The Pennsylvania State University

The Graduate School

College of Health and Human Development

DOES MOTIVATION MEDIATE THE EFFECT OF PARENTAL INFLUENCE ON URBAN, MINORITY ADOLESCENTS’ PHYSICALLY ACTIVE LEISURE?

A Dissertation in

Recreation, Park and Tourism Management

by

Jason Lovejoy Scott

© 2014 Jason Lovejoy Scott

Submitted in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

December 2014
The dissertation of Jason Lovejoy Scott was reviewed and approved* by the following:

Linda L. Caldwell  
Distinguished Professor of Recreation, Park and Tourism Management and Human Development and Family Studies  
Dissertation Adviser  
Chair of Committee

Garry Chick  
Professor of Recreation, Park and Tourism Management

Benjamin D. Hickerson  
Assistant Professor of Recreation, Park and Tourism Management

Edward A. Smith  
Director, Edna Bennett Pierce Prevention Research Center

Deborah Kerstetter  
Professor of Recreation, Park and Tourism Management

*Signatures are on file in the Graduate School.
Abstract

Physical inactivity remains a concern for public health due to the low levels of physical activity reported by adolescents. Of particular concern are low levels of physical activity among minority adolescents, particularly those of African American and Hispanic descent. Many researchers and practitioners have tried a variety of strategies in recent years to combat the physical inactivity problem with varying results, yet physical activity levels remain low. One promising strategy involves parental support as an avenue to increase physical activity. The purposes of this dissertation are (a) to examine the effect that adolescent perceptions of parental support may have on adolescent physical activity, and if there is a relationship, (b) to examine if two types of motivation, intrinsic and identified/task oriented, mediate the effects of parental support on adolescent physical activity. This study also examined gender differences, the time of week in which physical activity occurs, and the varying types of physical activity participation such as walking, running, and other physical activity among urban, minority youth. Gender differences found girls reported significantly lower amounts of physical activity compared to boys. Using Social Cognitive Theory and Self Determination Theory as the theoretical frameworks, perceptions of parental support and individual motivation significantly predicted adolescent physical activity. The results indicated that perceptions of parental encouragement and engagement significantly predicted total physical activity, time of week physical activity and type of physical activity. Structural equation modeling was used to test the direct and indirect paths that perceptions of parental support and motivation on total physical activity, time of week physical activity, and type of physical activity. The results indicated that both intrinsic and identified/task oriented motivation mediated the effects of perceptions of parental encouragement across each model tested. The findings of this study provide a link between perceptions of
parental support and motivation that may be useful in designing physical activity prevention and intervention programs targeted to urban, minority adolescents.
Table of Contents

List of Tables ........................................................................................................................................ ix
List of Figures ...................................................................................................................................... xi
Acknowledgements .......................................................................................................................... xii

Chapter 1: Introduction ................................................................................................................... 1
  Physical Activity as a Public Health Concern ............................................................................... 1
  Physical Activity among Minority Youth ....................................................................................... 4
  Correlates and Promotion of Physical Activity ............................................................................ 5
    Role of parents and motivation .................................................................................................. 5
    Importance of examining time differences and type of physical activity ......................... 6

Significance and Purpose of the Study ............................................................................................ 7
  Research Questions ...................................................................................................................... 9

Conceptual Model ........................................................................................................................... 10

Chapter One Summary ................................................................................................................... 11

Chapter 2: Literature Review ........................................................................................................ 13
  Research on Adolescent Physical Activity ............................................................................... 13
    Physical Activity and Health ..................................................................................................... 15
    Physical Activity Guidelines .................................................................................................... 16
    Current Physical Activity Trends ............................................................................................ 17

Theoretical Perspectives .................................................................................................................. 20
  Social Cognitive Theory ............................................................................................................. 20
  Self-Determination Theory ........................................................................................................ 22
  Parental Support ......................................................................................................................... 24

Time of Week and Type of Physical Activity ............................................................................... 26

Commonly Used Methods and Instrumentation ............................................................................ 28

Chapter Two Summary .................................................................................................................. 29

Chapter 3: Methods ........................................................................................................................ 31
  Research Design ......................................................................................................................... 31
  Participants .................................................................................................................................... 31
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auxiliary Variables</td>
<td>44</td>
</tr>
<tr>
<td>Mediation</td>
<td>44</td>
</tr>
<tr>
<td>Chapter Three Summary</td>
<td>50</td>
</tr>
<tr>
<td>Chapter 4: Results</td>
<td>51</td>
</tr>
<tr>
<td>Research Question 1: Descriptive Statistics</td>
<td>53</td>
</tr>
<tr>
<td>Research Question 2: Effects of Parental Support on Total Physical Activity</td>
<td>56</td>
</tr>
<tr>
<td>Factor Analysis</td>
<td>58</td>
</tr>
<tr>
<td>Model Testing</td>
<td>60</td>
</tr>
<tr>
<td>Path Models</td>
<td>62</td>
</tr>
<tr>
<td>Research Question 3: Intrinsic Motivation on Total Physical Activity</td>
<td>63</td>
</tr>
<tr>
<td>Research Question 3a: Gender Differences on Total Physical Activity</td>
<td>70</td>
</tr>
<tr>
<td>Research Question 3b: Intrinsic Motivation on Type of Physical Activity</td>
<td>73</td>
</tr>
<tr>
<td>Research Question 3c: Intrinsic Motivation on Time of Week Physical Activity</td>
<td>76</td>
</tr>
<tr>
<td>Research Question 4: Identified/task Oriented Motivation on Total Physical Activity</td>
<td>78</td>
</tr>
<tr>
<td>Research Question 4a: Gender Differences on Total Physical Activity</td>
<td>81</td>
</tr>
<tr>
<td>Research Question 4b: Identified/task Oriented Motivation on Type of Physical Activity</td>
<td>85</td>
</tr>
<tr>
<td>Research Question 4c: Identified/task Oriented Motivation on Time of Week Physical Activity</td>
<td>88</td>
</tr>
<tr>
<td>Chapter Four Summary</td>
<td>91</td>
</tr>
<tr>
<td>Chapter Five: Discussion</td>
<td>93</td>
</tr>
<tr>
<td>Interpretation of Findings</td>
<td>96</td>
</tr>
<tr>
<td>Baseline Physical Activity Levels</td>
<td>96</td>
</tr>
<tr>
<td>Gender Differences</td>
<td>97</td>
</tr>
<tr>
<td>Parental Support Predicting Physical Activity</td>
<td>98</td>
</tr>
<tr>
<td>The Role of Intrinsic Motivation as a Mediator</td>
<td>98</td>
</tr>
<tr>
<td>The Role of Identified/task Oriented Motivation as a Mediator</td>
<td>101</td>
</tr>
<tr>
<td>Application of the Theoretical Frameworks</td>
<td>102</td>
</tr>
<tr>
<td>Limitations</td>
<td>103</td>
</tr>
<tr>
<td>Measurement</td>
<td>104</td>
</tr>
<tr>
<td>Implications</td>
<td>105</td>
</tr>
<tr>
<td>Future Research</td>
<td>105</td>
</tr>
<tr>
<td>Section</td>
<td>Page</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Chapter Five Summary</td>
<td>107</td>
</tr>
<tr>
<td>References</td>
<td>108</td>
</tr>
<tr>
<td>Appendix</td>
<td>125</td>
</tr>
</tbody>
</table>
List of Tables

Table 1. 3-Form Design ................................................................................................................ 35
Table 2. Time spent being physically activity over a 7 day period .............................................. 54
Table 3. Independent T-tests for physical activity by gender. ....................................................... 56
Table 4. Descriptive statistics for parental support and motivation items. ................................. 57
Table 5. Factor loadings for perceptions of parental support. ...................................................... 58
Table 6. Three regression models for total physical activity: total sample, boys, girls ............... 59
Table 7. Regression analysis predicting type of physical activity. ............................................... 60
Table 8. Regression analysis predicting time of week on physical activity. ............................... 60
Table 9. Goodness of fit for intrinsic motivation models. ............................................................ 62
Table 10. Goodness of fit for identified/task oriented motivation models. .................................. 62
Table 11. Total effects for intrinsic motivation on total physical activity ................................... 64
Table 12. Alpha, beta, and residual direct effects for intrinsic motivation on total physical activity ......................................................................................................................... 66
Table 13. Total effects for intrinsic motivation on type of physical activity .................................. 74
Table 14. Alpha, beta, and residual direct effects for intrinsic motivation on type of physical activity .......................................................................................................................... 75
Table 15. Total effects for intrinsic motivation on time of week physical activity ...................... 77
Table 16. Alpha, beta, and residual direct effects for intrinsic motivation on time of physical activity .......................................................................................................................... 78
Table 17. Total effects for identified/task oriented motivation on total physical activity .......... 79
Table 18. Alpha, beta, and residual direct effects for identified/task oriented motivation on total physical activity ........................................................................................................... 84
Table 19. Total effects for identified/task oriented motivation on type of physical activity. 86
Table 20. Alpha, beta, and residual direct effects for identified/task oriented motivation on type of physical activity. 88
Table 21. Total effects for identified/task oriented motivation on time of physical activity. 89
Table 22. Alpha, beta, and residual direct effects for identified/task oriented motivation on time of physical activity. 91
Table 23. Summary of findings from the regression models (Research Question 2). 92
Table 24. Summary of findings from the structural equation models (Research Questions 3 and 4). 92
List of Figures

Figure 1. General conceptual model of parental support, motivation, and physical activity ...... 11
Figure 2. Mediation model............................................................................................................ 45
Figure 3. Model of perceptions of parental support on total physical activity. ......................... 46
Figure 4. Model of perceptions of parental support on type of physical activity. ....................... 47
Figure 5. Model of perceptions of parental support on time of physical activity....................... 48
Figure 6. Model of identified motivation as a mediator of PPS on total physical activity.......... 48
Figure 7. Model of identified motivation as a mediator of PPS on type of physical activity...... 49
Figure 8. Model of identified motivation as a mediator of PPS on time of physical activity...... 50
Figure 9. Path model with unstandardized coefficients for total physical activity..................... 64
Figure 10. Path model with unstandardized coefficients for boys’ total physical activity.......... 71
Figure 11. Path model with unstandardized coefficients for girls’ total physical activity....... 72
Figure 12. Path model with unstandardized coefficients for type of physical activity............. 74
Figure 13. Path model with unstandardized coefficients for time of week physical activity .... 77
Figure 14. Path model with unstandardized coefficients for total physical activity............... 80
Figure 15. Path model with unstandardized coefficients for boys’ total physical activity........ 82
Figure 16. Path model with unstandardized coefficients for girls’ total physical activity....... 85
Figure 17. Path model with unstandardized coefficients for type of physical activity.......... 87
Figure 18. Path model with unstandardized coefficients for time of week physical activity..... 90
Acknowledgements

To get to this point in my life, I’ve received nothing but support and encouragement from family, friends, colleagues, and advisors. As with everything I hold dear in my life, I have to first acknowledge and thank God because without Him, this dream would not be possible. Next, Dr. Linda Caldwell has stood with me over the past five years (and throughout this process), and I have learned so much from here during my years at Penn State. Her dedication to youth development and healthy leisure has motivated me to follow in her footsteps and set out on my own path to encouraging healthy leisure pursuits among youth.

I would also like to acknowledge my committee members, Drs. Garry Chick, Ed Smith, and Ben Hickerson. They have always offered very thoughtful and insightful questions and comments that always, always allowed me to think more critically about my work. This dissertation is as much theirs as it is mine.

Lastly, my beautiful wife, my parents, and my beloved sister have pushed me every step of the way and they have not allowed the quitting spirit to overtake me. I thank them and I appreciate everything they have ever done and every ounce of support and encouragement they have offered.
Chapter 1: Introduction

Physical activity is essential to the health and well-being of all individuals, and physical activity among U.S. adolescents is a public health problem. Of particular concern is the lack of physical activity among minority youth and the health risks associated with physical inactivity. Many studies have been conducted on promoting physical activity among youth, but few have focused primarily on minority youth. Literature suggests that both parents and motivation are important predictors of being physically active, but little is known about how these predictors function in diverse populations. In this study, I will examine the role of parents and motivation in promoting physical activity for adolescents in an urban, minority sample. The purposes of this dissertation are (a) to examine the effect that adolescent perceptions of parental support may have on adolescent physical activity, and if there is a relationship, (b) to examine if two types of motivation, intrinsic and identified/task oriented, mediate the effects of parental support on adolescent physical activity.

In this chapter, I will provide justification for considering adolescent physical inactivity as a public health concern. I will then briefly describe the current state of adolescent physical activity, including the benefits and consequences of meeting/not meeting the recommended physical activity guidelines. Next, I will describe the health disparities that exist for minority populations as it relates to inadequate physical activity levels. Finally, I will discuss the theoretical framework and conceptual model used for this study.

**Physical Activity as a Public Health Concern**

A pandemic of physical inactivity continues to plague the U.S. population. Physical inactivity is a risk factor for developing diseases and illnesses resulting in a more unhealthy
population (U.S. Department of Health and Human Services, 2010; World Health Organization, 2012). A nationwide study using data from the National Health and Nutrition Examination Survey found that 92% of the adolescents did not receive enough physical activity, although the connection between health and physical activity is well documented (Troiano, Berrigan, Dodd, Masse, Tilert, & McDowell, 2008). Adolescents are of particular concern because physical activity is an essential component of human development for a healthy lifestyle. The lack of physical activity among today’s adolescents is a key contributor to the early onset of the development of diseases and illnesses that are normally seen in adult populations. For example, Li and colleagues found that about 55% of boys participated in physical activity while less than half of girls received any physical activity (Li, Treuth, & Wang, 2010).

Indeed, the current activity level of adolescents is far below the recommended guidelines (Bigelow, 2008; Heitzler, Martin, Duke, & Huhman, 2006; Troiano et al., 2008). According to the United States Department of Health and Human Services’ (USDHHS) recommended guidelines for health promotion, adolescents should do 60 minutes or more of physical activity each day. Adolescents should participate in some form of aerobic activity, muscle strengthening, and bone strengthening at least three days per week to meet the recommended guidelines for adolescents. Recent estimates show that only 42% of US children aged 6–11 meet physical activity guidelines (Troiano et al., 2008). Data from a national study using National Risk Youth Behavior Surveillance found 43.7% of high school boys and 25.6% of high school girls exercised at least one hour, five days a week (Troiano et al., 2008). A vast majority of adolescent boys and girls are not receiving enough daily physical activity despite the numerous benefits associated with living an active lifestyle.
The benefits of participation in physical activity have been linked to enhanced quality of life, disease prevention, better mental health, and improved cognitive performance (Tomporowski et al., 2008; Trudeau & Shephard, 2008). Regular physical activity also helps control weight, reduces the risk of cardiovascular diseases, Type 2 diabetes, and some cancers (USDHHS, 2010). Adolescents engaged in regular physical activity may also have stronger bones and muscles and increased endurance and flexibility than those not engaged in regular physical activity (Herman, Hopman, & Craig, 2010; Yang et al., 2007).

Adolescents who fail to meet the recommended guidelines of physical activity are at an increased risk of developing illnesses and diseases associated with a sedentary lifestyle. Obesity, a condition characterized by excess accumulation and storage of fat, has become a major problem among adolescents, particularly minority adolescents. There has been a 30% increase in obesity rates among adolescents over the past three decades (USDHHS, 2010). In addition to adolescents being more obese, obesity can increase one’s risk for hypertension, Type 2 diabetes, high cholesterol, asthma, arthritis, poor health status, and influence academic performance (Fedewa & Ahn, 2011; Sallis, McKenzie, Kolody, Lewis, Marshall, Rosengard, 1999; Taras & Potts-Datema, 2005).

Despite the potential harmful consequences of physical inactivity, the consequences disproportionately affect minority populations, particularly African American and Hispanic youth (Bigelow, 2008; Paschal, Lewis-Moss, Sly, & White, 2010). Approximately 21.8% of Hispanic children and 21.5% of African American children compared to 12.3% of non-Hispanic white children were overweight or obese between the years 1986-1988 (Strauss & Pollack, 2001). Currently, nearly 40% of Hispanic and African American children are considered overweight and obese (USDHHS, 2010). More alarmingly, these minority youth are also more
likely to become overweight or obese adults when compared to non-Hispanic whites. African Americans and Hispanics are also more susceptible to an increased likelihood of developing obesity related illness and diseases compared to whites and tend to have higher rates of hypertension and cardiovascular related diseases (USDHHS, 2010).

**Physical Activity among Minority Youth**

Minorities also report lower levels of physical activity compared to whites (Bigelow, 2008). Lower reported levels of physical activity of African American and Hispanic adolescents may be a key contributor to the health disparities when compared to other ethnicities (Paschal, Lewis-moss, Sly, & White, 2010). For example, African American girls are at a higher risk for a host of cardiovascular diseases but are less physically active than white girls of the same age cohort. On the other hand, African American boys face similar health risks, but the literature is sparse when examining the physical activity of African American boys in relation to health issues. The overall rate of reported physical activity among Hispanic adolescents is lower than non-Hispanic whites as well. Of particular concern, both African Americans and Hispanic adolescents are faced with glaring health disparities such as higher rates of obesity and cardiovascular diseases and lower reported rates of physical activity when compared to their white counterparts.

The lack of physical activity among minority adolescents, coupled with the increased obesity rates, is alarming. African American girls have the lowest rates of physical activity among all adolescent groups and nearly two in five Hispanic children ages 2-19 are considered overweight or obese (USDHHS, 2010). There is also evidence that inactive, obese adolescents are more likely to become inactive, obese adults; however, physically active adolescents are
more likely to be physically active throughout the aging process (Pate, Baranowski, Dowde, & Trost, 1996).

**Correlates and Promotion of Physical Activity**

A number of studies have been conducted to both understand correlates of physical activity among youth as well as evaluate strategies and efforts to promote increased physical activity. Although there are many correlates associated with physical activity such as proximity to parks and open, green spaces; age; sex; health status; self-efficacy; previous physical activity; and social support (Floyd, Spengler, Maddock, Gobster, & Suau, 2008; Heitzler et al., 2006; Sallis, Conway, Prochaska, McKenzie, Marshall, & Brown, 2001), of particular interest to me was the role that parents have on increasing their children’s physical activity. Due to the physical activity disparities between boys and girls, gender differences are also important because minority females report the lowest amounts of physical activity.

**Role of parents and motivation.** A growing body of literature suggests that parents are one of the most consistent and substantial predictors of adolescent physical activity (Dzewaltowski, Ryan, & Rosenkranz, 2008; Edwardson & Gorely, 2010; Madsen, McCulloch, & Crawford, 2009; Thompson, Humbert & Mirwald, 2003; USDHHS, 2010). Parenting style, modeling, beliefs about physical activity participation and encouragement have been linked to increases in adolescent physical activity (Hennessy, Hughes, Goldberg, Hyatt, & Economos, 2010). However, the role of parents to promote adolescent physical activity needs further exploration (O’Connor, Jago, & Baranowski, 2009) as little is known about the mechanisms by which parents influence their child’s physical activity.

