7350 E UNI
From:	Carol Johnston, Chair Biosci IRB
Date:	08/22/2011
Committee Action:	**Expedited Approval**
Approval Date:	08/22/2011
Review Type:	Expedited F7
IRB Protocol #:	1108006721
Study Title:	The use of an internal locus of control scale as a prediction of exercise adherence in children ages 6-12
Expiration Date:	08/21/2012

The above-referenced protocol was approved following expedited review by the Institutional Review Board.

It is the Principal Investigator's responsibility to obtain review and continued approval before the expiration date. You may not continue any research activity beyond the expiration date without approval by the Institutional Review Board.

Adverse Reactions: If any untoward incidents or severe reactions should develop as a result of this study, you are required to notify the Biosci IRB immediately. If necessary a member of the IRB will be assigned to look into the matter. If the problem is serious, approval may be withdrawn pending IRB review.

Amendments: If you wish to change any aspect of this study, such as the procedures, the consent forms, or the investigators, please communicate your requested changes to the Biosci IRB. The new procedure is not to be initiated until the IRB approval has been given.

Please retain a copy of this letter with your approved protocol.

APPENDIX B

PARENTAL CONSENT FORM: ENGLISH

Study Title: The use of an internal locus of control scale as a prediction of exercise adherence in children ages 6-12

PARENTAL LETTER OF PERMISSION

Dear Parent:

I am a graduate student under the direction of Professor Jack Chisum in the School of Nutrition and Health Promotion at Arizona State University. I am conducting a research study to determine if exercise adherence in children can be predicted based on the child's internal locus of control.

I am inviting your child's participation, which will involve completing two questionnaires on three occasions during the school year. The questionnaires ask about the activities your child participates in during the course of a week and if they agree or disagree with statements related to their own influence in the events happening around them. Each questionnaire will take approximately 15 minutes to complete. Your child's participation in this study is voluntary. If you choose not to have your child participate or to withdraw your child from the study at any time, there will be no penalty and it will not affect your child's grade. Likewise, if your child chooses not to participate or to withdraw from the study at any time, there will be no penalty. Your child may participate in the THANX program even if they do not complete the questionnaires. The results of the research study may be published, but your child's name will not be used.

Although there may be no direct benefit to your child, the possible benefit of your child's participation is finding a link between physical activity and the child's perception of being in control of their actions. There are no foreseeable risks or discomforts to your child's participation.

Responses will be confidential. All participant data will be coded so that it cannot be connected with the participants. This study may be used in reports, presentations, or publications but your child's name will not be used. Results will only be shared in the aggregate form.

If you have any questions concerning the research study or your child's participation in this study, please call me at (480) 290-8264 or email holly.aguila@asu.edu, or Dr. Chisum at (602) 496-1872 or email **jchisum@mainex1.asu.edu.**

Sincerely,

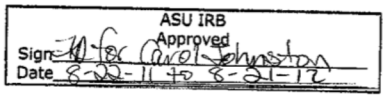
Holly Aguila

By signing below, you are giving consent for your child, _____ (Child's name) to participate in the above study.

_____ _____ _____

Signature Printed Name Date

If you have any questions about you or your child's rights as a subject/participant in this research, or if you feel you or your child have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the Office of Research Integrity and Assurance, at (480) 965-6788.



APPENDIX C

PARENTAL CONSENT FORM: SPANISH

Título del estudio: "El uso de una escala de control interno como predicción de conformidad de ejercicio en jovenes de 6 a 12 años de edad"

CARTA DE PERMISO DEL PADRE

Estimado Padre:

Soy un estudiante graduado bajo la dirección del Profesor Jack Chisum en la Escuela de Nutrición y Promoción de Salud en Universidad Estatal de Arizona. Estoy llevando a cabo un estudio de investigación para determinar si la adherencia al ejercicio en niños puede ser predecida basada en la localidad interna de control del niño.