Furthermore, the majority of previous research has focused on either the direct influence parental support has on adolescent physical activity or adolescents’ motivation to be physically
active. For example, parental support has been shown to be consistently positively correlated and linked with increased physical activity participation among adolescents; however, little is known about the influences of parental support for urban, minority adolescents (Vierling, Standage, & Treasure, 2007). In addition, there have been very few, if any, studies examining how parental support actually influences physical activity.

One promising potential mediator for participation in physical activity is motivation. Numerous studies on intrinsic motivation have shown that enjoyment and fun are central to physical activity participation and maintenance (Grieser et al., 2008; Schneider & Cooper, 2011). Another type of motivation, identified/task oriented motivation, also plays an important role in increasing adolescent physical activity because a reward or goal, such as having a healthier body, is associated with being physically active. Research suggests that some adolescents participate in physical activity explicitly to receive a reward or achieve a goal (Gamble, Parra, & Beech, 2009).

In summary, there is clear evidence that motivation can influence an adolescent to be physically active, but it is also important to understand that motivation alone does not lead to increases in the amount of physical activity in which adolescents engage (Salvy, Roemmich, Bowker, Romero, Stadler, & Epstein, 2009). Examining parental support and motivation separately has typically been the norm in research studies, but combining the two and testing the pathways between parental support and motivation may provide a critical link to finding a solution leading to increases in the current physical activity levels among adolescents (Vierling, Standage, & Treasure, 2007).

**Importance of examining time differences and type of physical activity.** In addition to understanding the role of parents and motivation in promoting adolescent physical activity, and
the possible mediating effect of motivation, other important considerations may be the time of week and types of physical activity in which adolescents receive physical activity. For example, Fairclough, Ridgers, and Welk (2012) found that both boys and girls were more active on the weekends than during the week. Additionally, Edwardson and Gorely (2010) found differences in types and intensities of physical activity such as walking and running among adolescents. The findings of Fairclough, Ridgers, and Welk (2012) and Edwardson and Gorely (2010) highlight the need to further examine when time of week and types of physical activity in which adolescents receive physical activity. Obtaining a better understanding of the time and type of physical activity will better inform future studies and interventions which may prove beneficial in the continued effort to increase adolescent physical activity because physical activity among adolescents may occur at any time during one’s leisure and there are varying ways to receive physical activity. Studies conducted on physical activity examine moderate to vigorous activity as well as the varying types of physical activity opportunities available. This study will examine walking, running, and other physical activity to capture the broad spectrum of physical activity opportunities.

Significance and Purpose of the Study

Linking the factors of parents, motivation, and the type and time of adolescent physical activity may provide a more comprehensive understanding of adolescent physical activity than what currently exists, particularly among minority, urban youth. Urban, minority adolescents face a myriad of health issues and challenges to be physically active. Specifically, more research is needed to understand how interpersonal and intrapersonal factors such as parental support and motivation can increase physical activity among adolescents. This study will contribute to the
physical activity literature because it is exploring dimensions of parental support and their effects on varying types of physical activity at different time points during the day and week.

Using Social Cognitive Theory (SCT) and theories of motivation as guiding theoretical frameworks, I will explore the interpersonal and intrapersonal factors that may influence adolescent physical activity. At the interpersonal level, parental support will be used to obtain a greater perspective of how parents influence physical activity and motivation to be physically active through parental engagement, parental encouragement, and parental modeling. At the intrapersonal level, both intrinsic and identified/task oriented motivation will be examined to see how both types of motivation operate in adolescent physical activity. I will model these relations for weekday and weekend activity for three different types of physical activity: walking, running, and other physical activity. Data collected from two different time points will be used to answer the research questions to better assess the potential causal link between perceptions of parental support and motivation at time 1 on later physical activity at time 2. Using two waves of data to explore the structural equation models will allow the predictor variables time to have an effect on physical activity at a later time.

Thus, the purposes of this study are two-fold. First, I want to examine how adolescent perceptions of parental support may influence total physical activity, type of physical activity, and time of week of adolescent physical activity. Secondly, I will examine if two types of motivation, intrinsic and identified/task oriented, mediate the effects of perceived parental support on total physical activity, type of physical activity, and time of week of adolescent physical activity. To address the purposes of my study, the following research questions will be investigated.
Research Questions

1. What is the baseline physical activity among urban, minority adolescents?
   a. Are there gender differences in total physical activity, type of physical activity, and time of week physical activity?

2. What are the effects of perceived parental engagement, perceived parental encouragement, and perceived parental modeling at time 1 on total physical activity (walking, running, and other physical activity) at time 2?
   a. Do the effects of perceived parental engagement, perceived parental encouragement, and perceived parental modeling on physical activity (walking, running, and other physical activity) differ by gender?
   b. Do the effects of perceived parental engagement, perceived parental encouragement, and perceived parental modeling on physical activity differ by type of physical activity?
   c. Do the effects of perceived parental engagement, perceived parental encouragement, and perceived parental modeling on physical activity differ by time of week of physical activity?

3. Does intrinsic motivation at time 1 mediate the effects of time 1 perceived parental engagement, perceived parental encouragement, and perceived parental modeling on total physical activity (walking, running, and other physical activity) at time 2?
   a. Does the mediated effect of intrinsic motivation differ by gender on total physical activity (walking, running, and other physical activity)?
   b. Does the mediated effect of intrinsic motivation differ by type of physical activity (walking, running, and other physical activity)?
c. Does the mediated effect of intrinsic motivation differ by time of week of physical activity (walking, running, and other physical activity)?

4. Does identified/task oriented motivation at time 1 mediate the time 1 effects of perceived parental engagement, perceived parental encouragement, and perceived parental modeling on total physical activity (walking, running, and other physical activity) at time 2?
   
a. Does the mediated effect of identified/task oriented motivation differ by gender on total physical activity (walking, running, and other physical activity)?
   
b. Does the mediated effect of identified/task oriented motivation differ by type of physical activity (walking, running, and other physical activity)?
   
c. Does the mediated effect of identified/task oriented motivation differ by time of week of physical activity (walking, running, and other physical activity)?

**Conceptual Model**

This study is based on Social Cognitive Theory (SCT). Social Cognitive Theory posits that individuals learn from others and this study suggests that youth learn physical activity behaviors from their parents. Additionally, there is evidence that learned and observed behaviors are critical to increased motivation. The relationship between parental support and motivation warrants further investigation to determine if the relationship leads to increased physical activity participation among youth. A description of the proposed relationship between parental support on motivation on physical activity is shown in figure one.
Figure 1 depicts how adolescent perceptions of parental support (PPS; includes parental engagement, parental encouragement, and parental modeling) may have a direct and indirect influence on physical activity participation. In this model, PPS is expected to directly influence adolescent physical activity and motivation is introduced as a potential mediator. This mediating pathway suggests that motivation may mediate the effects of perceptions of parental support on physical activity.

**Chapter One Summary**

The high incidence of physical inactivity among adolescents has created a public health problem. A majority of adolescents are suffering from the consequences related to a general lack of physical activity. Adolescents need to achieve and exceed the recommend physical activity guidelines to receive the benefits associated with an active lifestyle. Parents may be one avenue to assist in promoting adolescent physical activity. The purpose of this study is to examine parental support as a predictor in adolescent physical activity while also examining two types of motivation as potential mediators. My study includes two time points to better assess the influence of parental support and motivation on physical activity. Using two time points is important to providing evidence of causal links between the predictors and physical activity.
examine three types of physical activity during the week as well as on weekends to gain a better understanding of how and when urban, minority adolescents receive physical activity.
Chapter 2: Literature Review

The purposes of this study are (a) to examine the effects that adolescent perceptions of parental support have on adolescent physical activity and if there is a relationship, (b) to examine if two types of motivation, intrinsic and identified/task oriented, mediate the effects of parental support on adolescent physical activity. I examine these relations for three types of physical activities during the week and over the weekend. In this chapter, I provide justification for the need for research on physical activity particularly focusing on minority adolescents. Next, I provide evidence supporting the physical activity links to health and then describe the current physical activity trends of adolescents, particularly focusing on urban, minority adolescents. I then introduce the theory of Social Cognitive Theory and theories of motivation as they relate to physical activity. Finally, I describe how parents and motivation are associated with physical activity and why motivation might be a mediator.

Research on Adolescent Physical Activity

The lack of physical activity is a global concern (World Health Organization, 2012) despite the 60 years of documented history showing the positive relationship between health and physical activity. Physical activity is essential for child growth and development and it is also important for weight control and good health. On the other hand, a lack of physical activity coupled with unhealthy food choices has caused a spike in the prevalence of obesity among youth in recent years. Data from the NHANES dataset shows that 16.9% of U.S. children and adolescents are obese (Ogden, Carroll, Kit, & Flegal, 2012), while levels of physical activity have remained virtually unchanged at low levels (Li et al., 2010). Physical inactivity is low among adolescents ranging from 6%-20% of adolescents receiving the recommended amounts of
physical activity, thus physical inactivity has become one of the main risk factors for numerous health complications such as obesity. According to the Centers for Disease Control and Prevention’s Youth Risk Behavior Surveillance System, physical inactivity is among the six health risk behaviors that lead to morbidity and mortality among youth (CDC, 2012). Additionally, Ogden and colleagues (2006) noted that today’s youth are one of the most inactive and unhealthy in recent history. Again, just over half of boys and less than half of girls are receiving enough physical activity whereas African American adolescent girls have the lowest rates of physical activity among all groups with only 38% of them meeting the necessary guidelines using a nationally representative sample (Li et al., 2010).

A body of literature suggests that as adolescents age, physical activity levels drop precipitously; thus, caloric intake and energy expenditure become an inverse relationship resulting in an unhealthy, diseased population. For example, older adolescents are less likely than younger children to be physically active with over sixty percent of children reportedly meeting the recommended guidelines whereas less than twenty percent of adolescents meet the recommended guidelines (Troiano et al., 2008). The decline in physical activity appears during adolescence which is a critical period in an individual’s life. Coincidentally, the decline begins during the 7th and 8th grade years and continues to decline during the high school years. Fewer than one in five current high school students report meeting the current physical activity daily requirements. At the current levels, adolescents’ physical inactivity is a risk factor for poor overall health. For example, the CDC has identified physical inactivity as one of six independent risk factors that lead to morbidity and mortality of today’s youth (CDC, 2013).
Physical Activity and Health

Some of the earliest research on physical activity and health was conducted in the 1950s by Morris and colleagues. Morris and colleagues’ (1953) groundbreaking study found that men who had physically active jobs had a lower incidence of coronary heart disease than those with sedentary jobs. Conducted in London, Morris and colleagues found that bus drivers were twice as likely to die from a cardiovascular event as their fellow co-workers, the bus conductors. This study highlighted the effects of physical activity as conductors moved regularly and physical inactivity as bus drivers remained seated for extending periods of time. The Morris study (1953) was the first study of its kind to establish an association between health and physical activity. Morris et al. (1953) laid the foundation for the connection between physical activity and health. Over the next 60 years, several studies supported and broadened Morris and colleagues’ findings to include connections between physical activity and the multidimensional components of health such as physical, mental, social, and spiritual health (Heintzman & Mannell, 2003; Powell, Martin, & Chowdhury, 2003; Sugiyama, Leslie, Giles-Corti, & Owen, 2008; Weyerer & Kupfer, 1994).

A large body of literature consistently shows that active individuals report better overall health outcomes and less negative health occurrences than individuals who are sedentary. Some of the links between physical activity and physical health include stronger, leaner and longer muscles, increased bone density, and decreased risks of mortality, hypertension, diabetes and a host of other cardiovascular related illnesses (USDHHS, 2010). In addition to these physical and biological benefits, regular physical activity also has a positive effect on mental, social, and spiritual health. Regular physical activity attainment is also related to improved mental health. Glover and Parry (2009) showed cancer patients who were physically active were less depressed
than individuals who reported little to no physically activity. Youth engaged in physical activity report feeling less stressed and angry while also reporting higher levels of happiness than youth who do not participate in physical activity (Hallal, Victora, Azevedo, & Wells, 2006). Youth who participate in physical activity regularly report better academic achievement and improved cognitive performance than youth who receive little to no physical activity (Hallal, et al., 2006).

Physical activity often occurs in the context of family, friends and social settings. Being physically active with others has been shown to help foster social relationships by providing a social bonding experience. Floyd and colleagues (2011 & 2008) found youth to be more physically active in group settings with peers than youth who were alone. Individuals who engage in holistic exercises such as Tai Chi and Yoga report higher levels of spiritual well-being and connections to their spiritual self while reporting lower levels when engaged in sedentary activities such as TV viewing. Heintzman (2010; 2009) found several links to improved spiritual well-being through active leisure experiences such as outdoor nature walks. The numerous health outcomes related to physical activity has been well documented and is based upon a preponderance of evidence showing improved health outcomes as part of an active lifestyle. However, adolescents should meet, if not, exceed the recommended physical activity guidelines to reap the health benefits associated with physical activity.

**Physical Activity Guidelines**

Based upon a preponderance of evidence showing improved physiological fitness as an outcome of an active lifestyle, the American Society of Sports Medicine (ACSM) and the United States Department of Health and Human Services (USDHHS) developed the first set of recommended guidelines for the general population to increase the physiological fitness of individuals in 1975 (ACSM, 1978). Years later to broaden the scope of physical activity and
make the physical activity guidelines more inclusive to all individuals of varying ability and fitness levels, the Centers for Disease Control and the American College of Sports Medicine formalized a new set of guidelines aimed at moderate levels of physical activity (Pate, Pratt, & Blair, 1995). This updated recommendation focused on shifting society from a sedentary lifestyle to a more active lifestyle by highlighting the importance participating in regular, moderate intensity physical activity.

The new physical activity guidelines required adults to participate in moderate intensity activities for 30 minutes most days of the week, preferably every day. From these updated guidelines, other guidelines evolved to include children and adolescents as well recommendations for muscle and bone strengthening. For example, the U.S. Surgeon General report, issued in 1996, was the first to highlight the need for children and adolescents to participate in physical activity. The report suggested that all individuals can improve the quality of their lives by being physically active, but focused on young people stating “they are the future of the country.” The 1996 U.S. Surgeon General report also emphasized the need for minorities and people with low-incomes to engage in regular physical activity due to the numerous health disparities affecting these populations. Following the 1996 U.S. Surgeon General’s report, “The Physical Activity Guidelines for Americans” was issued by the U.S. Department of Health and Human Services with the recommendation that children and adolescents aged 6-17 years participate in physical activity 60 minutes or more each day to gain the health benefits associated with physical activity participation.

**Current Physical Activity Trends**

Despite the overwhelming evidence showing the positive association between adolescents meeting the recommended physical activity guidelines and health, adolescents’
physical activity levels are relatively low. However, the most vulnerable youth are from low-income, minority populations living in environments with limited resources such as urban and rural areas. Additionally, a myriad of health issues are associated with physical inactivity and obesity such as hypertension and other cardiovascular diseases. Minorities, particularly African Americans and Hispanics have lower rates of self-reported physical activity and higher rates of obesity and compared to other racial/ethnic groups (United States Department of Health and Human Services, 2010). In both the African American and Hispanic communities a considerable number of health disparities and inequities exist that may be related to lack of physical activity putting these populations at an increased risk of developing diseases and illnesses compared to other groups.

In 2007, the percentage of adolescents meeting the recommended physical activity guidelines was higher among non-Hispanic white adolescents (37%) than both African American (31.1%) and Hispanic adolescents (30.2%; Li, Treuth, & Wang, 2010). Nearly forty percent of Hispanic youth are already considered overweight/obese (Ogden, Carroll, & Curtin, 2010), which may translate to a more obese nation as census estimates expect the Hispanic population to continue to grow. Both African American and Hispanic adolescents face barriers to physical activity participation such as crime, safety concerns and poor neighborhood environment that may have a negative impact on physical activity (USDHHS, 1996); however, having a parent participate with them may help negotiate some of those barriers. Hispanic girls and African American girls both face dramatic, steep declines in physical activity as they age while physical activity among boys gradually decline with age (Belcher, Berrigan, Dodd, Emken, Chou, Spruijt-Metz, 2010). On the other hand, both ethnic minority groups spend considerable amounts of time using media and less time engaged in active leisure (Rideout, Foehr, & Roberts, 2010).
In two qualitative studies, Harley and colleagues (2009) and Gómez (2004) provided some insight into the lack of physical activity among African American and Hispanic adolescent girls. Harley conducted interviews with black women aged 25-45 examining what contributes to lack of physical activity. Three themes emerged from the data: lack of exposure, physical activity norms and beliefs, and hair type. For example, the participants discussed how lack of exposure and having role models that were physically active contributed to lack of physical activity. In another study on barriers to participation in physical activity, Gomez (2004) found violence and parents perceptions of safety diminished the opportunities for Hispanic girls to be physically active, but not for Hispanic boys.

In addition to racial and ethnic differences in physical activity levels among adolescents, gender differences remain pervasive. While physical inactivity is rampant among both boys and girls, there are some gender-specific issues as well. According to the nationally representative sample from the Youth Risk Behavior Surveillance surveys, boys (43.7%) were more physically active than girls (25.6%). For example, boys have higher rates of participation in sports, both structured and unstructured, than girls (Sabo, 2009). In addition to having higher rates of participation in sports, boys continue to have higher levels of physical activity than girls (McMurray, Harrell, Bangdiwala, & Hu, 2003). McMurray et al. (2003) found physical activity levels declined more sharply for girls than boys in their longitudinal study that tracked over 1,000 boys and girls over an eight year period. It is clearly evident that there are gender differences between boys and girls, but more needs to be understood about how these differences are potentially influenced by parental support. The notion that boys are more physically active than girls is supported in numerous empirical studies with no evidence showing girls are ever
more active than boys. The disproportionately lower rates of physical activity among girls are still a cause of concern and a solution to this issue has yet to be found.

The need to increase physical activity levels among adolescents regardless of race or gender was incorporated into Healthy People 2010 and 2020 (USDHHS, 2013). The first goal of Healthy People 2010 was to increase the quality and years of healthy life for individuals of all ages and the second goal was to eliminate health disparities. Healthy People 2020 expanded to four goals: (1) attain high-quality, longer lives free of preventable disease, disability, injury, and premature death; (2) achieve health equity, eliminate disparities, and improve the health of all groups; (3) create social and physical environments that promote good health for all; and (4) promote quality of life, healthy development, and healthy behaviors across all life stages. Through regular physical activity participation, these goals can be met because there is overwhelming evidence supporting the link between physical activity and multidimensional components of health.

**Theoretical Perspectives**

The current study conceptualizes how parents influence and motivate their children to be physically active. A number of studies have examined youth physical activity, but the literature is sparse concerning parents as motivators of youth physical activity, particularly across time and with minority adolescents. The current study is grounded in Bandura’s (1986) Social Cognitive Theory, which provides a model of how parents may influence motivation, which in turn may influence physical activity. Given the focus on motivation, this study is also grounded in Self-Determination Theory (e.g., Ryan & Deci; 1985, 2000).