Pido la participación de su hijo para completar dos cuestionarios en tres ocasiones durante el año escolar. Los cuestionarios requieren que su hijo nombre las actividades en las que toma parte durante una semana y si está de acuerdo o no con declaraciones relacionadas a su propia influencia en los acontecimientos que suceden a su alrededor. Cada cuestionario tomará aproximadamente 15 minutos. La participación de su hijo/a en este estudio es voluntaria. Si decide no permitir que su niño participe o si decide retirar a su niño del estudio en cualquier momento, no habrá repercuciones y no afectará sus calificaciones. De la misma manera, si su niño decide no participar o si decide retirarse del estudio a cualquire hora, no habrá ninguna repercución. Su niño puede tomar parte en el programa de THANX aunque no complete los cuestionarios. Los resultados del estudio de investigación pueden ser publicados, pero el nombre de su hijo no será utilizado.

Aunque es posible que no haya beneficio directo para su niño, el beneficio posible de la participación en el estudio es encontrar la relació entre la actividad física y la percepción del niño de estar bajo control de sus acciones. No hay riesgos ni molestias obvias en la participación de su niño.

Las respuestas serán confidenciales. Todos los datos del participante serán codificados para que no puedan ser conectados con los participantes. Este estudio puede ser utilizado en reportes, presentaciones, o en publicaciones pero el nombre de su niño no será utilizado. Los resultados sólo serán compartidos en forma global.

Si tiene alguna pregunta con respecto al estudio de investigación o la participación de su hijo en este estudio, favor de llamarme al (480) 290-8264 o contactarme por correo electrónico holly.aguila@asu.edu, o al Dr. Chisum a (602) 496-1872 o jchisum@mainex1.asu.edu.

Su servidora,

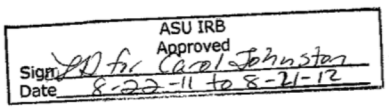
Holly Aguila

Al firmar abajo, da consentimiento para que su hijo, _____ (el nombre del hijo) participle en el estudio antes mencionado.

_____ _____ _____

Firma Nombre Fecha

Si tiene alguna pregunta acerca de sus derechos tanto como los derechos de su niño como sujeto/participante en esta investigación, o si siente que usted o su niño han sido colocados en peligro, puede contactar al Chair of the Human Subjects Institutional Review Board, en la Office of Research Integrity and Assurance, al (480) 965-6788.



APPENDIX D

CHILD ASSENT FORM

Child Assent Forms
THANX English /Spanish

Study Title: The use of an internal locus of control scale as a prediction of exercise adherence in children ages 6-12

I have been told that my mom or dad have given permission for me to take part in a project to see about being in control of my own success when it comes to exercise.

I will be asked to complete 2 questionnaires three different times during this school year. The questionnaires will probably take about 15 minutes to fill out each time. I am taking part because I want to. I know that I can stop at any time if I want to and it will be okay if I want to stop.

Sign Your Name Here _____ Print Your Name Here _____

Date _____

Título del estudio: "El uso de una escala de control interno como predicción de conformidad de ejercicio en jovenes de 6 a 12 años"

Me han dicho que mi mamá o papa ha dado permiso para que yo participe en un proyecto para ver si tengo control de mi própio éxito en cuanto al ejercicio.

Me pedirán que complete 2 cuestionarios en 3 ocaciones diferentes durante el año escolar. Los cuestionarios durarán unos 15 minutos para llenar cada vez. Estoy tomando parte porque quiero. Sé que puedo dejar de participar en cualquier momento que quiero y está bien si no quiero participar más.

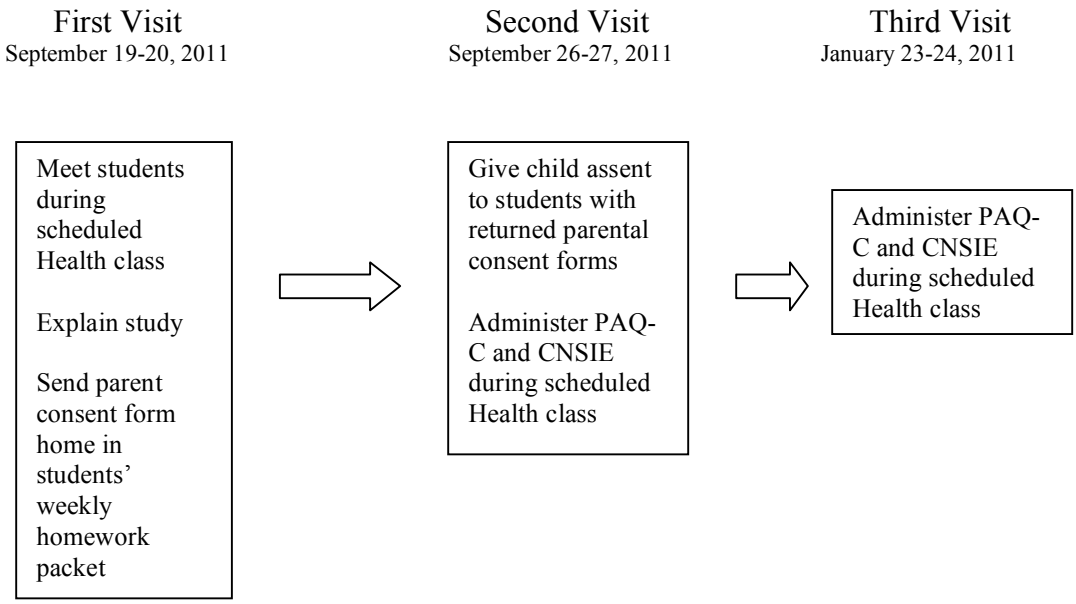
Firma tu nombre aquí _____ Escribe tu nombre aquí _____