**Social Cognitive Theory**
Social Cognitive Theory (SCT), developed by Albert Bandura, posits individuals learn through observing others’ attitudes, behaviors, and the outcomes associated with those behaviors. SCT addresses the individual, behavioral, and environmental interactions and the relationships among them and seeks to explain individuals’ behaviors based on these interactions. Bandura (1986) argued that the cognitive processes of human thought and action have a causal relationship to human motivation. He later revisited his theory to demonstrate how SCT can be used as a model for health promotion and disease prevention (Bandura, 2004).

Bandura (2004) argued that to establish effective health practices through the SCT framework, specific core determinants need to be met. The core determinants were knowledge, perceived self-efficacy, outcome expectations, goals, perceived facilitators, and impediments. Individuals meeting these determinants are at an increased theoretical likelihood of changing their behavior. Since many adolescent behaviors are grounded in familial habits (Bandura, 2004), parents are critical to helping their children establish healthy health practices such as regular physical activity participation through engagement, encouragement and modeling behaviors. Based on SCT, these parental behaviors may have an influence on adolescent behavior resulting in behavior change. In addition to parents playing a critical role in health promotion, adolescent motivation is equally, if not more important.

Bandura’s assertion is the basis for the current study because it applies to how parents can influence their children’s motivation. According to SCT, the four processes of learning are: (1) direct effects produced by somebody else’s actions, (2) vicarious experiences of others, (3) judgments voiced by others, and (4) derivation of further knowledge that is already known (Bandura, 1986). Thus according to SCT, I hypothesize that adolescents are motivated to be physically active by their parents through parental engagement, parental encouragement, and
parental modeling to increase physical activity participation. Through these processes, adolescents’ listen to their parents regarding physical activity participation, retain what they have learned about physical activity, reproduce what they have learned, and become motivated to participate in physical activity.

Thus, parental engagement, parental encouragement and parental modeling represent the needed components of SCT to help establish a behavior change in adolescent physical activity by activating adolescents’ motivation to be physically active. Additionally, SCT posits children learn their gender identity and appropriate behaviors based on their own sex; therefore, this study will also examine how parental support operates in both adolescent boys and girls. For example, boys are more physically active than girls, which may be due to how parents socialize and orient their children to physically active behaviors.

**Self-Determination Theory**

Theories of motivation are widely held to be considered to stem from two perspectives: Content (Alderfer, 1969; Herzberg, 1959; Maslow, 1943; McCelland, 1961) and Process (Adams, 1963; Locke, 1968; Vroom, 1964). Content theories of motivation deal with individuals satisfying an inherent need whereas process theories of motivation deal with what drives individuals to behave in certain ways. Motivation can be described as a driving force resulting in participation or completion of a given task or behavior. According to Ryan and Deci (2000) motivation is important to participation and prolonged interest in a given activity because motivation moves one to do something. For example, motivated individuals are more likely to engage in and sustain particular behaviors that are of interest to them.

In order to describe the process of motivation, Ryan and Deci (e.g., 1985, 2000) developed the Self-Determination Theory (SDT). SDT is a theoretical framework used to study
human motivation through three areas: autonomy, competence, and relatedness (Ryan & Deci, 2000). SDT argues that individuals must fulfill the three areas to achieve optimal functioning; however, not all individuals exhibit these innate psychological needs. Thus, SDT proposes motivation exists on a continuum. The motivation continuum starts with amotivation on the far left, which denotes a lack of motivation and intention (Ryan & Deci, 2000). Amotivated individuals have little to no desire to behave in a particular way. Next on the continuum is a class of externally regulated behavior: extrinsic motivation, introjection, identification, integration (Ryan & Deci, 2000). These classes of extrinsic motives are based on the external forces that drive an individual to behave in a particular way. Intrinsic motivation lies at the right of the continuum and is concerned with the internal and inherent forces that drive individuals. Of particular interest to this study are the motivational styles of identified and intrinsic motivation and how they relate to the three areas of SDT.

Adolescents are most likely to be physically active if the activity is volitional and enjoyable. For example, intrinsically motivated individuals participate in a chosen activity for the enjoyment of the activity or to satisfy one’s own desires (Ryan & Deci, 2000). Ryan and Deci (2010) contended that human motivation is greater if individuals participate in activities that are volitional, fun and are of greater interest to the individual. Grieser and colleagues (2007) and Schneider and Cooper (2011) used enjoyment as a moderator of physical activity finding when enjoyment for physical activity was high, physical activity participation was high and when enjoyment was low, physical activity was also low.

In addition to intrinsic motives, Ryan and Deci (2000) contended identified motivation is also a powerful motivator that may facilitate intrinsic motivation. Identified motivation is defined as personally identifying with a behavior not for enjoyment of the behavior, but for the
benefits associated with the behavior (Ryan & Deci, 2000). Physical activity for some adolescents may not be enjoyable, but the benefits of being physically active may motivate some adolescents to be physically active. For example, Hassandra, Goudas and Chroni (2003) found that identified motivation assisted in the facilitation of intrinsic motivation thus increasing individuals’ likelihood of participating in physical education. Adolescents’ confidence in their abilities combined with achievement of goals is important for physical activity participation. Adolescents’ motivation to be physically active may be related to achieving desired goals such as improved health and reduced stress.

Furthermore, a body of literature has demonstrated that physical activity participation may be largely dependent on relatedness (Bauer et al., 2008; Floyd et al., 2011). Adolescents were more likely to be physically active in group settings whereas individual adolescents were displayed lower levels of physical activity. Previous research demonstrates the critical role intrinsic and identified motivation play in physical activity; however, parents may help trigger adolescent motives.

**Parental Support**

Brustad (1993) described the importance of parents in promoting adolescent physical activity behavior. Parental support is of particular concern because it has been linked to adolescent physical activity in a number of studies (Dzewaltowski, Ryan, & Rosenkranz, 2008; Edwardson & Gorely, 2010; Fawcett, Garton, & Dandy, 2009; Madsen, McCulloch, & Crawford, 2009; O'Connor, Jago, & Baranowski, 2009). Part of the reason parents are important is through the processes of modeling and encouragement, which are considered primary predictors of adolescent physical activity (Hennessy, Hughes, Goldberg, Hyatt, & Economos, 2010; Madsen, et al., 2009; Trost et al., 2003). Furthermore, children of parents engaged in
physically active activities are more likely to be engaged in the same activities suggesting the importance of modeling (Madsen, et al., 2009). Beets, Cardinal, and Alderman (2010) found adolescents who received encouragement from their parents to be physically active were more active than those who received little to no encouragement from their parents.

The previous research highlights the importance of parental support; however, the link between parental support and motivation is missing. Ryan and Deci (2000) argued that individuals who experience autonomy through internalized behaviors are more likely to be motivated to continue those behaviors. For example, Heitzler, Martin, Duke and Huhman (2006) found that children’s positive beliefs about physical activity were linked to parent support in their nationally representative sample. Positive beliefs about physical activity may be linked to motivation since motivation is tied to autonomous behaviors. Additionally, encouragement from parents also has been shown to influence physical activity of adolescents. Adolescents who were motivated by their parents to play or participate in sports were more likely to be active than those who lacked motivational support from their parents (Beets, et al., 2010). Parents can influence youth physical activity through motivation because previous research shows youth physical activity becomes internalized through parental support.

There are, however, differences in how fathers and mothers influence physical activity. For example, Davison, Cutting and Birch (2003) found that fathers influence adolescent physical activity through active engagement in physical activity with their children and through the planning of family outings that involve elements of physical activity. In contrast, Davison, Cutting and Birch (2003) found that mothers are more likely to play more assistive roles in their influence of adolescent physical activity. For example, they found that mothers were responsible
for transportation, payment of fees and having conversations about adolescent behaviors more than fathers.

There are also father-son and mother-daughter differences centered on physical activity participation. Boys are more likely to be encouraged to participate in sports than girls by both parents and fathers are more likely to be active with their sons rather than their daughters (Eccles & Harrold, 1991). The gender differences are consistent across studies primarily among non-Hispanic whites; however, there is little empirical evidence of these differences among low-income, urban minority populations.

The process of parental support on youth motivation is yet to be fully understood, despite its importance in promoting child physical activity. Evidence that does contribute to this understanding includes Ratelle, Baldwin, and Vallerand’s (2005) work that demonstrated how cue activation can be used to activate motivation. For example, cues from parents such as encouragement, engagement, and modeling may be able to activate their children’s motivation to be physically active. Motivation may specify the mechanism by which parents exert their influence on adolescent physical activity. Additionally, the time and type of physical activity among adolescents is also important when trying to understand the roles of parents and motivation.

**Time of Week and Type of Physical Activity**

Examining when adolescent physical activity occurs has become increasingly more prevalent in recent years (Beets, Vogel, Champan, Pitetti, & Cardinal, 2007; Copperman & Bhat, 2007; Fairclough, Ridgers, & Welk, 2012; Rowlands, Pilgrim, & Eston, 2007; Stone, Rowlands, & Eston, 2009; Treuth, Catellier, Schmitz, Pate, Elder, McMurray, Blew, Yang, & Webber, 2007). Beets and colleagues (2007) found gender differences with regard to parental support, but
most importantly there were differences for when the parental support was provided. Interestingly, but not surprisingly, fathers spent more time engaged in physical activity with their sons on the weekends than weekdays; whereas mothers spent more time with actively involved in their daughters’ weekday physical activity behavior (Beets et al., 2007).

This line of research, however, is in its infancy. To date, a majority of the studies examining when adolescent physical activity occurs has used homogenous samples of primarily White, non-Hispanic youth. Thus, there remains the need to examine this phenomenon in diverse populations among U.S. adolescents.

Furthermore, research conclusions are inconsistent (Beets et al., 2007; Rowlands, Eston, & Ingledew, 1999; Rowlands et al., 2007; Wilkin, Mallam, Metcalf, Jeffrey, & Voss, 2006). Beets, et al. and Wilken, et al. found youth’s activity levels were greater on the weekend whereas Rowlands et al. found evidence supporting more weekday physical activity for youth. The inconsistencies in the research findings provide further reasoning to explore when adolescent physical activity occurs among diverse populations. In addition to when adolescent physical activity occurs, the type of physical activity participation is also of interest to this study. For example, researchers study physical activity as any bodily movement such as walking, running, and participation in organized sports with varying results (Edwardson & Gorely, 2010). Walking is the most common method of receiving physical activity for both boys and girls, but the differences become more prevalent when the type of physical activity shifts to more strenuous forms of physical activity like running and other forms of physical activity (Edwardson & Gorely, 2010; Stone, Rowlands, & Eston, 2009). Edwardson & Gorely (2010) conducted a systematic review of parental influence on the different types and intensities of youth physical activity and found wide discrepancies in the literature. With so many subtle differences in the
literature regarding the type of physical activity, further examination of these differences as they relate to diverse populations is warranted. Many of the differences found in the physical activity literature stem from the varying methods and instrumentation utilized to examine adolescent physical activity.

**Commonly Used Methods and Instrumentation**

Researchers have used a variety of quantitative and qualitative methods to examine physical activity (Duncan, Duncan, & Strycker, 2005; Edwardson & Gorely, 2010; Thompson, Humbert, & Mirwald, 2003). Of particular concern is the conflicting evidence among the varying methods (Edwardson & Gorely, 2010; Fairclough, Ridgers, & Welk, 2012). Most of the physical activity research relies on cross-sectional data while a few datasets like NHANES and Youth Behavior Surveillance system utilized longitudinal data. More recently, ecological momentary assessment approaches have been utilized to measure physical activity in real time (Fairclough, Ridgers, & Welk, 2012); however, the technology is expensive and the results are relatively consistent with other methods to examine adolescent physical activity. According to Edwardson and Gorely (2010), over 80 percent of studies examining the role of parental support on youth physical activity used cross-sectional research designs. Using cross-sectional data is useful for determining correlates of physical activity, but little information about causality and inferences can be gleaned from cross-sectional studies. However, collecting and analyzing two waves of data may provide a different perspective to the previous research findings. By using two waves of data for this study, it is possible to make better inferences between parents and physical activity and test the mediating effects of parental support on adolescent physical activity.

Furthermore, a variety of measures are used to measure physical activity with little consistency in the literature among the measures (Edwardson & Gorely, 2010). There are unique
and distinct differences in how physical activity is measured such as subjective and objective measures. Subjective measures such as self-report and physical activity recall are commonly used whereas newer technologies emphasizing objective measures are growing in popularity. Edwardson and Gorely (2010) found that over half of the 55 studies examining parental influences on youth physical activity were studied using self-report measures completed by the youth via recall whereas only one-third of the studies utilized objective measures such as pedometers, actigraphs and accelerometers while the remaining studies used a combination of both subjective and objective measures for validity purposes. Each instrument has been used to varying degrees either separately or in conjunction with each other, but the subtle differences account for the variation of activity levels among adolescents in the literature.

Part of the problem in the wide use of methods and instrumentation is the vast number of disciplines that study adolescent physical activity. Researchers from leisure sciences, kinesiology, and public health, to name a few, have varying backgrounds on what constitutes physical activity hence the varying methods to examine the same problem. Additionally, each method and instrument has its inherent flaws; however, each method and instrument is still somewhat useful in examining physical activity. Despite the varying methods and inconsistent measures used to examine physical activity, there is a resounding consensus that adolescent physical activity is low and needs to be increased significantly, particularly among minority adolescents.

Chapter Two Summary

Despite the numerous benefits associated with being physically active, adolescents, particularly minority adolescents, are currently not meeting the recommended physical activity guidelines. There is a growing body of literature suggesting parental support may be pivotal in
the promotion of physical activity among adolescents. Additionally, motivation may specify the mechanism through which parental support exerts its influence on adolescent physical activity. Studies conducted on physical activity have used both subjective and objective measurements; however, the results are strikingly similar across the studies. Regardless of instrumentation, researchers understand the need to increase physical activity participation may offset some of the health consequences associated with physical inactivity among adolescents. My study used the most common form of data collection for physical activity, the self-report.
Chapter 3: Methods

In this chapter, I describe the research design, data collection procedures, instrument, and analytic strategy that will be used to (a) to examine the effects that adolescent perceptions of parental support have on adolescent physical activity and if there is a relation, (b) to examine if two types of motivation, intrinsic and identified/task oriented, mediate the effects of parental support on adolescent physical activity. A multi-wave research design (two waves) was used to collect data via paper and pencil to gather information on adolescent physical activity behavior. Data were analyzed using structural equation modeling and missing data analyses.

Research Design

The current study was part of a larger study that collected data from minority, urban youth at two time points to gather information on adolescents’ physical activity. The larger study was to evaluate a pilot intervention that adapted the TimeWise: Taking Charge of Leisure Time (Caldwell, 2005) curriculum to promote youth physical activity.

Participants. Participants were recruited to the study during the homeroom class from all students in the 7th and 8th grade in four schools located in a large, urban city in central Pennsylvania. In accordance with the institution’s IRB, opt-out parental consent was obtained and only those students who had consent and who assented participated in the study. Students brought home parental passive informed consent forms and student assent forms were distributed during students’ homeroom. In total, 523 students from the 7th and 8th grade attending the four schools participated in the study.

Data Collection. Data for this study were collected via self-report using paper and pencil at two different time points. Data collection took place during scheduled homeroom hours over the course of two time periods, roughly two months apart, during the Spring 2010 academic
semester. Although cross-sectional research designs are the most common type of research design, determining causality and making inferences is limited using these designs, thus a multi-wave research design is better suited for the purposes of the research questions. Collecting data at two different time points strengthens the argument for how adolescent perceptions of parental support (PPS) and adolescent motivation at one time point (T1) may predict physical activity behavior two months later (T2). According to Cole and Maxwell (2003), using multiple waves of data allows researchers to make rigorous inferences about causality and is better suited for mediation analysis. Using this type of research design, I am able to demonstrate if individual motivation is indeed a mediator through which perceptions of parental support function.

Prior to data collection, researchers and research assistants introduced themselves in the students’ classrooms and described the survey procedure prior to administering the surveys to participants whom had parental consent and had assented to participate. On average, the survey took 30-40 minutes for students to complete. No personally identifiable information was collected for any student as the only demographics taken were gender and grade level.

**Instrumentation.** Adolescents responded to questions from the Penn State Health Behavior Survey, which included a 7-Day Physical Activity Recall survey. The Penn State Health Behavior Survey, a self-report questionnaire, included an intensive set of items to assess frequency, duration, level, and type of physical activity. Other behavioral and attitudinal information centered on physical activity was collected as well. Although, self-report measures are not as reliable as objective measurements of physical activity, self-reports are valid measurement tools (Sirard & Pate, 2001). For convenience and study design, the self-report measure was used for data collection. Given the scope of the data collection process, the costs of using more objective measures such as accelerometers and risk of lost devices contributed
greatly to using self-report to collect information on physical activity levels for the study. All items used to measure the target variables were developed specifically to measure physical activity participation among diverse, urban populations for the current study. Physical activity behavior was assessed for seven time periods ranging from getting to school physical activity to after school physical activity. The instrument was 22 pages in length and employed a study design, the 3-form design, to mitigate respondent burden due to survey length and time required to answer several questions.

**Instrumentation validity and reliability.** Items used to construct the survey instrument were taken from a variety of existing instruments based on a thorough review of existing physical activity literature. The overarching aim of the larger study was to develop valid and reliable self-report physical activity measures in large sample sizes (Graham & Caldwell, 2011). Items in the Penn State Health Behavior Survey are similar to items in the Physical Activity Questionnaire for Adolescents (PAQ-A) (Kowalski, Crocker, & McGrath, 1997), but more specifically items were heavily borrowed from the Promoting Physically Active Leisure Time in Youth (PPALTY-H) survey (Bradley, 2010). Additionally, other items were developed specifically for the larger study to gather physical activity information from minority adolescents in an urban environment. Graham and Caldwell (2011) reported the correlation between the self-reported physical activity measures and accelerometry (r=.30) were consistent with previous research conducted using reliable self-report physical activity instruments (Sallis & Saelens, 2000; Treuth, et al, 2003; Treuth, Ningqi, Young, & Maynard, 2005; Welk, Wickel, Peterson, Heitzler, Fulton, & Potter, 2007); Wong, Leatherdale, & Manske, 2006). Based on the findings of the Graham and Caldwell (2011) study, the Penn State Health Behavior Survey was found to have acceptable construct validity. In an unpublished Master’s thesis, Bradley (2010)
determined the convergent, concurrent, and discriminant validity of the self-reported physical activity measures and the motivation measures to be consistent with other existing scales. Based on these unpublished works, the Penn State Health Behavior Survey may be a useful instrument to measure physical activity among diverse, urban populations.

**Planned missingness.** Data for this sample were collected using a 3-form “planned missingness” design (Graham, Taylor, Olchowski, & Cumsille, 2006). The 3-form design is useful when survey length may result in large amounts of missing data due to respondent fatigue (Graham, 2012). The goal of the 3-form design is to have at least 2/3 of the data be complete cases. Using the 3-form design allows researchers to gather information on the key variables of interest central to the research while also gathering additional information on other variables that are not as central to the research. For example, survey questions sets were grouped into four different sets: X set, A set, B set, and C set. Questions about physical activity, which were central to the research, were included in the X-set and were answered by every participant in the study. Other questions of interest were included in the A, B and C sets and were not answered by every participant (see Table 1). For example, 2/3 of the participants answered questions in the A set. Questions of interest in the A set included questions about free time physical activity. Two-third of participants also answered questions in the B set, which included questions about social support. Questions from the C set included questions about motivation and physical activity. Several variables used in the models in this study (i.e., perceptions of parental engagement, perceptions of parental encouragement, and perceptions of parental modeling; intrinsic motivation; and identified motivation) included data that were missing by design. This resulted in approximately one-third of the data missing (missing completely at random; MCAR; Schafer & Graham, 2002); however, physical activity variables were not designed to be missing.
Table 1. 3-Form Design

<table>
<thead>
<tr>
<th>Question Set</th>
<th>X</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Note: 1=questions asked; 0=questions not asked

**Measures**

The data for this study were collected on a variety of variables as part of the larger study aimed at evaluating a physical activity intervention at two time points. Items measuring perceptions of parental support and motivation were assessed using time 1 variables whereas the physical activity measures were assessed using time 2 variables. For the purposes of this study, only the measures that will be used to investigate the research questions will be expanded upon in following sections.

**Physical Activity Measures**

The physical activity portion of the survey was broken into seven time periods covering the previous seven days and asked about physical activity during the following time periods: during school, after school, evenings of school days, Saturday morning, Saturday afternoon and evening, Sunday morning, and Sunday afternoon and evening. For the purposes of this dissertation, physical activity measured during school will be dropped resulting in six time periods outside of school because non-school physical activity is the outcome of interest. For example, minutes of walking, running, and other physical activity were assessed daily for each of the seven time periods resulting in an inflated daily amount of physical activity. Adolescent’s daily amounts of physical activity would be a combination of walking, running, and other physical activity for each time period.
To assess after-school physical activity, participants were asked to self-report the amount of time spent walking and running using the following questions at time 2: “During the past 5 school days, how much time after school [afternoon and in the evening], did you usually spend walking/running each day?” Similarly, to assess weekend walking or running, participants were asked “How much time [Saturday/Sunday morning/afternoon and evening] did you spend walking/running/participating in other physical activity?” Responses for each question ranged from 0 (0 minutes) to 6 (60 minutes or more) in increments of 10 minutes.

Other physical activity was measured with the item stem, “During the past 5 school days, if you did any of the following physical activities AFTER SCHOOL, circle the ONE activity you did most.” This was followed by a list of 13 activities such as baseball, basketball, cheerleading, dancing, riding a bike, lifting weights, and so on. The response option “I did not do any of these” was also provided. We then asked, "How many school days did you do this activity after school?" and "How many school days did you do this activity in the evening?" Responses for each question ranged from 0 days (0) to 5 days (5).

Of particular interest to this study was to examine walking, running, other physical activity, and total physical activity. These variables were measured as follows.

**Walking.** To measure walking the following items were used to form Walking: after school and evening hour walking, Saturday morning; Saturday afternoon and evening walking; Sunday morning; and Sunday afternoon and evening walking.

**Running.** To measure walking the following items were used to form Running: after school and evening hour running, Saturday morning; Saturday afternoon and evening running; Sunday morning; and Sunday afternoon and evening running.
**Other Physical Activity.** To measure other physical activity the following items were used to form Other Physical Activity: after school and evening hour other physical activity, Saturday morning; Saturday afternoon and evening other physical activity; Sunday morning; and Sunday afternoon and evening other physical activity.

**Total Physical Activity.** To measure total physical activity, a total score was calculated by summing and averaging the total amounts of time spent in walking, running, and other physical activity from each time period (18 items).

**Time of Week of Physical Activity**

As noted, I was interested in whether time of week made a difference in the relations under investigation. Measures include weekday and weekend physical activity.

**Weekday Physical Activity.** To measure weekday physical activity, weekday after school and evening hours for walking, running, and other physical activity variables (six items) were combined to form Weekday Physical Activity.

**Weekend Physical Activity.** To measure weekend physical activity, Saturday and Sunday afternoon and evening hours for walking, running, and other physical activity variables (12 items) were combined to form Weekend Physical Activity.

**Parental Support**

Three measures of parental support were used. These were perceptions of parental involvement, parental encouragement, and parental modeling.

**Perceptions of parental involvement.** Adolescents’ perceptions of being involved in physical activity with their parents’ was measured using two items at time 1: “How often do you and your mother (stepmother or guardian) do physically active things together that are fun?” and
“How often do you and your father (stepfather or guardian) do physically active things together that are fun?” Responses ranged from never (0) to almost daily (5).

**Parental encouragement.** Adolescents’ perceptions of being encouraged to be physically active was measured using four items at time 1: “How often do your parents ask you what happened during your physical activities?” “How often do your parents start conversations with you about you being physically active?” How often do your parents encourage you to be physically active with them?” and “How often do your parents help you do things to be physically active?” Responses ranged from never (1) to all the time (5).

**Parental modeling.** Adolescents’ perceptions of their parents’ exercise behavior was measured using a single item at time 1: “How often do your parents exercise?” Responses ranged from (1) very often to never (5).

**Motivation**

Two types of motivation were measured. These include intrinsic motivation and identified and task oriented motivation.

**Intrinsic motivation.** Adolescent’s intrinsic motivation was measured using three items at time 1: “Why do you do physically active things in your free time? How often is it because…”: “you enjoy sweating and working hard?” “you like to feel totally involved in an activity?” and “it’s fun?” Responses ranged from never (1) to all the time (5).

**Identified/task oriented motivation.** Adolescents’ identified/task oriented motivation was measured using five items at time 1: “Why do you do physically active things in your free time? How often is it because…”: “you want to make your body stronger?” “it will bring you better health?” “it helps you relieve stress?” “it helps you concentrate better in school?” and “you want to improve your mood?” Responses ranged from never (1) to all the time (5).
Analytic Strategy

Data were analyzed using a variety of techniques and statistical software packages to appropriately answer each research question such as descriptive statistics, reliability analysis, independent samples t-tests, multiple regression, factor analysis, missing data techniques, and structural equation modeling.

Descriptive Statistics and Reliability Analysis

Using IBM SPSS Statistics, descriptive information such as gender and grade level were calculated along with summary statistics, including means and standard deviations, of all measured variables. Internal reliabilities were assessed for the subscales and full scales using Cronbach’s alpha. Reliability analyses were tested for Perceptions of Parental Engagement, Perceptions of Parental Encouragement, Intrinsic Motivation, Identified Motivation, and for each scale and subscale of Physical activity. Each scale and subscale is expected to demonstrate acceptable reliability. Internal consistency values of $\geq .70$ indicate that scale items reliably measure the same construct.

Independent Samples T-test

Independent t-tests were used for bi-variate analyses between the dichotomous independent variables and the continuous dependent variables. Independent samples t-tests are appropriate when the independent variable is dichotomous and the dependent variable is continuous (Vaske, 2008). By using independent t-tests to determine if means were statistically different from one another, comparisons were made between boys’ and girls’ physical activity participation.

Multiple Regression
To model the relationship between perceptions of parental encouragement, perceptions of parental engagement, and perceptions of parental modeling on physical activity participation, multiple regression analyses were used.

**Factor Analysis**

Exploratory factor analysis using principal component analysis was used to identify levels of correlations between each item measuring perceptions of parental support to determine the factor loadings. Principal component analysis finds the linear combinations of the items that maximizes variance. Next, a varimax rotation was performed on the factor loadings to make the factor loadings interpretable. A varimax rotation is one of the most common factor rotations as it rotates the factors, but retain that the factors are uncorrelated with one another (Kaiser, 1970).

**Handling Missing Data**

Missing data are likely to occur when administering a self-report survey to adolescents for a variety of reasons such as skipping items or just not responding to items; however, the real reason for missing data is never truly known. In addition to item non-response, the use of the 3-Form design will also produce large amounts of missing data. Missing data can produce biased parameter estimates (e.g., variances and covariances) and adversely affect statistical power. To handle the missing data and make full use of the data set, the expectation maximization (EM) algorithm and maximum likelihood (ML) approaches were used to estimate 45% of the missing data.

Due to the amount of missingness in the data, multiple imputations procedures were utilized. Multiple Imputation procedures preserve characteristics of the data allowing for unbiased parameter estimates and restoring some of the lost statistical power that it attributed to the missing data. By using multiple imputations, I can analyze data as if there no missing values...
Thus, means, standard deviations, correlations, variances, and covariances will be unbiased. To impute the data, I used the NORM program then analyzed the data using IBM SPSS Statistics.

The expectation maximization (EM) algorithm is an iterative two step procedure used to replace missing values whereas maximum likelihood procedures are able to yield parameter estimates in a single step (Graham, Cumsille, & Shevock, 2013). Using the EM algorithm will allow for better estimates when performing descriptive analyses such as correlations, frequencies, means, and standard deviations. ML approaches can provide unbiased parameter estimates and restore some of the lost statistical power due to missing data. By using these approaches, I analyzed the data as if there were no missing values (Graham, 2012).

**Parceling**

Parceling is a common technique used in structural equation modeling when a large number of variables load on a single latent variable during model testing (Graham & Tatterson, 2000). Parceling refers to aggregating individual items in order to stabilize parameter estimates and improves goodness of fit (Rogers & Schmitt, 2004). The optimal domain representative approach to parceling was used to stabilize each structural equation model. The procedure chooses items for the parcels such that the correlations between parcels are optimized, under the constraint that the variance of the correlations is less than .001 (Zhou, 2013). Each model specified in this study has 18 outcome variables; therefore, creating parcels assisted with goodness of fit and helped stabilize the beta coefficients. The technique used in this statistical analysis involved aggregating items based on the factor loadings for the six measures of the walking, running, and other physical activity items and the time of week measures. Items with the highest and lowest factor loadings were aggregated into the first parcel, followed by the
aggregation of the items with the second highest and second lowest factor loadings, and lastly, the two remaining items were aggregated into a third parcel. Graham and Tatterson (2000) recommend using parcels when more than five single items load on one factor. Parcels were created exclusively for structural equation modeling analysis and do not have any effect on the physical activity scales used for descriptive statistics and multiple regression analysis.

**Total physical activity parcels.** Three parcels were created from the 18 total physical activity variables using the optimal domain representative approach to parceling. Total physical activity parcel one was created using the following six items: afternoon walking, evening other physical activity, Saturday morning walking, Saturday afternoon walking, Sunday morning other physical activity, Sunday afternoon walking. Total physical activity parcel two was created using the following six items: afternoon running and evening walking, Saturday morning running, Saturday afternoon other physical activity, Sunday morning walking, Sunday afternoon other physical activity. Total physical activity parcel three was created using the following six items: afternoon other physical activity and evening running, Saturday morning other physical activity, Saturday afternoon walking, Sunday morning running, and Sunday afternoon running.

**Time of week physical activity parcels.** To form the weekday physical activity factor, three parcels were created using the optimal domain representative approach to parceling. Weekday parcel one was created using the following two items: afternoon walking and evening other physical activity. Weekday parcel two was created using the following two items: afternoon running and evening walking. Weekday parcel three was created using the following two items: afternoon other physical activity and evening running.

To form the weekend physical activity factor, another three parcels were created using the optimal domain representative approach to parceling. Weekend parcel one was created using
the following four items: Saturday morning walk, Saturday afternoon walking, Sunday morning other physical activity, Sunday afternoon walking. Weekend parcel two was created using the following four items: Saturday morning running, Saturday afternoon other physical activity, Sunday morning walking, Sunday afternoon other physical activity. Weekend parcel three was created using the following four items: Saturday morning other physical activity, Saturday afternoon walking, Sunday morning running, and Sunday afternoon running.

**Type of physical activity parcels.** Two parcels were created for each type of physical activity using the optimal domain representative approach to parceling. For the walking factor, parcel one was created using afternoon walking, Saturday morning walking, and Sunday afternoon walking; parcel two was created using evening walking, Saturday afternoon walking, and Sunday morning walking.

For the running factor, parcel one was created using afternoon running, Saturday morning running, and Sunday afternoon running; parcel two was created using evening running, Saturday afternoon running, and Sunday morning running.

For the other physical activity factor, parcel one was created using afternoon other physical activity, Saturday morning other physical activity, and Sunday afternoon other physical activity; parcel two was created using evening other physical activity, Saturday afternoon other physical activity, and Sunday morning other physical activity.

**Auxiliary variables**

Using auxiliary variables helped to assist in the missing data procedure when using structural equation modeling analyses. Auxiliary variables are variables that are correlated with variables of interest but are not part of the analysis model. For the purposes of this study, the motivation variables were used in data analysis because they are highly correlated with one
another. For example, identified motivation variables (better health, stronger body, etc.) served as auxiliary variables when intrinsic motivation was the mediator. Collins, Schafer, and Kam (2001) used auxiliary variables in their simulations showing that auxiliary variables are important to missing values because adding them can help to restore power compared to ML models without auxiliary variables. Auxiliary variables were primarily used when gathering the total effects for each structural equation model. Total effects are the effects of the independent variable on the dependent variable with the mediator omitted from the model. Rather than deleting the mediator from the model altogether, I allowed the mediator’s residual error to covary with the dependent variable’s residual error, thus allowing for restored power in the path models.

**Structural Equation Modeling**

Structural equation modeling was used to test the direct, indirect and total effects of the pathways between perceptions of parental engagement, perceptions of parental encouragement, and perceptions of parental modeling, motivation, and physical activity. Due to Chi-Square being sensitive to sample size, three indices of practical fit were used to judge goodness of fit. The three indices are Rho (Tucker & Lewis, 1973; also known as the Nonnormed Fit Index, NNFI; Bentler & Bonnett, 1980); the Comparative Fit Index (CFI; Bentler, 1990), and the Root Mean Square Error of Approximation (RMSEA; Browne & Cudeck, 1993). There are two parts to a structural equation model: the measurement model and the structural model. The measurement model refers to the mapping of items on their latent variables and the structural model refers to the causal and correlational links between the latent variables.

**Mediation.** According to Maxwell and Cole (2007), too many studies use cross-sectional data to test for mediation. The authors argue that ignoring the time sequence or not allowing for
certain processes to develop is a flawed strategy when using cross-sectional data to test mediation. Furthermore, they cite research by Gallob and Reichard (1985, 1987, 1981) explaining “the importance of time in the formation and interpretation of structural equation models.” Despite the importance of time, mediation is still tested using cross-sectional data in many studies. To follow the time-sequence proposal suggested by Gallob and Reichard (1985, 1987, 1991) and Maxwell and Cole (2007), this study will use data collected at two time points. Perceptions of parental support and adolescent motivation will be measured at time 1 to predict physical activity, which will be measured at time 2. Using two waves of data will allow for better interpretation of the structural equation models.

In order to test mediation, adequate time is needed for an independent variable to have an effect on a dependent variable. According to Maxwell and Cole (2007), mediation implies change over time. In this study perceptions of parental support are expected to influence two potential mediators, intrinsic and identified motivation which in turn will influence adolescent physical activity (See Figure 1). I posit that adolescents who receive high levels of parental engagement, parental encouragement, and parental modeling may be more likely to be motivated to be physically active.

To test these relationships, I followed the three conditions given by Baron and Kenny (1986) in conjunction with MacKinnon, Lockwood, Hoffman, West, and Sheets (2002): (1) there must be an X effect on Y, (2) there must be an X effect on M, and (3) there must be a M effect on Y when controlling for X (see Figure 2). Thus, I regressed adolescent physical activity on perceptions of parental support (PPS) and on individual motivation. Finally, I regressed adolescent physical activity controlling on individual motivation on controlling for PPS. It must be noted that some argue Baron and Kenny’s (1986) first rule for testing mediation is not
required (MacKinnon, Krull, & Lockwood, 2000); however, satisfying the first rule may yield better overall results (Graham, 2003). MacKinnon et al. (2002) proposed using the joint significance test to test for mediation which suggests there is significant mediation if the $X \rightarrow M$ and $M \rightarrow Y$ effects are both significant in one's model.

![Mediation model](image)

**Figure 2. Mediation model**

I tested several versions of the conceptual model shown in Figure 1. Each model specified Perceptions of Parental Support as a predictor. For research question 3 and 3a, each model specified Total Physical Activity as a dependent variable with intrinsic motivation introduced as a potential mediator. To address research question 3b, the model specified Walking, Running, and Other Physical Activity as the dependent variables with intrinsic motivation as a potential mediator of the effects of PPS. To address research question 3c, the model specified Weekday and Weekend Physical Activity as the dependent variables with intrinsic motivation as a potential mediator of the effects of PPS. Similarly, research questions 4, 4a, 4b, and 4c specified the same predictors and dependent variables as 3, 3a, 3b, and 3c respectively; however, identified/task oriented motivation is specified as the potential mediator of the effects of PPS.
Figure 3. Model of perceptions of parental support on total physical activity.

Figure 3 depicts how adolescent perceptions of parental engagement, parental encouragement, and parental modeling may have a direct influence on total physical activity participation. In this model, PPS is expected to directly influence intrinsic motivation and total physical activity. In this model, intrinsic motivation is introduced as a potential mediator. Intrinsic motivation is expected to have a direct influence on total physical activity and is expected to mediate the effects of perceptions of parental support on total physical activity. Gender differences were also examined in this model.

Figure 4. Model of perceptions of parental support on type of physical activity.
Figure 4 depicts how adolescent perceptions of parental encouragement and parental modeling may have a direct influence on the context (walking, running, other physical activity) of physical activity participation. In this model, PPS is expected to directly influence the each context of adolescent physical activity.

Figure 5. Model of perceptions of parental support on time of physical activity.

Figure 5 depicts how adolescent perceptions of parental encouragement and parental modeling may have a direct influence on time occurrence of physical activity participation. In this model, PPS is expected to directly influence each time occurrence (weekday and weekend).

Figure 6. Model of identified motivation as a mediator of PPS on total physical activity.
Figure 6 depicts how adolescent perceptions of parental engagement, parental encouragement, and parental modeling may have a direct and indirect influence on total physical activity participation. In this model, identified motivation is introduced as a potential mediator. Identified motivation is expected to have a direct influence on total physical activity and is expected to mediate the effects of perceptions of parental support on total physical activity. Gender differences were also tested in this model.

Figure 7. Model of identified motivation as a mediator of PPS on type of physical activity.

Figure 7 depicts how adolescent perceptions of parental encouragement and parental modeling may have a direct and indirect influence on the type of physical activity participation. In this model, identified motivation is introduced as a potential mediator. Identified motivation is expected to have a direct influence on type of physical activity and is expected to mediate the effects of perceptions of parental support on context of physical activity.
Figure 8. Model of identified motivation as a mediator of PPS on time of physical activity.