Fecha _____

ASU IRB Approved
Sign YR for Carol Johnston
Date 8-22-11 to 8-21-12

APPENDIX E

FLOW CHART


First Visit
September 19-20, 2011
Second Visit
September 26-27, 2011
Third Visit
January 23-24, 2011
Meet students during scheduled Health class
Explain study
Send parent consent form home in students' weekly homework packet
Give child assent to students with returned parental consent forms
Administer PAQ-C and CNSIE during scheduled Health class
Administer PAQ-C and CNSIE during scheduled Health class

APPENDIX F

CNSIE – ENGLISH

CNSIE

YES	NO	
____	____	1. Do you believe that most problems will solve themselves if you just don't fool with them?
____	____	2. Do you believe that you can stop yourself from catching a cold?
____	____	3. Are some kids just born lucky?
____	____	4. Most of the time, do you feel that getting good grades means a great deal to you?
____	____	5. Are you often blamed for things that just aren't your fault?
____	____	6. Do you believe that if somebody studies hard enough he or she can pass any subject?
____	____	7. Do you feel that most of the time it doesn't pay to try hard because things never turn out right anyway?
____	____	8. Do you feel that if things start out well in the morning that it's going to be a good day no matter what you do?
____	____	9. Do you feel that most of the time parents listen to what their children have to say?
____	____	10. Do you believe that wishing can make good things happen?
____	____	11. When you get punished, does it usually seem it's for no good reason at all?
____	____	12. Most of the time, do you find it hard to change a friend's (mind) opinion?
____	____	13. Do you think that cheering more than luck helps a team to win?
____	____	14. Do you feel that it's nearly impossible to change your parent's mind about anything?
____	____	15. Do you believe that your parents should allow you to make most of your own decisions?
____	____	16. Do you feel that when you do something wrong there's very little you can do to make it right?
____	____	17. Do you believe that most kids are just born good at sports?
____	____	18. Are most of the other kids your age stronger than you are?
____	____	19. Do you feel that one of the best ways to handle most problems is just not to think about them?
____	____	20. Do you feel that you have a lot of choice in deciding who your friends are?
____	____	21. If you find a four leaf clover, do you believe that it might bring you good luck?
____	____	22. Do you often feel that whether you do your homework has much to do with what kind of grades you get?
____	____	23. Do you feel that when a kid your age decides to hit you, there's little you can do to stop him or her?
____	____	24. Have you ever had a good luck charm?

____ ____ 25. Do you believe that whether or not people like you depends on how you act?

____ ____ 26. Will your parents usually help you if you ask them to?

____ ____ 27. Have you felt that when people were mean to you it was usually for no reason at all?

____ ____ 28. Most of the time, do you feel that you can change what might happen tomorrow by what you do today?

____ ____ 29. Do you believe that when bad things are going to happen they just are going to happen no matter what you try to do to stop them?

____ ____ 30. Do you think that kids can get their own way if they just keep trying?

____ ____ 31. Most of the time, do you find it useless to try to get your own way at home?

____ ____ 32. Do you feel that when good things happen they happen because of hard work?

____ ____ 33. Do you feel that when somebody your age wants to be your enemy there's little you can do to change matters?