Figure 8 depicts how adolescent perceptions of parental encouragement and parental modeling may have a direct and indirect influence on time occurrence of physical activity participation. In this model, PPS is expected to directly influence identified motivation and time occurrence of physical activity. In this model, identified motivation is introduced as a potential mediator. Identified motivation is expected to have a direct influence on time occurrence of physical activity and is expected to mediate the effects of perceptions of parental support on time occurrence of physical activity.

Chapter Three Summary

Data on the frequency, duration, time, and type of physical activity were collected among 7th and 8th grade students using a planned missingness research design. The quantitative data were collected via self-report using a 7-Day Physical Activity recall survey. Data were analyzed using a variety of techniques such as independent samples t-test, multiple regressions and structural equation modeling procedures using multiple statistical software packages to appropriately answer each research question.
Chapter 4: Results

In this chapter, I will describe and present the results for this study. The purposes of this dissertation were (a) to examine the effects that adolescent perceptions of parental support have on adolescent physical activity, and if there is a relationship, (b) to examine if two types of motivation, intrinsic and identified/task oriented, mediate the effects of parental support on adolescent physical activity. Data collection occurred at two time points, allowing for a better understanding of how parental support may influence motivation and physical activity. Three types of physically active leisure were of interest (walking, running and total physical activity), measured during the week and on weekends.

Descriptive statistics were used to determine baseline physical activity participation. Independent samples t-test were used to determine group differences in physical activity participation. Multiple regression models were used to test the effects of perceptions of parental support on physical activity. Finally, structural equation modeling was used to test the pathways of perceptions of parental support, individual motivation, and physical activity participation. These data analyses were used to address the following research questions for this study:

1. What is the baseline physical activity among urban, minority adolescents?
   a. Are there gender differences in total physical activity, type of physical activity, and time of week physical activity?

2. Are there effects of perceived parental engagement, perceived parental encouragement, and perceived parental modeling at time 1 on total physical activity (walking, running, and other physical activity) at time 2?
a. Do the effects of perceived parental engagement, perceived parental encouragement, and perceived parental modeling on physical activity (walking, running, and other physical activity) differ by gender?

b. Do the effects of perceived parental engagement, perceived parental encouragement, and perceived parental modeling on physical activity differ by type of physical activity?

c. Do the effects of perceived parental engagement, perceived parental encouragement, and perceived parental modeling on physical activity differ by time of week of physical activity?

3. Does intrinsic motivation at time 1 mediate the effects of time 1 perceived parental engagement, perceived parental encouragement, and perceived parental modeling on total physical activity (walking, running, and other physical activity) at time 2?

   a. Does the mediated effect of intrinsic motivation differ by gender on total physical activity (walking, running, and other physical activity)?

   b. Does the mediated effect of intrinsic motivation differ by type of physical activity (walking, running, and other physical activity)?

   c. Does the mediated effect of intrinsic motivation differ by time of week of physical activity (walking, running, and other physical activity)?

4. Does identified/task oriented motivation at time 1 mediate the time 1 effects of perceived parental engagement, perceived parental encouragement, and perceived parental modeling on total physical activity (walking, running, and other physical activity) at time 2?
a. Does the mediated effect of identified/task oriented motivation differ by gender on total physical activity (walking, running, and other physical activity)?

b. Does the mediated effect of identified/task oriented motivation differ by type of physical activity (walking, running, and other physical activity)?

c. Does the mediated effect of identified/task oriented motivation differ by time of week of physical activity (walking, running, and other physical activity)?

**Research Question 1: Descriptive Statistics**

Descriptive statistics for each item that measured physically active leisure are displayed in Table 2. First means and standard deviations are presented for each type of physical activity, walking, running, and other physical activity. In order to assess the overall level of physical activity, a variable “total time” was constructed. Total time was constructed using all items representing walking and running and four items representing other physical activity that measured time (N=16). Responses from all 16 items were dummy coded from 0 to 6 where 0 represented 0 minutes, 1 represented about 10 minutes, 2 represented about 20 minutes, 3 represented about 30 minutes, 4 represented about 40 minutes, 5 represented about 50 minutes, 6 represented about 60 minutes or more of physical activity. Next, the values were summed for all individuals then multiplied by a factor of 10 to reflect actual minutes. Thus the range of possible scores went from 0 to 960 minutes possible.

To assess, time spent being physically activity for weekday time and weekend time, a similar approach was used. For weekday time, four items were used while weekend time combined 12 items; thus possible ranges for scores were from 0 to 240 minutes and 0 to 720 minutes, respectively.
To calculate the types of physical activity, walking was measured using six items, running was measured using six items, and other physical activity was measured using four items. Corresponding ranges included 0 to 60 minutes for walking, running, and other physical activity.

In this study, adolescents spent 568 total minutes being physically active across the seven days. Adolescents were more active during the weekend (406 minutes) than during the week (162 minutes). Adolescents spent most of their leisure time physical activity engaged in walking (246 minutes) followed by running (175 minutes) and the least amount of time engaged in other forms of physical activity such as sport activities (147 minutes).

Table 2. Time spent being physically activity over a 7 day period

<table>
<thead>
<tr>
<th>Measures</th>
<th>Total (N = 554)</th>
<th>Boys (N = 272)</th>
<th>Girls (N = 282)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (Std. Dev.)</td>
<td>Mean (Std. Dev.)</td>
<td>Mean (Std. Dev.)</td>
</tr>
<tr>
<td><strong>Walk</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cronbach’s alpha = .85</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>During the past 5 school days, how much time after school did you usually spend walking each day?</td>
<td>50.3 (20.8)</td>
<td>52.6 (20.3)</td>
<td>49.5 (21.1)</td>
</tr>
<tr>
<td>During the past 5 school days, how much time in the evening did you usually spend walking each day?</td>
<td>44.1 (21.2)</td>
<td>44.5 (20.7)</td>
<td>43.3 (21.4)</td>
</tr>
<tr>
<td>How much time <strong>Saturday morning</strong> did you spend walking?</td>
<td>36.2 (22.0)</td>
<td>37.3 (22.5)</td>
<td>36.4 (22.2)</td>
</tr>
<tr>
<td>How much time <strong>Saturday afternoon and evening</strong> did you spend walking?</td>
<td>46.1 (20.2)</td>
<td>46.7 (20.3)</td>
<td>46.1 (21.2)</td>
</tr>
<tr>
<td>How much time <strong>Sunday morning</strong> did you spend walking?</td>
<td>31.2 (20.1)</td>
<td>30.3 (19.0)</td>
<td>32.6 (21.3)</td>
</tr>
<tr>
<td>How much time <strong>Sunday afternoon and evening</strong> did you spend walking?</td>
<td>38.4 (20.1)</td>
<td>39.3 (19.5)</td>
<td>38.2 (21.4)</td>
</tr>
<tr>
<td>Daily mean</td>
<td>246.3 (124.4)</td>
<td>250.7 (122.3)</td>
<td>246.1 (128.6)</td>
</tr>
<tr>
<td><strong>Run</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cronbach’s alpha = .88</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>During the past 5 school days, how much time after school did you usually spend jogging or running each day?</td>
<td>36.6 (21.8)</td>
<td>42.1 (21.5)</td>
<td>31.4 (20.1)</td>
</tr>
<tr>
<td>During the past 5 school days, how much time in the evening did you usually spend jogging or running each day?</td>
<td>31.1 (20.2)</td>
<td>35.5 (21.1)</td>
<td>26.4 (18.7)</td>
</tr>
<tr>
<td>How much time <strong>Saturday morning</strong> did you spend jogging or running each day?</td>
<td>24.7 (19.8)</td>
<td>28.3 (21.5)</td>
<td>20.1 (16.2)</td>
</tr>
</tbody>
</table>
jogging or running?
How much time Saturday afternoon and evening did you spend jogging or running?
How much time Sunday morning did you spend jogging or running?
How much time Sunday afternoon and evening did you spend jogging or running?
Daily mean

<table>
<thead>
<tr>
<th></th>
<th>Total time</th>
<th>Total time</th>
<th>Total time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Physical Activity</strong></td>
<td>568.3 (332.7)</td>
<td>619.1 (341.5)</td>
<td>520.6 (323.9)</td>
</tr>
<tr>
<td><strong>Weekday Physical Activity</strong></td>
<td>162.1 (82.5)</td>
<td>174.7 (83.6)</td>
<td>150.6 (81.3)</td>
</tr>
<tr>
<td><strong>Weekend Physical Activity</strong></td>
<td>406.2 (250.3)</td>
<td>444.4 (257.9)</td>
<td>370.0 (242.6)</td>
</tr>
</tbody>
</table>

Note:
1: Corresponding ranges: 0-60 minutes of walking, running, and other physical activity
2: Amounts reflect average daily amounts of physical activity

The second part of the first research question aimed to explore potential gender differences in the amounts of physical activity in which adolescents were engaged. To assess these gender differences, independent T-tests were conducted to compare total physical activity, time of week physical activity, and type of physical activity (Table 3). There were significant differences in the means for boys and girls for total physical activity and time of week physical activity when examining weekday and weekend physical activity. Overall, boys were more active than girls ($t = 4.94, p \leq .001$). There were also significant differences for boys and girls on running and engaging in other physical activity for leisure time physical activity with boys again
being more active than girls \( (t=6.54, p<.001; t=4.61, p<.001) \). There were no significant differences for gender on walking as a type of leisure time physical activity.

**Table 3. Independent T-tests for physical activity by gender.**

<table>
<thead>
<tr>
<th>Gender</th>
<th>Boys N=272</th>
<th>Girls N=282</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (Std. Dev.)</td>
<td>Mean (Std. Dev.)</td>
</tr>
<tr>
<td>Total Physical Activity</td>
<td>619.1 (341.5)</td>
<td>520.6 (323.9)</td>
</tr>
<tr>
<td>Type of PA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walk</td>
<td>250.7 (122.3)</td>
<td>246.1 (128.6)</td>
</tr>
<tr>
<td>Run</td>
<td>203.9 (128.1)</td>
<td>144.6 (106.6)</td>
</tr>
<tr>
<td>Other PA</td>
<td>164.5 (91.1)</td>
<td>129.9 (88.7)</td>
</tr>
<tr>
<td>Time of Week PA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weekday</td>
<td>174.7 (83.6)</td>
<td>150.6 (81.3)</td>
</tr>
<tr>
<td>Weekend</td>
<td>444.4 (257.9)</td>
<td>370.0 (242.6)</td>
</tr>
</tbody>
</table>

**Research Question 2: Effects of Parental Support on Total Physical Activity**

The second research question aimed to explore the effects of parental support at time 1 on later total physical activity at time 2 using multiple regression. Additionally, gender differences were examined. Prior to multiple regression analysis, reliabilities were calculated for each scale; these appear in Table 4. Each scale demonstrated Cronbach’s alphas of higher than .70 and thus was considered suitable for analysis. For each scale, no items were deleted to create the final scale. The means and standard deviations for the items and scales of for perceptions of parental support and motivation appear also appear in Table 4. The perceptions of parental support items measure to what extent adolescents perceive their parents to offer parental support and the motivation items measure adolescents’ motivation to participate in physically active leisure.
Table 4. Descriptive statistics for parental support and motivation items.

<table>
<thead>
<tr>
<th>Measures</th>
<th>Total (N = 554) Mean (SD)</th>
<th>Boys (N = 272) Mean (SD)</th>
<th>Girls (N = 282) Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parental Engagement</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cronbach’s alpha = .77</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How often do you and your mother (stepmother or guardian) do physically active things together that are fun?</td>
<td>3.41 (1.63)</td>
<td>3.54 (1.61)</td>
<td>3.41 (1.72)</td>
</tr>
<tr>
<td>How often do you and your father (stepfather or guardian) do physically active things together that are fun?</td>
<td>3.11 (1.82)</td>
<td>3.53 (1.75)</td>
<td>2.80 (1.77)</td>
</tr>
<tr>
<td>Scale Mean (std. dev.)</td>
<td>3.23 (1.73)</td>
<td>3.45 (1.68)</td>
<td>3.06 (1.73)</td>
</tr>
<tr>
<td><strong>Parental Encouragement</strong> (How often do you these things happen …)(^{+})</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cronbach’s alpha = .83</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your parents ask you what happened during your physical activities</td>
<td>3.36 (1.34)</td>
<td>3.58 (1.22)</td>
<td>3.14 (1.31)</td>
</tr>
<tr>
<td>Your parents start conversations with you about you being physically active</td>
<td>3.11 (1.43)</td>
<td>3.21 (1.32)</td>
<td>3.03 (1.41)</td>
</tr>
<tr>
<td>Your parents encourage you to be physically active with them</td>
<td>3.84 (1.42)</td>
<td>4.03 (1.32)</td>
<td>3.71 (1.40)</td>
</tr>
<tr>
<td>Your parents help you do things to be physically active</td>
<td>3.41 (1.52)</td>
<td>3.71 (1.42)</td>
<td>3.04 (1.42)</td>
</tr>
<tr>
<td>Scale Mean (std. dev.)</td>
<td>3.43 (1.43)</td>
<td>3.58 (1.32)</td>
<td>3.13 (1.39)</td>
</tr>
<tr>
<td><strong>Parental Modeling</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How often do your parents exercise?</td>
<td>3.35 (1.28)</td>
<td>3.44 (1.17)</td>
<td>3.32 (1.21)</td>
</tr>
<tr>
<td><strong>Identified Motivation</strong> (How often do you do physically active things because…)(^{+})</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cronbach’s alpha = .78</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>You want to make your body stronger</td>
<td>3.91 (1.10)</td>
<td>4.21 (1.04)</td>
<td>3.72 (1.12)</td>
</tr>
<tr>
<td>It will bring you better health</td>
<td>4.22 (1.13)</td>
<td>4.26 (1.07)</td>
<td>4.28 (1.12)</td>
</tr>
<tr>
<td>It helps you relieve stress</td>
<td>3.76 (1.34)</td>
<td>3.89 (1.27)</td>
<td>3.60 (1.42)</td>
</tr>
<tr>
<td>It helps you concentrate better in school</td>
<td>3.32 (1.32)</td>
<td>3.46 (1.32)</td>
<td>3.19 (1.33)</td>
</tr>
<tr>
<td>You want to improve your mood</td>
<td>3.71 (1.31)</td>
<td>3.88 (1.30)</td>
<td>3.54 (1.32)</td>
</tr>
<tr>
<td>Scale Mean (std. dev.)</td>
<td>3.78 (1.24)</td>
<td>3.89 (1.23)</td>
<td>3.54 (1.30)</td>
</tr>
<tr>
<td><strong>Intrinsic Motivation</strong> (How often do you do physically active things because…)(^{+})</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cronbach’s alpha = .76</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
You enjoy sweating and working hard  3.41 (1.42)  3.91 (1.25)  2.85 (1.34)
You like to feel totally involved in an activity  3.98 (1.22)  4.25 (1.01)  3.68 (1.36)
It's fun  4.11 (1.12)  4.33 (1.15)  3.86 (1.24)

Scale Mean (std. dev.)  3.78 (1.24)  4.16 (1.14)  3.46 (1.31)

Note 1: Response scale (1= never; 2= once or twice a year; 3= once or twice a month; 4= once or twice a week)

**Factor Analysis**

Based on the factor loadings of the predictor variables, three factors were found: perceptions of parental encouragement, perceptions of parental engagement, and perceptions of parental modeling. Principal components analysis demonstrated that the first factor, perceptions of parental encouragement explained 49% of the variance; the second factor, perceptions of parental engagement explained 16% of the variance and the last factor, perceptions of parental modeling explained 10% of the variance. The factor loadings for each of the three factors appear in Table 5.

**Table 5. Factor loadings for perceptions of parental support.**

<table>
<thead>
<tr>
<th></th>
<th>Factors 1</th>
<th>Factors 2</th>
<th>Factors 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>parents ask about PA</td>
<td>.76</td>
<td>.27</td>
<td>.13</td>
</tr>
<tr>
<td>parents start convo</td>
<td>.82</td>
<td>.11</td>
<td>.19</td>
</tr>
<tr>
<td>parents encourage PA</td>
<td>.82</td>
<td>.15</td>
<td>.20</td>
</tr>
<tr>
<td>parents help PA</td>
<td>.68</td>
<td>.47</td>
<td>.21</td>
</tr>
<tr>
<td>mother engagement</td>
<td>.14</td>
<td>.85</td>
<td>.17</td>
</tr>
<tr>
<td>father engagement</td>
<td>.17</td>
<td>.83</td>
<td>.24</td>
</tr>
<tr>
<td>parents exercise</td>
<td>.27</td>
<td>.27</td>
<td>.58</td>
</tr>
</tbody>
</table>

Using multiple regression, the three scales of parental support (perceptions of parental encouragement, perceptions of parental engagement, and perceptions of parental modeling) were entered into the model to predict total physical activity. Table 6 shows the regression results for three separate regression models: model one used the total sample for analysis, model two used
only boys and model three only contained girls for the purposes of understanding potential
gender differences for the effects of perceptions of parental support and adolescent physical
activity. Model one explained 16% of the variance ($R^2=.16$) for total physical activity.
Perceptions of both parental encouragement and parental engagement at time 1 were positively
associated with total physical activity at time 2. The model indicated the importance of parental
encouragement and engagement on later physical activity. Perceptions of parental modeling
were not significant.

When examining gender differences with regard to parental support and total physical
activity, similar results were found. Again, parental encouragement and engagement were
statistically significantly important for both boys and females when predicting physical activity
at a later time. The model for boys explained 16% of the variance ($R^2=.16$) and the model for
girls explained 12% of the variance ($R^2=.118$).

**Table 6. Three regression models for total physical activity: total sample, boys, girls.**

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>beta</th>
<th>T-value</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model one (total sample)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parental Encouragement</td>
<td>.25</td>
<td>5.53</td>
<td>.000</td>
</tr>
<tr>
<td>Parental Engagement</td>
<td>.24</td>
<td>5.35</td>
<td>.000</td>
</tr>
<tr>
<td>Parental Modeling</td>
<td>-.07</td>
<td>-1.56</td>
<td>.119</td>
</tr>
<tr>
<td><strong>Model two (boys)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parental Encouragement</td>
<td>.27</td>
<td>4.14</td>
<td>.000</td>
</tr>
<tr>
<td>Parental Engagement</td>
<td>.25</td>
<td>3.74</td>
<td>.000</td>
</tr>
<tr>
<td>Parental Modeling</td>
<td>-.08</td>
<td>-1.31</td>
<td>.192</td>
</tr>
<tr>
<td><strong>Model three (girls)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parental Encouragement</td>
<td>.20</td>
<td>2.90</td>
<td>.004</td>
</tr>
<tr>
<td>Parental Engagement</td>
<td>.23</td>
<td>3.59</td>
<td>.000</td>
</tr>
<tr>
<td>Parental Modeling</td>
<td>-.04</td>
<td>-0.66</td>
<td>.509</td>
</tr>
</tbody>
</table>

To examine the effects of adolescents’ perceptions of parental support on different types
of physical activity, multiple regression was used. Results appear in Table 7. The first regression
model included the total sample model explained 5% of the variance for walking ($R^2=.05$), 17%
of the variance for running ($R^2=.17$), and 13% of the variance for other physical activity
(R^2=.13). Perceptions of both parental encouragement and engagement were significant predictors for walking, but the effects of parental encouragement were stronger when predicting running and other physical activity indicating the importance of parental encouragement. Interestingly, the effect of perceptions of parental modeling were negatively associated with running indicating parental modeling leads to less running.

**Table 7. Regression analysis predicting type of physical activity.**

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>beta</th>
<th>T-value</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Walk</td>
<td>Run</td>
<td>Other</td>
</tr>
<tr>
<td>Parental Encouragement</td>
<td>.12</td>
<td>.20</td>
<td>.31</td>
</tr>
<tr>
<td>Parental Engagement</td>
<td>.17</td>
<td>.32</td>
<td>.11</td>
</tr>
<tr>
<td>Parental Modeling</td>
<td>-.04</td>
<td>-.10</td>
<td>-.03</td>
</tr>
</tbody>
</table>

To address the time of week differences in physical activity, the model of perceptions of parental support on weekday physical activity explained 16% of the variance (R^2=.16) while the model with weekend physical activity explained 13% of the variance (R^2=.13). Again, the effects of both perceptions of parental encouragement and engagement were moderate predictors of physical activity at varying times of the week. Surprisingly, perception of parental modeling was negatively associated with weekday physical activity. Results appear in Table 8.

**Table 8. Regression analysis predicting time of week on physical activity.**

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>beta</th>
<th>T-value</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weekday</td>
<td>Weekend</td>
<td>Weekday</td>
</tr>
<tr>
<td>Parental Encouragement</td>
<td>.25</td>
<td>.23</td>
<td>5.56</td>
</tr>
<tr>
<td>Parental Engagement</td>
<td>.24</td>
<td>.22</td>
<td>5.37</td>
</tr>
<tr>
<td>Parental Modeling</td>
<td>-.09</td>
<td>-.05</td>
<td>-1.98</td>
</tr>
</tbody>
</table>

**Model Testing**

To address research questions three and four, data were analyzed using IBM®SPSS®AMOS 20.0.0 using the maximum likelihood feature to handle missing data. A total of eight exploratory models were tested for model fit to examine whether individual
motivation mediated the influence of perceptions of parental support to physical activity. Each model specified adolescents’ perceptions of parental engagement, parental encouragement, and parental modeling as predictors. The dependent variables specified included total physical activity, type of physical activity (i.e., walking and running), and time of week physical activity (i.e., weekday and weekend). Due to the high correlation ($r=.84$) of the two putative mediators, intrinsic motivation and identified/task orientated motivation, four of the models specified intrinsic motivation as the mediator and four additional models specified identified/task oriented motivation each with the same predictor and dependent variables tested.

The $\chi^2$ statistic for each of the following models was significant; however, the $\chi^2$ statistic is known to be sensitive to sample size suggesting that each model did not statistically fit. Therefore, I used three indices of practical fit to judge model fit: Tucker Lewis index (TLI; Tucker & Lewis, 1973), comparative fit index (CFI; Bentler, 1990), and root mean square error approximate (RMSEA; Browne & Cudeck, 1993; Steiger & Lind, 1980). According to Tucker and Lewis (1973), interpretation for a good fit model is .95 or greater while values of .90 are acceptable; however, values lower than .85 are never acceptable. According to Bentler (1990), interpretation for a good fit model is .96 or greater while acceptable fit values for CFI range from .92 to .95; however, values lower than .85 are never acceptable. According to Browne and Cudeck (1993), interpretation for a good fitting model using RMSEA is .05 or lower, while values ranging from .05-.08 are acceptable; however, values greater than .10 indicate a model with poor fit. The goodness of fit for the intrinsic motivation and identified/task oriented models are found in Table 9 and Table 10, respectively.
Table 9. Goodness of fit for intrinsic motivation models.

<table>
<thead>
<tr>
<th>Model</th>
<th>X²</th>
<th>df</th>
<th>TLI</th>
<th>CFI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total PA</td>
<td>101.86***</td>
<td>56</td>
<td>.97</td>
<td>.98</td>
<td>.04</td>
</tr>
<tr>
<td>Boys</td>
<td>86.65***</td>
<td>56</td>
<td>.96</td>
<td>.97</td>
<td>.05</td>
</tr>
<tr>
<td>Girls</td>
<td>102.97***</td>
<td>56</td>
<td>.93</td>
<td>.96</td>
<td>.06</td>
</tr>
<tr>
<td>Type of PA</td>
<td>353.03***</td>
<td>135</td>
<td>.91</td>
<td>.94</td>
<td>.05</td>
</tr>
<tr>
<td>Time of Week PA</td>
<td>236.21***</td>
<td>91</td>
<td>.93</td>
<td>.95</td>
<td>.05</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01, ***p < .001

Table 10. Goodness of fit for identified/task oriented motivation models.

<table>
<thead>
<tr>
<th>Model</th>
<th>X²</th>
<th>df</th>
<th>TLI</th>
<th>CFI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total PA</td>
<td>122.55***</td>
<td>81</td>
<td>.98</td>
<td>.98</td>
<td>.03</td>
</tr>
<tr>
<td>Boys</td>
<td>130.21***</td>
<td>81</td>
<td>.94</td>
<td>.96</td>
<td>.05</td>
</tr>
<tr>
<td>Girls</td>
<td>120.73***</td>
<td>81</td>
<td>.95</td>
<td>.97</td>
<td>.04</td>
</tr>
<tr>
<td>Type of PA</td>
<td>366.57***</td>
<td>172</td>
<td>.93</td>
<td>.95</td>
<td>.05</td>
</tr>
<tr>
<td>Time of Week PA</td>
<td>264.53***</td>
<td>122</td>
<td>.94</td>
<td>.96</td>
<td>.05</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01, ***p < .001

Path Models. There are four types of effects that need to be understood when testing mediation: total effects, simple effects relating to mediation, indirect or mediated effects, and residual direct effects. The total effects are the effects of the predictors on the dependent variable with the mediator omitted. According to Baron and Kenny’s (1986) first rule of mediation, a total effect of the predictor on the dependent variable needs to be significant to test mediation. With a significant total effect of perceptions of parental support on physical activity, the next questions is whether this relation can be explained by a mediating variable.

Next, there are two effects, alpha and beta effects, that make up the simple effects relating to mediation. Alpha effects are the effects from the predictors to the mediator and beta effects are the effects from the mediator to the outcome, controlling for the predictors. For example, the effect of perceptions of parental encouragement on intrinsic motivation is an alpha effect and the effect of intrinsic motivation on physical activity is the beta effect.
The third type of effect, indirect effect, is defined as the product of the unstandardized regression coefficients of the alpha and beta effect. The mediated effect is considered to be statistically significant by the joint significance test if the alpha and beta effects are both significant (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002).

The last effects are known as residual direct effects. Residual direct effects are the effects of the predictors on the dependent variable when controlling for the mediator. These effects are important because a significant residual direct effect suggests another mediator may explain the effects of the predictors on the dependent variable.

**Research Question 3: Intrinsic Motivation on Total Physical Activity**

Results related to the total effects, simple effects related to mediation, indirect and residual direct effects of this model appear in Table 11 and 12 while Figure 9 depicts the unstandardized beta coefficients. The chi-square statistic, $\chi^2(56, N=554) = 101.86, p<.001$, indicated that the hypothesized model statistically did not fit the data; however, the model was judged to be good using the indices of practical fit (TLI=.97, CFI=.98, RMSEA=.04). The variables in this model accounted for 27% of the variance in participation in physical activity for urban, minority adolescents.

The total effect was significant and positive for perceptions of parental encouragement at time 1 predicting total physical activity at time 2 ($\beta=.25, t=2.34$) indicating a higher level of parental encouragement was associated with greater total physical activity at a later time. The total effect for perceptions of parental engagement at time 1 on total physical activity at time 2 was also significant and positive ($\beta=.34, t=3.60$) indicating a higher level of parental engagement was associated with greater total physical activity at a later time. The total effect for parental
modeling on total physical activity was not significant indicating there is no relationship between perceptions of parental modeling at time 1 and total physical activity at time 2.

**Table 11. Total effects for intrinsic motivation on total physical activity.**

<table>
<thead>
<tr>
<th>Total Physical Activity</th>
<th>Perceptions of Parental Encouragement</th>
<th>Perceptions of Parental Engagement</th>
<th>Perceptions of Parental Modeling</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Boys</td>
<td>Girls</td>
</tr>
<tr>
<td>Total Physical Activity</td>
<td>Beta</td>
<td>(.11)</td>
<td>(.12)</td>
</tr>
<tr>
<td></td>
<td>std. error</td>
<td>2.34</td>
<td>1.12</td>
</tr>
</tbody>
</table>

The alpha effect for perceptions of parental encouragement on intrinsic motivation was positive and significant ($\beta=.50$, t=7.20) indicating a higher level of parental encouragement was associated with greater intrinsic motivation. The alpha effects for perceptions of both parental engagement and parental modeling were not significant. The beta effect for intrinsic motivation at time 1 on total physical activity at time 2 was positive and significant ($\beta=.49$, t=2.89) indicating adolescents who are intrinsically motivated at time 1 engaged in greater amounts of physical activity at a later time.

![Path model with unstandardized coefficients for total physical activity.](image)

*Figure 9. Path model with unstandardized coefficients for total physical activity.*

Using the joint significance test, intrinsic motivation completely mediated the effect of perceptions of parental encouragement on total physical activity suggesting that intrinsic
motivation explains the relationship between perceptions of parental encouragement at time 1 and total physical activity at a later time. Intrinsic motivation did not mediate the effect of perceptions of parental engagement and modeling on total physical activity.

The residual direct effect for perceptions of parental encouragement at time 1 on total physical activity at time 2 was not significant, indicating that intrinsic motivation is the only mediator that explains the effect of perceptions of parental encouragement on total physical activity at a later time. However, there was a significant residual direct effect for perceptions of parental engagement at time 1 on total physical activity at time 2 (β=.34, t=3.64) suggesting intrinsic motivation does not explain all of the effect that perceptions of parental engagement has on total physical activity. That is, another mediating variable(s) may further explain the process by which intrinsic motivation mediates the effect of perceptions of parental engagement at time 1 on total physical activity at a later time.
Table 12. Alpha, beta, and residual direct effects for intrinsic motivation on total physical activity.

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Boys</th>
<th>Girls</th>
<th>Total</th>
<th>Boys</th>
<th>Girls</th>
<th>Total</th>
<th>Boys</th>
<th>Girls</th>
<th>Total</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intrinsic Motivation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parameter estimates</td>
<td>.50</td>
<td>.66</td>
<td>.37</td>
<td>.00</td>
<td>-.01</td>
<td>.02</td>
<td>-.07</td>
<td>-.10</td>
<td>-.04</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(std. error)</td>
<td>(.07)</td>
<td>(.12)</td>
<td>(.09)</td>
<td>(.05)</td>
<td>(.06)</td>
<td>(.08)</td>
<td>(.05)</td>
<td>(.07)</td>
<td>(.06)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t-value</td>
<td>7.20</td>
<td>5.68</td>
<td>4.32</td>
<td>.04</td>
<td>-1.12</td>
<td>.23</td>
<td>-1.41</td>
<td>-1.53</td>
<td>-1.61</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.14)</td>
<td>(.32)</td>
<td>(.15)</td>
<td>(.09)</td>
<td>(.12)</td>
<td>(.14)</td>
<td>(.08)</td>
<td>(.14)</td>
<td>(.10)</td>
<td>(.17)</td>
<td>(.35)</td>
<td>(.21)</td>
</tr>
<tr>
<td><strong>Total Physical Activity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parameter estimates</td>
<td>-0.00</td>
<td>-.11</td>
<td>.01</td>
<td>.34</td>
<td>.29</td>
<td>.47</td>
<td>-.09</td>
<td>.02</td>
<td>-.17</td>
<td>.49</td>
<td>.47</td>
<td>.52</td>
</tr>
<tr>
<td>(std. error)</td>
<td></td>
<td></td>
<td></td>
<td>(.09)</td>
<td>(.12)</td>
<td>(.14)</td>
<td>(.08)</td>
<td>(.14)</td>
<td>(.10)</td>
<td>(.17)</td>
<td>(.35)</td>
<td>(.21)</td>
</tr>
<tr>
<td>t-value</td>
<td></td>
<td></td>
<td></td>
<td>3.64</td>
<td>2.45</td>
<td>3.40</td>
<td>-1.04</td>
<td>.18</td>
<td>-1.68</td>
<td>2.89</td>
<td>1.34</td>
<td>2.48</td>
</tr>
</tbody>
</table>

Note: Column labels are the independent variables, row labels are the dependent variables. The three values in each cell are parameter estimates (regression coefficients), standard errors (in parentheses), and t-values for each effect. Effects shown in the top row are referred to as "alpha" effects (effect of independent variable on the mediator). Effects shown in the rightmost column are referred to as "beta" effects (effect of the mediator on the outcome, controlling for the independent variable). All other effects are referred to as "residual direct effects" (the effect of the independent variable on the outcome, controlling for the mediator. Referred to as tau', this is the part of the total effect that remains unexplained by the mediating variable).
Research Question 3a: Gender differences on total physical activity. Results related to the total effects, simple effects related to mediation, indirect and residual direct effects of this model appear in Table 11 and 12 while Figures 10 and 11 show the path coefficients. For boys, the chi-square statistic, $X^2(56, N=554) = 86.65$, $p<.001$ indicated that the hypothesized model statistically did not fit the data; however, the model was judged to be good using the indices of practical fit (TLI=96, CFI=.97, RMSEA=.05). The variables in this model accounted for 22% of the variance in participation in physical activity for urban, minority boys. For girls, the chi-square statistic, $X^2(56, N=554) = 102.97$, $p<.001$, indicated that the hypothesized model statistically did not fit the data; however, the model was judged to be acceptable using the indices of practical fit (TLI=93, CFI=.96, RMSEA=.06). The variables in this model accounted for 31% of the variance in participation in physical activity for urban, minority girls.

There was not a significant total effect for perceptions of parental encouragement at time 1 on total physical activity at time 2 for both boys and girls. The total effects for boys ($\beta=.29$, $t=2.42$) and girls ($\beta=.48$, $t=3.40$) were positive and significant for perceptions of parental engagement at time 1 on total physical activity at time 2 indicating greater parental engagement during physical activity was associated with greater amounts of physical activity for both boys and girls. There was not a significant total effect for perceptions of parental modeling at time 1 on total physical activity at time 2 for both boys and girls.
For boys, the alpha effect for perceptions of parental encouragement on intrinsic motivation was positive and significant ($\beta=.66$, $t=5.68$) indicating greater parental encouragement was associated with greater intrinsic motivation. The alpha effect was also positive and significant for girls ($\beta=.37$, $t=4.32$) indicating greater parental encouragement was associated with greater intrinsic motivation. The alpha effects for both genders for perceptions of both parental engagement and parental modeling were not significant. For boys, the beta effect for intrinsic motivation at time 1 on total physical activity at time 2 was not significant; however, for girls, the beta effect ($\beta=.52$, $t=2.48$) was positive and significant indicating girls who are intrinsically motivated engaged in greater amounts of physical activity at a later time.

**Figure 10. Path model with unstandardized coefficients for boys’ total physical activity.**
Using the joint significance test, intrinsic motivation completely mediated the effect for girls for perceptions of parental encouragement on total physical activity, suggesting that intrinsic motivation explains the relationship between perceptions of parental encouragement at time 1 and total physical activity at a later time for only girls. However, there was no significant total effect between perceptions of parental encouragement and total physical activity. It is possible to have mediation without a significant total effect; however, it is easier to explain the mediation process if the total effect is significant. I will speculate on this finding in Chapter 5.

For both boys and girls, intrinsic motivation did not mediate the effect of perceptions of parental engagement or modeling on total physical activity.

The residual direct effect for girls for perceptions of parental encouragement at time 1 on total physical activity at time 2 was not significant, indicating that intrinsic motivation is the only mediator that can explain the effect of perceptions of parental encouragement on total physical activity at a later time for girls. However, there was a significant residual direct effect for perceptions of parental engagement at time 1 on total physical activity at time 2 for boys ($\beta=.29$, p<.05).
t=2.45) and girls (β=.47, t=3.40) suggesting intrinsic motivation does not explain all of the effect. That is, another mediating variable(s) may further explain the process by which intrinsic motivation mediates the effect of perceptions of parental engagement at time 1 on total physical activity at a later time in both boys and girls.

**Research Question 3b: Intrinsic motivation on type of physical activity.** Results related to the total effects, simple effects related to mediation, indirect and residual direct effects of this model appear in Table 13 and 14 and beta coefficients appear in Figure 12. The chi-square statistic, $X^2(135, N=554) = 353.03$, $p<.001$, indicated that the hypothesized model statistically did not fit the data; however, the model was judged to be acceptable using the indices of practical fit (TLI=.91, CFI=.94, RMSEA=.05). The variables in this model accounted for 57% of the variance in walking, 75% for running, and 39% for other physical activity for urban, minority adolescents.

Due to the correlation between the perceptions of parental encouragement and perceptions of parental engagement ($r=.81$) having a suppressor effect in this model and the lack of relation between intrinsic motivation and perceptions of parental engagement, perceptions of parental engagement was removed from the model. There were positive and significant total effects for perceptions of parental encouragement at time 1 for walking (β=.30, $t=2.23$), running (β=.36, $t=2.64$) and other physical activity (β=.51, $t=3.35$) at time 2 indicating a higher level of parental encouragement was associated with greater amounts of the three types of physical activity. The total effect for perceptions of parental modeling on each type of physical activity was not significant, indicating parental modeling has no influence of the different types of physical activity.
Table 13. Total effects for intrinsic motivation on type of physical activity.

<table>
<thead>
<tr>
<th></th>
<th>Perceptions of Parental Encouragement</th>
<th>Perceptions of Parental Modeling</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>beta</td>
<td>.30</td>
</tr>
<tr>
<td></td>
<td>std. error</td>
<td>(.13)</td>
</tr>
<tr>
<td></td>
<td>t-value</td>
<td>2.23</td>
</tr>
<tr>
<td>Walking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Running</td>
<td>beta</td>
<td>.36</td>
</tr>
<tr>
<td></td>
<td>std. error</td>
<td>(.14)</td>
</tr>
<tr>
<td></td>
<td>t-value</td>
<td>2.64</td>
</tr>
<tr>
<td>Other Physical Activity</td>
<td>beta</td>
<td>.51</td>
</tr>
<tr>
<td></td>
<td>std. error</td>
<td>(.15)</td>
</tr>
<tr>
<td></td>
<td>t-value</td>
<td>3.35</td>
</tr>
</tbody>
</table>

The alpha effect for perceptions of parental encouragement on intrinsic motivation was positive and significant ($\beta=.38$, $t=4.72$), indicating a higher level of parental encouragement was associated with a higher level of intrinsic motivation. The alpha effect for perceptions parental modeling was not significant. The only significant beta effect for intrinsic motivation at time 1 was on running ($\beta=.70$, $t=2.64$) at time 2 indicating adolescents who are intrinsically motivated engaged in greater amounts of running at a later time.