____ ____ 34. Do you feel that it's easy to get friends to do what you want them to?

____ ____ 35. Do you usually feel that you have little to say about what you get to eat at home?

____ ____ 36. Do you feel that when someone doesn't like you there's little you can do about it?

____ ____ 37. Do you usually feel that it's almost useless to try in school because most other children are just plain smarter than you are?

____ ____ 38. Are you the kind of person who believes that planning ahead makes things turn out better?

____ ____ 39. Most of the time, do you feel that you have little to say about what your family decides to do?

____ ____ 40. Do you think it's better to be smart than to be lucky?

APPENDIX G

CNSIE – SPANISH

CNSIE (Spanish)

SI___ NO__

_____ _____ 1. ¿Crees que la mayoría de los problemas se resolverán si no haces nada?

_____ _____ 2. ¿Crees que tienes el poder de no resfriarte?

_____ _____ 3. ¿Algunos muchachos nacen con suerte?

_____ _____ 4. ¿La mayoría del tiempo sientes que es importante sacar buenas calificaciones en la escuela?

_____ _____ 5. ¿A menudo otros te hechan la culpa por cosas por las cuales no eres culpable?

_____ _____ 6. ¿Crees que alguien que estudia lo suficiente puede aprobar cualquiera materia?

_____ _____ 7. ¿Sientes que la mayoría del tiempo no vale la pena intentar algo porque de todas maneras las cosas no van a salir bien?

_____ _____ 8. ¿Sientes que si las cosas empiezan bien por la mañana, va a ser un buen día sin tener en cuenta lo que haces?

_____ _____ 9. ¿Sientes que la mayoría del tiempo los padres escuchan lo que le dicen los hijos?

_____ _____ 10. ¿Crees que con solo desearlo puedes hacer que pasen cosas buenas?

_____ _____ 11. ¿Cuando te castigan, sueles parecer que no es por una buena razón?

_____ _____ 12. ¿La mayoría del tiempo, encuentras difícil cambiar la opinión de un amigo?

_____ _____ 13. ¿Piensas que el animar a un equipo ayuda mas que la suerte?

_____ _____ 14. ¿Sientes que es casi imposible cambiar la opinión de tus padres?

_____ _____ 15. ¿Crees que tus padres debían permitirte hacer casi todas tus deciciones?

_____ _____ 16. ¿Sientes que cuando te equivocas en algo hay muy poco que puedas hacer para rectificarlo?

_____ _____ 17. ¿Crees que la mayoría de los muchachos nacen con talentos naturales para los deportes?

_____ _____ 18. ¿La mayoría de los otros muchachos de tu edad son más fuertes que tu?

_____ _____ 19. ¿Sientes que la mejor manera de arreglar la mayoría de los problemas es no pensar en ellos?

_____ _____ 20. ¿Sientes que tienes muchas opciones en decidir quienes son tus amigos?

_____ _____ 21. ¿Si encuentras un trebol, crees que te puede traer buena suerte?

_____ _____ 22. ¿A menudo sientes que el hecho de hacer la tarea tiene mucho que ver con las notas que recibes?

_____ _____ 23. ¿Sientes que cuando un muchacho de tu edad decide pegarte, hay poco que puedes hacer para pararlo?

_____ _____ 24. ¿Alguna vez has recibido un señal de buena suerte?

_____ _____ 25. ¿Crees que tu comportamiento influye la opinion que otras personas tienen de ti?

_____ _____ 26. ¿Tus padres suelen ayudarte si se lo pides?

_____ _____ 27. ¿Has sentido que cuando la gente te trató mal no fue por ningun motivo?

_____ _____ 28. ¿La mayoría del tiempo sientes que tus acciones de hoy pueden cambiar lo que ocurra mañana?

_____ _____ 29. ¿Crees que cuando cosas malas van a ocurrir, pasarán aunque tu trates de pararlas?

_____ _____ 30. ¿Crees que los muchachos pueden conseguir lo que quieren si siguen intentando?

_____ _____ 31. ¿La mayoría del tiempo, lo encuentras inútil intentar de conseguir lo que quieres en casa?

_____ _____ 32. ¿Sientes que cuando te pasan cosas buenas, ocurren por tu buen esfuerzo?

_____ _____ 33. ¿Sientes que cuando alguien de tu edad quiere ser tu enemigo, hay poco que puedes hacer para cambiar la situación?