![Figure 12. Path model with unstandardized coefficients for type of physical activity.](image)

*p<.05, **p<.01, ***p<.001, dotted line: p=ns
Using the joint significance test, intrinsic motivation completely mediated the effect for perceptions of parental encouragement on running, suggesting that intrinsic motivation explains the relationship between perceptions of parental encouragement at time 1 and running at a later time. Intrinsic motivation did not mediate the effect of perceptions of parental encouragement on walking or other physical activity. Additionally, intrinsic motivation did not mediate the effect of perceptions of parental modeling on any type of physical activity.

The only residual direct effect of key interest was for perceptions of parental encouragement at time 1 on running at time 2. This effect was non-significant, indicating intrinsic motivation explains the relationship between running and perceptions of parental encouragement. Although the residual direct effects of perceptions of parental encouragement and running and other physical activity were non-significant, intrinsic motivation did not mediate these effects.

Table 14. Alpha, beta, and residual direct effects for intrinsic motivation on type of physical activity.

<table>
<thead>
<tr>
<th></th>
<th>Perceptions of Parental Encouragement</th>
<th>Perceptions of Parental Modeling</th>
<th>Intrinsic Motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrinsic Motivation</td>
<td>beta (.37)</td>
<td>- .03</td>
<td>.01 (.08)</td>
</tr>
<tr>
<td></td>
<td>std. error (.08)</td>
<td>.52</td>
<td>.06 (.06)</td>
</tr>
<tr>
<td></td>
<td>t-value 4.72</td>
<td>.52</td>
<td>4.72 (.72)</td>
</tr>
<tr>
<td>Walking</td>
<td>beta (.14)</td>
<td>.03</td>
<td>.42 (.26)</td>
</tr>
<tr>
<td></td>
<td>std. error (.17)</td>
<td>.27</td>
<td>.27 (.12)</td>
</tr>
<tr>
<td></td>
<td>t-value .84</td>
<td>1.64</td>
<td>.84 (.17)</td>
</tr>
<tr>
<td>Running</td>
<td>beta (.11)</td>
<td>-.01</td>
<td>.70 (.27)</td>
</tr>
<tr>
<td></td>
<td>std. error (.17)</td>
<td>.07</td>
<td>.07 (.12)</td>
</tr>
<tr>
<td></td>
<td>t-value .62</td>
<td>2.64</td>
<td>.62 (.17)</td>
</tr>
<tr>
<td>Other Physical Activity</td>
<td>beta (.32)</td>
<td>-.15</td>
<td>.52 (.30)</td>
</tr>
<tr>
<td></td>
<td>std. error (.20)</td>
<td>1.71</td>
<td>.15 (.14)</td>
</tr>
<tr>
<td></td>
<td>t-value 1.64</td>
<td></td>
<td>-.08 (.14)</td>
</tr>
</tbody>
</table>

Note: column labels are the independent variables, row labels are the dependent variables. The three values in each cell are parameter estimates (regression coefficients), standard errors (in parentheses), and t-values for each effect. Effects shown in the top row are referred to as "alpha" effects (effect of independent variable on the mediator). Effects shown in the rightmost column
are referred to as "beta" effects (effect of the mediator on the outcome, controlling for the independent variable). All other effects are referred to as "residual direct effects" (the effect of the independent variable on the outcome, controlling for the mediator. Referred to as tau', this is the part of the total effect that remains unexplained by the mediating variable).

**Research Question 3c: Intrinsic motivation on time of week physical activity.** Results related to the total effects, simple effects related to mediation, indirect and residual direct effects of this model appear in Tables 15 and 16 with unstandardized beta coefficients appearing in Figure 13. The chi-square statistic, $X^2(91, N=554) = 236.21$, $p<.001$, indicated that the hypothesized model statistically did not fit the data; however, the model was judged to be acceptable using the indices of practical fit (TLI=.93, CFI=.95, RMSEA=.05). The variables in this model accounted for 76% of the variance in participation in weekday physical activity and 88% of the variance for weekend physical activity for urban, minority adolescents.

Due to the correlation between the perceptions of parental encouragement and perceptions parental engagement ($r=.81$) having a suppressor effect in this model and the lack of relation between intrinsic motivation and perceptions of parental engagement, perceptions of parental engagement was removed from the model. There were positive and significant total effects for perceptions of parental encouragement at time 1 on weekday physical activity at time 2 ($\beta=.39$, $t=4.54$) and also for weekend physical activity ($\beta=.28$, $t=3.03$) indicating that perceptions of parental encouragement influences the time in which physical activity takes place. The total effect for perceptions of parental modeling on time of week physical activity was not significant indicating there is no relationship.
Table 15. Total effects for intrinsic motivation on time of week physical activity.

<table>
<thead>
<tr>
<th></th>
<th>Perceptions of Parental Encouragement</th>
<th>Perceptions of Parental Modeling</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>beta</td>
<td>std. error</td>
</tr>
<tr>
<td>Weekday Physical Activity</td>
<td>.39</td>
<td>(.09)</td>
</tr>
<tr>
<td></td>
<td>t-value</td>
<td>4.54</td>
</tr>
<tr>
<td>Weekend Physical Activity</td>
<td>.28</td>
<td>(.09)</td>
</tr>
<tr>
<td></td>
<td>t-value</td>
<td>3.03</td>
</tr>
</tbody>
</table>

The alpha effect for perceptions of parental encouragement on intrinsic motivation was positive and significant ($\beta=.50$, $t=8.16$) indicating greater parental encouragement was associated with greater intrinsic motivation. The alpha effect for perceptions of parental modeling was not significant. The beta effect for intrinsic motivation at time 1 on weekday ($\beta=.47$, $t=2.86$) and weekend physical activity ($\beta=.56$, $t=3.05$) at time 2 was positive and significant indicating adolescents who are intrinsically motivated engaged in greater amounts of physical activity at a later time during the week and on the weekends.

![Path model with unstandardized coefficients for time of week physical activity.](image)

*Figure 13. Path model with unstandardized coefficients for time of week physical activity.*

Using the joint significance test, intrinsic motivation completely mediated the effect for perceptions of parental encouragement at time 1 on later weekday and weekend physical activity,
suggesting that intrinsic motivation does explain the relationship between perceptions of parental encouragement at time 1 and time of week physical activity. Intrinsic motivation did not mediate the effect of perceptions of parental modeling on time of week physical activity.

The residual direct effects for perceptions of parental encouragement at time 1 on both weekday ($\beta=.15, t=1.21$) and weekend ($\beta=.002, t=.01$) physical activity at time 2 was not significant, indicating that intrinsic motivation explains the effect of perceptions of parental encouragement on both weekday and weekend physical activity at a later time.

### Table 16. Alpha, beta, and residual direct effects for intrinsic motivation on time of physical activity.

<table>
<thead>
<tr>
<th>Intrinsic Motivation</th>
<th>Perceptions of Parental Encouragement</th>
<th>Perceptions of Parental Modeling</th>
<th>Intrinsic Motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beta (std. error, t-value)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weekday Physical Activity</td>
<td>.50 (0.06, 8.16)</td>
<td>-0.07 (0.05, -1.48)</td>
<td></td>
</tr>
<tr>
<td>Weekend Physical Activity</td>
<td>.00 (0.14, 0.01)</td>
<td>-0.07 (0.09, -0.85)</td>
<td>0.56 (0.18, 3.05)</td>
</tr>
</tbody>
</table>

Note: column labels are the independent variables, row labels are the dependent variables. The three values in each cell are parameter estimates (regression coefficients), standard errors (in parentheses), and t-values for each effect. Effects shown in the top row are referred to as "alpha" effects (effect of independent variable on the mediator). Effects shown in the rightmost column are referred to as "beta" effects (effect of the mediator on the outcome, controlling for the independent variable). All other effects are referred to as "residual direct effects" (the effect of the independent variable on the outcome, controlling for the mediator. Referred to as $\tau'$, this is the part of the total effect that remains unexplained by the mediating variable).

**Research Question 4: Identified/task Oriented Motivation on Total Physical Activity**

Results related to the total effects, simple effects related to mediation, indirect and residual direct effects of this model appear in Table 17 and 18 and Figure 14 depicts the unstandardized beta coefficients. The chi-square statistic, $X^2(81, N=554) = 122.55, p<.001$, ...
indicated that the hypothesized model statistically did not fit the data; however, the model was judged to be good using the indices of practical fit (TLI=98, CFI=.98, RMSEA=.03). The variables in this model accounted for 19% of the variance in participation in physical activity for urban, minority adolescents.

The total effect was significant and positive for perceptions of parental encouragement at time 1 predicting total physical activity at time 2 ($\beta=.26, t=2.46$), indicating greater parental encouragement was associated with greater total physical activity at a later time. The total effect for perceptions of parental engagement at time 1 on total physical activity at time 2 was also significant and positive ($\beta=.33, t=3.54$), indicating greater parental engagement was associated with greater total physical activity at a later time. The total effect for parental modeling on total physical activity was not significant indicating there is no relationship between perceptions of parental modeling at time 1 and total physical activity at time 2.

Table 17. Total effects for identified/task oriented motivation on total physical activity.

<table>
<thead>
<tr>
<th></th>
<th>Perceptions of Parental Encouragement</th>
<th>Perceptions of Parental Engagement</th>
<th>Perceptions of Parental Modeling</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Boys</td>
<td>Girls</td>
</tr>
<tr>
<td>Total Physical Activity</td>
<td>beta</td>
<td>std. error</td>
<td>t-value</td>
</tr>
<tr>
<td></td>
<td>.26</td>
<td>(.11)</td>
<td>2.46</td>
</tr>
<tr>
<td></td>
<td>.19</td>
<td>(.17)</td>
<td>1.09</td>
</tr>
<tr>
<td></td>
<td>.20</td>
<td>(.12)</td>
<td>1.66</td>
</tr>
</tbody>
</table>

The alpha effect for perceptions of parental encouragement on identified/task oriented motivation was positive and significant ($\beta=.62, t=7.58$), indicating greater parental encouragement was associated with greater identified/task oriented motivation. The alpha effects for perceptions of both parental engagement and parental modeling were not significant. The beta effect for identified/task oriented motivation at time 1 on total physical activity at time
2 was positive and significant ($\beta=.45$, $t=2.80$) indicating adolescents who are task motivated engaged in greater amounts of physical activity at a later time.

Using the joint significance test, identified/task oriented motivation completely mediated the effect for perceptions of parental encouragement on total physical activity, suggesting that identified/task oriented motivation explains the relationship between perceptions of parental encouragement at time 1 and total physical activity at a later time. Identified/task oriented motivation did not mediate the effect of perceptions of parental engagement and modeling on total physical activity.

The residual direct effect for perceptions of parental encouragement at time 1 on total physical activity at time 2 was not significant, indicating that identified/task oriented motivation is the only mediator that can explain the effect of perceptions of parental encouragement on total physical activity at a later time. However, there was a significant residual direct effect for perceptions of parental engagement at time 1 on total physical activity at time 2 ($\beta=.35$, $t=3.73$),

**Figure 14. Path model with unstandardized coefficients for total physical activity.**

Using the joint significance test, identified/task oriented motivation completely mediated the effect for perceptions of parental encouragement on total physical activity, suggesting that identified/task oriented motivation explains the relationship between perceptions of parental encouragement at time 1 and total physical activity at a later time. Identified/task oriented motivation did not mediate the effect of perceptions of parental engagement and modeling on total physical activity.

The residual direct effect for perceptions of parental encouragement at time 1 on total physical activity at time 2 was not significant, indicating that identified/task oriented motivation is the only mediator that can explain the effect of perceptions of parental encouragement on total physical activity at a later time. However, there was a significant residual direct effect for perceptions of parental engagement at time 1 on total physical activity at time 2 ($\beta=.35$, $t=3.73$),
suggesting identified/task oriented motivation does not explain all of the effect. That is, another mediating variable(s) may further explain the process by which identified/task oriented motivation mediates the effect of perceptions of parental engagement at time 1 on total physical activity at a later time.

**Research Question 4a: Gender differences on total physical activity.** Results related to the total effects, simple effects related to mediation, indirect and residual direct effects of this model appear in Table 17 and 18 and Figures 15 and 16 depict the unstandardized beta coefficients. For boys, the chi-square statistic, $X^2(81, N=554) = 130.21, p<.001$, indicated that the hypothesized model statistically did not fit the data; however, the model was judged to be acceptable using the indices of practical fit (TLI=.94, CFI=.96, RMSEA=.05). The variables in this model accounted for 24% of the variance in participation in physical activity for urban, minority boys. For girls, the chi-square statistic, $X^2(81, N=554) = 120.73, p<.001$, indicated that the hypothesized model statistically did not fit the data; however, the model was judged to be good using the indices of practical fit (TLI=.95, CFI=.97, RMSEA=.04). The variables in this model accounted for 30% of the variance in participation in physical activity for urban, minority girls.

There was not a significant total effect for perceptions of parental encouragement at time 1 on total physical activity at time 2 for both boys and girls. The total effects for boys ($\beta=.29, t=2.40$) and girls ($\beta=.48, t=3.43$) were positive and significant for perceptions of parental engagement at time 1 on total physical activity at time 2, indicating greater parental engagement during physical activity was associated with greater amounts of physical activity for both boys and girls. There was not a significant total effect for perceptions of parental modeling at time 1 on total physical activity at time 2 for both boys and girls.
For boys, the alpha effect for perceptions of parental encouragement on identified/task oriented motivation was positive and significant ($\beta=.75$, $t=5.57$), indicating greater parental encouragement was associated with greater identified/task oriented motivation. The alpha effect was also positive and significant for girls ($\beta=.50$, $t=5.11$), indicating greater parental encouragement was associated with greater identified/task oriented motivation.

The alpha effects for both genders for perceptions of parental engagement were not significant. For both genders, the beta effects for identified/task oriented motivation at time 1 on total physical activity at time 2 were positive and significant ($\beta=.53$, $t=1.96$; $\beta=.49$, $t=2.28$) indicating goal oriented adolescents had greater amounts of physical activity at a later time.

![Path model with unstandardized coefficients for boys’ total physical activity.](image)

**Figure 15. Path model with unstandardized coefficients for boys’ total physical activity.**

Using the joint significance test, identified/task oriented motivation completely mediated the effect for both boys and girls for perceptions of parental encouragement on total physical activity, suggesting that identified/task oriented motivation explains the relationship between perceptions of parental encouragement at time 1 and total physical activity at a later time for both genders. However, there was no significant total effect between perceptions of parental encouragement and total physical activity. For both boys and girls, identified/task oriented
motivation did not mediate the effect of perceptions of parental modeling on total physical activity.
Table 18. Alpha, beta, and residual direct effects for identified/task oriented motivation on total physical activity.

<table>
<thead>
<tr>
<th>Perceptions of Parental Encouragement</th>
<th>Perceptions of Parental Engagement</th>
<th>Perceptions of Parental Modeling</th>
<th>Identified Motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Boys</td>
<td>Girls</td>
</tr>
<tr>
<td>Identified Motivation</td>
<td>beta</td>
<td>.62</td>
<td>.75</td>
</tr>
<tr>
<td></td>
<td>std. error</td>
<td>(.08)</td>
<td>(.14)</td>
</tr>
<tr>
<td></td>
<td>t-value</td>
<td>7.58</td>
<td>5.57</td>
</tr>
<tr>
<td>Total Physical Activity</td>
<td>beta</td>
<td>-.02</td>
<td>-.21</td>
</tr>
<tr>
<td></td>
<td>std. error</td>
<td>(.16)</td>
<td>(.30)</td>
</tr>
<tr>
<td></td>
<td>t-value</td>
<td>-.13</td>
<td>-.71</td>
</tr>
</tbody>
</table>

Note: column labels are the independent variables, row labels are the dependent variables. The three values in each cell are parameter estimates (regression coefficients), standard errors (in parentheses), and t-values for each effect. Effects shown in the top row are referred to as "alpha" effects (effect of independent variable on the mediator). Effects shown in the rightmost column are referred to as "beta" effects (effect of the mediator on the outcome, controlling for the independent variable). All other effects are referred to as "residual direct effects" (the effect of the independent variable on the outcome, controlling for the mediator. Referred to as tau', this is the part of the total effect that remains unexplained by the mediating variable).
Figure 16. Path model with unstandardized coefficients for girls’ total physical activity.

The residual direct effect for both boys and girls for perceptions of parental encouragement at time 1 on total physical activity at time 2 was not significant, indicating that identified/task oriented motivation is the only mediator that can explain the effect of perceptions of parental encouragement on total physical activity at a later time for boy and girls. However, there was a significant residual direct effect for perceptions of parental engagement at time 1 on total physical activity at time 2 for boys ($\beta=.34$, $t=2.65$) and girls ($\beta=.48$, $t=3.48$), suggesting identified/task oriented motivation does not explain all of the effect. That is, another mediating variable(s) may further explain the process by which identified/task oriented motivation mediates the effect of perceptions of parental engagement at time 1 on total physical activity at a later time in both boys and girls.

**Research Question 4b: Identified/task oriented motivation on type of physical activity.** Results related to the total effects, simple effects related to mediation, indirect and residual direct effects of this model appear in Table 19 and 20 and Figure 17 depicts the unstandardized beta coefficients. The chi-square statistic, $\chi^2(172, N=554) = 366.57$, $p<.001$, 

*Figure 16. Path model with unstandardized coefficients for girls’ total physical activity.*
indicated that the hypothesized model statistically did not fit the data; however, the model was judged to be acceptable using the indices of practical fit (TLI=.93, CFI=.95, RMSEA=.05). The variables in this model accounted for 56% of the variance in walking, 82% for running, and 51% for other physical activity for urban, minority adolescents.

Due to correlation between the perceptions of parental encouragement and perceptions of parental engagement (r=.81) having a suppressor effect in this model and the lack of relation between identified/task oriented motivation and perceptions of parental engagement, perceptions of parental engagement was removed from the model. There were positive and significant total effects for perceptions of parental encouragement at time 1 for walking (β=.53, t=5.54), running (β=.62, t=5.91), and other physical activity (β=.67, t=5.73) at time 2, indicating greater parental encouragement was associated with greater amounts of running and engagement in other forms of physical activity. There were no significant total effects for perceptions of parental modeling on walking, running or other physical activity.