_____ _____ 34. ¿Sientes que es fácil conseguir que tus amigos hagan lo que tu quieres?

_____ _____ 35. ¿Sueles sentir que tienes poca influencia en lo que se come en la casa?

_____ _____ 36. ¿Sientes que cuando no te gusta alguien hay poco que puedes hacer?

_____ _____ 37. ¿Sueles sentir que es inútil intentar sobresalir en la escuela porque los otros muchachos son más inteligentes que tu?

_____ _____ 38. ¿Eres el tipo de persona que cree que planear con anticipación hace que las cosas salgan mejor?

_____ _____ 39. ¿La mayoría del tiempo, sientes que tienes poca influencia en las deciciones de tu familia?

_____ _____ 40. ¿Piensas que es mejor ser inteligente que tener suerte?

APPENDIX H

PAQ-C (ENGLISH)

ID:_____ Age:_____
Sex: M_____ F_____ Grade:_____
Teacher:_____

We are trying to find out about your level of physical activity from the last 7 days (in the last week). This includes sports or dance that make you sweat or make your legs feel tired, or games that make you breathe hard, like tag, skipping, running, climbing, and others.

Remember:
1. There are no right and wrong answers — this is not a test.
2. Please answer all the questions as honestly and accurately as you can — this is very important.

1. Physical activity in your spare time: Have you done any of the following activities in the past 7 days (last week)? If yes, how many times? (Mark only one box per row.)

	No	1-2	3-4	5-6	7+
Skipping					
Rowing/canoeing					
In-line skating					
Tag					
Walking for exercise					
Bicycling					
Jogging/running					
Aerobics					
Swimming					
Baseball/softball					
Dance					
Football					
Badminton					
Skateboarding					
Soccer					
Street hockey					
Volleyball					

Floor hockey					

	No	1-2	3-4	5-6	7+
Basketball					
Ice skating					
Cross-country skiing					
Ice hockey/ringette					
Other:					
Other:					

2. In the last 7 days, during your physical education (PE) classes, how often were you very active (playing hard, running, jumping, throwing)? (Circle one only.)

I don't do PE
Hardly ever
Sometimes
Quite often
Always

3. In the last 7 days, what did you do most of the time at recess? (Circle one only.)

Sat down (talking, reading, doing schoolwork)
Stood around or walked around
Ran or played a little bit
Ran around and played quite a bit
Ran and played hard most of the time

4. In the last 7 days, what did you normally do at lunch (besides eating lunch)? (Circle one only.)

Sat down (talking, reading, doing schoolwork)
Stood around or walked around
Ran or played a little bit
Ran around and played quite a bit
Ran and played hard most of the time

5. In the last 7 days, on how many days right after school, did you do sports, dance, or play games in which you were very active? (Circle one only.)

None
1 time last week
2 or 3 times last week
4 times last week
5 times last week

6. In the last 7 days, on how many evenings did you do sports, dance, or play games in which you were very active? (Circle one only.)

None
1 time last week
2 or 3 times last week
4 or 5 last week
6 or 7 times last week

7. On the last weekend, how many times did you do sports, dance, or play games in which you were very active? (Circle one only.)

None
1 time
2 — 3 times
4 — 5 times
6 or more times

8. Which one of the following describes you best for the last 7 days? Read all five statements before deciding on the one answer that describes you. Circle your choice.

A. All or most of my free time was spent doing things that involve little physical effort

B. I sometimes (1 — 2 times last week) did physical things in my free time (e.g. played sports, went running, swimming, bike riding, did aerobics)

C. I often (3 — 4 times last week) did physical things in my free time

D. I quite often (5 — 6 times last week) did physical things in my free time

E. I very often (7 or more times last week) did physical things in my free time.

9. Mark how often you did physical activity (like playing sports, games, doing dance, or any other physical activity) for each day last week.

	None	Very Little	Some	Medium	Often
Monday					
Tuesday					
Wednesday					
Thursday					
Friday					
Saturday					
Sunday					

10. Were you sick last week, or did anything prevent you from doing your normal physical activities? (Circle one.)

Yes
No

If Yes, what prevented you?_____

APPENDIX I

PAQ-C (SPANISH)

ID:_____ Edad:_____
Sexo: M_____ F_____ Grado:____
Maestro/a:_____

Queremos saber tu nivel de actividad física durante los últimos siete días (en la última semana). Esto incluye deportes o baile que te hacen sudar o que cansan tus piernas, o juegos que te hacen respirar fuerte como correr, brincar, escalar, jugar a las escondidas, u otras actividades.

Recuerda:

1. No hay respuestas correctas o incorrectas. Este no es un examen.
2. Por favor contesta todas las preguntas honestamente lo más correcto posible – esto es muy importante.

1. Actividad física en tu tiempo libre: ¿Has hecho alguna de las siguientes actividades en la última semana? ¿Cuántas veces? (Solo marca un cuadro por línea.)

	No	1-2	3-4	5-6	Más
Brincar					
Remar					
Patinar					
Jugar a la roña					
Caminar como ejercicio					
Andar en bicicleta					
Trotar o correr					
Gymnasia					
Natación					
Béisbol o softball					

Baile					
Fútbol Americano					
	No	1-2	3-4	5-6	Más
Volante					
Fútbol					
Hockey de calle					
Voleibol					
Hockey de piso					
Balón cesto					
Patinaje sobre hielo					
Esquí					
Hockey de hielo					
Otro:					
Otro:					

2. En los últimos 7 días, durante tu clase de educación física (PE), ¿Con que frecuencia estabas activo (jugando fuerte, corriendo, saltando, tirando)? (Escoje una sola respuesta)

_____ No participé en educación física
_____ Casi nunca
_____ A veces
_____ Muchas veces
_____ Siempre

3. En los últimos 7 días, ¿Que hiciste la mayor parte del tiempo durane el recreo? (Escoje solo una respuesta)

_____ Me senté (hablé, leí, hice trabajo de la escuela)
_____ Me quedé parado o caminé un poco
_____ Corrí o jugué un poco
_____ Corrí y jugué mucho
_____ Corrí y jugué fuerte casi todo el tiempo

4. En los últimos 7 días, ¿Que hiciste durante el lonche (además de comer)?
_____ Me senté (hablé, leí, hice trabajo de la escuela)
_____ Me quedé parado o caminé un poco
_____ Corrí o jugué un poco
_____ Corrí y jugué mucho
_____ Corrí y jugué fuerte casi todo el tiempo

5. En los últimos 7 días, ¿En cuántos días participaste en deportes, baile, o juegos muy activos inmediatamente después de la escuela?

_____ Ninguno
_____ 1 día
_____ 2 o 3 días
_____ 4 días
_____ 5 días

6. En los últimos 7 días, ¿En cuantás tardes/noches participaste en deportes, baile, o juegos muy activos?

_____ Ninguna
_____ 1 tarde
_____ 2 o 3 tardes
_____ 4 o 5 tardes
_____ 6 o 7 tardes

7. Durante el último fin de semana, ¿Cuántas veces participaste en deportes, baile, o juegos muy activos?

_____ Ninguna vez
_____ 1 vez
_____ 2-3 veces
_____ 4-5 veces
_____ 6 veces o más

8. ¿Cuál de los siguientes te describe major durante los últimos 7 días? Lee las 5 opciones antes de decidir en la descripción que más te corresponda.

_____ Todo o casi todo mi tiempo libre la pasé haciendo actividades que requieren poco esfuerzo físico.

_____ Pocas veces (1-2 veces la semana pasada) hice actividades físicas en mi tiempo libre) (por ejemplo jugar deportes, correr, nadar, andar en bicicleta, hacer gimnasia)

_____ A veces (3-4 veces la semana pasada) hice actividades físicas en mi tiempo libre.

_____ Varias veces (5-6 veces la semana pasada) hice actividades físicas en mi tiempo libre.

_____ Muchas veces (7 o más veces la semana pasada) hice actividades físicas en mi tiempo libre.

9. Marca la frecuencia con la que hiciste actividades físicas (deportes, juegos, baile, u otra actividad física) por cada día de la semana pasada.

	Nunca	Algunas veces	Varias veces	Muchas veces
Lunes				
Martes				
Miércoles				
Jueves				
Viernes				
Sábado				
Domingo				

10. ¿Estuviste enfermo la semana pasada, o hubo algo que te previno hacer tus actividades físicas normales? (marca uno)

_____ Sí
_____ No

Si respondiste que "sí", ¿Que te previno de participar en tus actividades físicas normales?_____