<table>
<thead>
<tr>
<th>Table 19. Total effects for identified/task oriented motivation on type of physical activity.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceptions of Parental Encouragement</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Walking</td>
</tr>
<tr>
<td>beta</td>
</tr>
<tr>
<td>std. error</td>
</tr>
<tr>
<td>t-value</td>
</tr>
<tr>
<td>Running</td>
</tr>
<tr>
<td>beta</td>
</tr>
<tr>
<td>std. error</td>
</tr>
<tr>
<td>t-value</td>
</tr>
<tr>
<td>Other Physical Activity</td>
</tr>
<tr>
<td>beta</td>
</tr>
<tr>
<td>std. error</td>
</tr>
<tr>
<td>t-value</td>
</tr>
</tbody>
</table>

The alpha effect for perceptions of parental encouragement on identified/task oriented motivation was positive and significant (β=.61, t=8.47), indicating greater parental
encouragement was associated with greater identified/task oriented motivation. The alpha effect for perceptions of parental modeling was not significant. The beta effects for identified/task oriented motivation at time 1 on walking (β=.77, t=4.21), running (β=.61, t=3.13), and other physical activity (β=.97, t=4.35) at time 2 were positive and significant, indicating adolescents who are goal oriented had greater amounts of walking, running, and other physical activity at a later time.

![Path model with unstandardized coefficients for type of physical activity.](image)

*Figure 17. Path model with unstandardized coefficients for type of physical activity.*

Using the joint significance test, intrinsic motivation completely mediated the effect for perceptions of parental encouragement on walking, running, and other physical activity, suggesting that identified/task oriented motivation explains the relationship between perceptions of parental encouragement at time 1 and type of physical activity at a later time. Additionally, identified/task oriented motivation did not mediate the effect of perceptions of parental modeling on any type of physical activity.

All three of the residual direct effect for perceptions of parental encouragement at time 1 on walking (β=-.08, t=-.49), running (β=.11, t=.65), and other physical activity (β=-.09, t=-.46) at
time 2 were not significant, indicating identified/task oriented motivation explains the relationship between perceptions of parental encouragement and type of physical activity.

**Table 20. Alpha, beta, and residual direct effects for identified/task oriented motivation on type of physical activity.**

<table>
<thead>
<tr>
<th>Identified Motivation</th>
<th>Perceptions of Parental Encouragement</th>
<th>Perceptions of Parental Modeling</th>
<th>Identified Motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>beta .61</td>
<td>- .08</td>
<td>.77</td>
</tr>
<tr>
<td></td>
<td>std. error (.07)</td>
<td>(.05)</td>
<td>(.18)</td>
</tr>
<tr>
<td></td>
<td>t-value 8.47</td>
<td>-1.70</td>
<td>4.21</td>
</tr>
<tr>
<td>Walking</td>
<td>beta -.08</td>
<td>.08</td>
<td>.61</td>
</tr>
<tr>
<td></td>
<td>std. error (.16)</td>
<td>(.09)</td>
<td>(.20)</td>
</tr>
<tr>
<td></td>
<td>t-value -.49</td>
<td>.94</td>
<td>4.21</td>
</tr>
<tr>
<td>Running</td>
<td>beta .11</td>
<td>-.02</td>
<td>.61</td>
</tr>
<tr>
<td></td>
<td>std. error (.17)</td>
<td>(.10)</td>
<td>(.20)</td>
</tr>
<tr>
<td></td>
<td>t-value .65</td>
<td>-1.17</td>
<td>3.13</td>
</tr>
<tr>
<td>Other Physical Activity</td>
<td>beta -.09</td>
<td>.17</td>
<td>.97</td>
</tr>
<tr>
<td></td>
<td>std. error (.19)</td>
<td>(.11)</td>
<td>(.22)</td>
</tr>
<tr>
<td></td>
<td>t-value -.46</td>
<td>1.52</td>
<td>4.35</td>
</tr>
</tbody>
</table>

Note: column labels are the independent variables, row labels are the dependent variables. The three values in each cell are parameter estimates (regression coefficients), standard errors (in parentheses), and t-values for each effect. Effects shown in the top row are referred to as "alpha" effects (effect of independent variable on the mediator). Effects shown in the rightmost column are referred to as "beta" effects (effect of the mediator on the outcome, controlling for the independent variable). All other effects are referred to as "residual direct effects" (the effect of the independent variable on the outcome, controlling for the mediator. Referred to as tau', this is the part of the total effect that remains unexplained by the mediating variable).

**Research Question 4c: Identified/task oriented motivation on time of week physical activity.** Results related to the total effects, simple effects related to mediation, indirect and residual direct effects of this model appear in Table 21 and 22. The chi-square statistic, $X^2(122, N=554) = 264.53, p<.001$, indicated that the hypothesized model statistically did not fit the data; however, the model was judged to be acceptable using the indices of practical fit (TLI=.94, CFI=.96, RMSEA=.05). The variables in this model accounted for 73% of the variance in participation in weekday physical activity and 91% of the variance for weekend physical activity for urban, minority adolescents.
Due to the correlation between the perceptions of parental encouragement and perceptions parental engagement (r=.81) having a suppressor effect in this model and the lack of relation between intrinsic motivation and perceptions of parental engagement, perceptions of parental engagement was removed from the model. There were positive and significant total effects for perceptions of parental encouragement at time 1 on weekday (β=.38, t=4.40) and weekend (β=.28, t=3.00) physical activity at time 2, indicating that perceptions of parental encouragement influences both weekday and weekend physical activity. The total effect for perceptions of parental modeling on time of week physical activity was not significant, indicating there is no relationship.

Table 21. Total effects for identified/task oriented motivation on time of physical activity.

<table>
<thead>
<tr>
<th></th>
<th>Perceptions of Parental Encouragement</th>
<th>Perceptions of Parental Modeling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekday Physical Activity</td>
<td>beta = .38</td>
<td>-0.07</td>
</tr>
<tr>
<td></td>
<td>std. error = (.09)</td>
<td>(.08)</td>
</tr>
<tr>
<td></td>
<td>t-value = 4.40</td>
<td>-.90</td>
</tr>
<tr>
<td>Weekend Physical Activity</td>
<td>beta = .28</td>
<td>-0.10</td>
</tr>
<tr>
<td></td>
<td>std. error = (.09)</td>
<td>(.09)</td>
</tr>
<tr>
<td></td>
<td>t-value = 3.00</td>
<td>-1.19</td>
</tr>
</tbody>
</table>

The alpha effect for perceptions of parental encouragement on identified/task oriented motivation was positive and significant (β=.60, t=8.30), indicating greater parental encouragement was associated with greater identified/task oriented motivation. The alpha effect for perceptions of parental modeling was not significant. The beta effect for identified/task oriented motivation at time 1 on weekday physical activity was not significant (β=.30, t=1.94) while the beta effect for weekend physical activity was significant (β=.53, t=3.09) at time 2, indicating adolescents who are goal oriented engaged in greater amounts of physical activity at a later time.
Using the joint significance test, identified/task oriented motivation completely mediated the effect for perceptions of parental encouragement at time 1 on later weekend physical activity, suggesting that identified/task oriented motivation does explain the relationship between perceptions of parental encouragement at time 1 and weekend physical activity. However, identified/task oriented motivation was not significant when mediating the effects of perceptions of parental encouragement. Identified/task oriented motivation did not mediate the effect of perceptions of parental modeling on time of week physical activity.

The residual direct effects for perceptions of parental encouragement at time 1 on both weekday ($\beta=.20$, $t=1.50$) and weekend ($\beta=-.03$, $t=-.21$) physical activity at time 2 were non-significant, indicating that identified/task oriented motivation explains the effect of perceptions of parental encouragement on both weekday and weekend physical activity at a later time.
Table 22. Alpha, beta, and residual direct effects for identified/task oriented motivation on time of physical activity.

<table>
<thead>
<tr>
<th>Identified Motivation</th>
<th>Perceptions of Parental Encouragement</th>
<th>Perceptions of Parental Modeling</th>
<th>Identified Motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>beta</td>
<td>-.60</td>
<td>-.08</td>
</tr>
<tr>
<td></td>
<td>std. error</td>
<td>(.07)</td>
<td>(.05)</td>
</tr>
<tr>
<td></td>
<td>t-value</td>
<td>8.30</td>
<td>-1.72</td>
</tr>
<tr>
<td></td>
<td>Weekday Physical Activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>beta</td>
<td>.20</td>
<td>-.04</td>
</tr>
<tr>
<td></td>
<td>std. error</td>
<td>(.14)</td>
<td>(.08)</td>
</tr>
<tr>
<td></td>
<td>t-value</td>
<td>1.50</td>
<td>-.55</td>
</tr>
<tr>
<td></td>
<td>Weekend Physical Activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>beta</td>
<td>-.03</td>
<td>-.06</td>
</tr>
<tr>
<td></td>
<td>std. error</td>
<td>(.15)</td>
<td>(.09)</td>
</tr>
<tr>
<td></td>
<td>t-value</td>
<td>-.21</td>
<td>-.64</td>
</tr>
</tbody>
</table>

Note: column labels are the independent variables, row labels are the dependent variables. The three values in each cell are parameter estimates (regression coefficients), standard errors (in parentheses), and t-values for each effect. Effects shown in the top row are referred to as "alpha" effects (effect of independent variable on the mediator). Effects shown in the rightmost column are referred to as "beta" effects (effect of the mediator on the outcome, controlling for the independent variable). All other effects are referred to as "residual direct effects" (the effect of the independent variable on the outcome, controlling for the mediator). Referred to as τ', this is the part of the total effect that remains unexplained by the mediating variable.

Chapter Four Summary

Descriptive statistics, independent samples t-test, multiple regressions, and structural equation modeling techniques were used to analyze the data for the four main and 10 sub-research questions of the study. Physical activity levels were below the recommended levels, with males being more active than females. Perceptions of parental encouragement and perceptions of parental engagement were significant predictors of physical activity participation among adolescents. Both intrinsic and identified/task oriented motivation mediated the effects of perceptions of parental encouragement and perceptions of parental engagement in some of the structural equation models. A summary of the significant findings for this dissertation is presented in Tables 23 and 24 respectively.
### Table 23. Summary of findings from the regression models (Research Question 2).

<table>
<thead>
<tr>
<th>Regression models</th>
<th>Significant Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RQ 2</strong>: Total sample and total physical activity</td>
<td>Perceptions of parental encouragement and engagement positively predicted total physical activity.</td>
</tr>
<tr>
<td><strong>RQ 2A</strong>: Gender differences</td>
<td>Boys and girls, perceptions of parental encouragement and engagement positively predicted total physical activity.</td>
</tr>
<tr>
<td><strong>RQ 2B</strong>: Total sample and type of physical activity</td>
<td>Perceptions of parental encouragement and engagement positively predicted walking, running, and other physical activity. Perceptions of parental modeling negatively predicted running.</td>
</tr>
<tr>
<td><strong>RQ 2C</strong>: Total sample and time of week physical activity</td>
<td>Perceptions of parental encouragement and engagement positively predicted weekday and weekend physical activity; perceptions of parental modeling negatively predicted weekday physical activity.</td>
</tr>
</tbody>
</table>

### Table 24. Summary of findings from the structural equation models (Research Questions 3 and 4).

<table>
<thead>
<tr>
<th>SEM models</th>
<th>Significant Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RQ 3</strong>: Intrinsic motivation on total physical activity</td>
<td>No mediation, although as RQ3a indicates, there were gender differences</td>
</tr>
<tr>
<td><strong>RQ 3A</strong>: Gender differences</td>
<td>Boys, no mediation; Girls, complete mediation of perceptions of parental encouragement on total physical activity</td>
</tr>
<tr>
<td><strong>RQ 3B</strong>: Intrinsic motivation on type of physical activity</td>
<td>Complete mediation of perceptions of parental encouragement on running</td>
</tr>
<tr>
<td><strong>RQ 3C</strong>: Intrinsic motivation on time of week physical activity</td>
<td>Complete mediation of perceptions of parental encouragement on weekday and weekend physical activity</td>
</tr>
<tr>
<td><strong>RQ 4</strong>: Identified motivation on total physical activity</td>
<td>Complete mediation of perceptions of parental encouragement</td>
</tr>
<tr>
<td><strong>RQ 4A</strong>: Gender differences</td>
<td>Boys and girls, complete mediation of perceptions of parental encouragement on total physical activity</td>
</tr>
<tr>
<td><strong>RQ 4B</strong>: Identified motivation on time of week physical activity</td>
<td>Complete mediation of perceptions of parental encouragement on walking, running, and other physical activity</td>
</tr>
<tr>
<td><strong>RQ 4C</strong>: Identified motivation on type of physical activity</td>
<td>Complete mediation of perceptions of parental encouragement on weekend physical activity</td>
</tr>
</tbody>
</table>
Chapter Five: Discussion

The purposes of this dissertation were (a) to examine the effects that adolescent perceptions of parental support may have on adolescent physical activity and if there is a relationship, (b) to examine if two types of motivation, intrinsic and identified/task oriented, mediate the effects of parental support on adolescent physical activity. I also examined gender differences in these relations, as well as whether the relations differed with respect to time of day of activity and type of activity involvement. In this chapter, I will discuss the findings and offer interpretations of the findings. Additionally, I will discuss limitations, implications, and future research for this study. Two theoretical frameworks guided the study: the Social Cognitive Theory theoretical framework (Bandura, 1986) posits individuals learn through observing others’ attitudes, behaviors, and the outcomes associated with those behaviors. Two types of intrinsic motivation posited through the Self-determination theory (Ryan & Deci, 2000) describe individuals’ willingness to engage in particular behaviors (i.e., physical activity). The following research questions guided the study:

1. What is the baseline physical activity among urban, minority adolescents?
   a. Are there gender differences in total physical activity, type of physical activity, and time of week physical activity?

2. Are there effects of perceived parental engagement, perceived parental encouragement, and perceived parental modeling at time 1 on total physical activity (walking, running, and other physical activity) at time 2?
a. Do the effects of perceived parental engagement, perceived parental
couragement, and perceived parental modeling on physical activity (walking,
running, and other physical activity) differ by gender?

b. Do the effects of perceived parental engagement, perceived parental
couragement, and perceived parental modeling on physical activity differ by
type of physical activity?

c. Do the effects of perceived parental engagement, perceived parental
couragement, and perceived parental modeling on physical activity differ by
time of week of physical activity?

3. Does intrinsic motivation at time 1 mediate the effects of time 1 perceived parental
engagement, perceived parental encouragement, and perceived parental modeling on total
physical activity (walking, running, and other physical activity) at time 2?
   a. Does the mediated effect of intrinsic motivation differ by gender on total physical
      activity (walking, running, and other physical activity)?
   b. Does the mediated effect of intrinsic motivation differ by type of physical activity
      (walking, running, and other physical activity)?
   c. Does the mediated effect of intrinsic motivation differ by time of week of
      physical activity (walking, running, and other physical activity)?

4. Does identified/task oriented motivation at time 1 mediate the time 1 effects of perceived
parental engagement, perceived parental encouragement, and perceived parental
modeling on total physical activity (walking, running, and other physical activity) at time
2?
a. Does the mediated effect of identified/task oriented motivation differ by gender on total physical activity (walking, running, and other physical activity)?

b. Does the mediated effect of identified/task oriented motivation differ by type of physical activity (walking, running, and other physical activity)?

c. Does the mediated effect of identified/task oriented motivation differ by time of week of physical activity (walking, running, and other physical activity)?

The findings from this study suggest that urban, minority adolescent physical activity levels are inconsistent with previous studies using various physical activity measures and instruments (Duncan, Duncan, & Strycker, 2005; Edwardson & Gorely, 2010; Thompson, Humbert, & Mirwald, 2003). Walking was the most common form of physical activity and adolescents were more active during the week than on the weekend despite having more leisure time on the weekends. Not surprisingly, there were gender differences; girls engaged in less total physical activity than boys. Girls were less physically active than boys in every statistical analysis with the lone exception of walking as a type of physical activity as no statistical differences were found for walking.

Parents play a pivotal role in the amount of physical activity in which boys and girls engage. Adolescent perceptions of parental support were a moderate predictor of adolescent physical activity. Of the three parental support factors, a perception of parental encouragement was the strongest predictor of adolescent physical activity. In addition to the influence of parental support on adolescent physical activity, this dissertation provides evidence that parents can also serve to activate their child’s motivation to be physically active. Furthermore, two types of motivation, intrinsic and task/identified motivation, mediated the effects of perceptions of
parental encouragement, and not parental engagement, on physical activity, although this differed by gender and type of motivation.

These findings indicated that the influence of perceiving one’s parents to be encouraging of physical activity serves to intrinsically motivate girls, but not boys, to be physically active. On the other hand, perceiving that one’s parents encourages physical activity serves as a means of enhancing one’s identified or task-orientation motivation for both boys and girls.

**Interpretation of Findings**

The findings from my study support existing evidence about adolescent physical activity, but the findings also present new evidence that may help move research on physical activity forward, particularly since the sample for this study was comprised of urban, minority youth. I will first address the basic descriptive findings and then turn to the findings from the exploratory regression and SEM models.

**Baseline Physical Activity Levels**

The first research question of this study was to determine levels of physical activity among urban, minority adolescents. This study used a 7-day physical activity recall method that examined amount of physical activity across several time periods and types of activities. I compared findings from this study with the CDC’s recommended physical activity guidelines. The amount of physical activity reported by youth in this study are higher than previous studies (Belcher, Berrigan, Dodd, Emken, Chou, Spruijt-Metz, 2010 & Rideout, Foehr, & Roberts, 2010). Although other studies have shown that youth tend to overestimate physical activity participation (Belcher et al., 2010); however, in this study, it appears that there was measurement error that resulted in an inflation of reported activity. Adolescents in this study reported spending
624 total weekly minutes walking, 446 minutes running, and 147 minutes engaged in other forms of physical activity for a seven day period totaling 1217 minutes spent being physical activity.

Given these numbers, the adolescents in this study had daily amounts of physical activity that approached three hours, which exceeds the CDC’s weekly recommendations for adolescents. This probable overestimation of amounts of physical activity participation is likely largely due to measurement error. For example, most self-report physical activity instruments measure daily amounts of physical activity once per day (Troiano et al., 2008). In this study, participants may have double counted physical activity amounts by including minutes of walking within the other physical activity category, resulting in inaccurate estimates of actual amounts of physical activity. Additionally, Saturday and Sunday mornings and evenings for each type of physical activity was also measured producing a large range in the possible amounts of physical activity for the duration of the study.

**Gender differences.** Gender remains one of the most common physical activity disparities in physical activity research. The findings from this study reinforced that those disparities exist, with girls being less physically activity than boys. Girls were less likely to run and participate in other physical activity when compared to boys; however, there were no gender differences when examining walking as a form of physical activity. This particular finding supports previous research that found gender differences in more strenuous forms of physical activity, but not walking (Vilhjalmsson & Kristjansdottir, 2003). The benefits of running and participation in various sports related activities are well understood, but walking has benefits as well. For example, (Rachele, Cuddihy, Washington, & McPhail, 2014) found youth physical activity was associated with the five dimensions of wellness: social, emotional, physical, intellectual, and spiritual wellness. Regular physical activity can range from a moderate to
vigorous activity such as walking or running so maybe the intent should be placed on modifying existing behavior among girls to help maximize the benefits of walking. For example, encouraging girls to walk for longer amounts of time, walk longer distances, or walk shorter distances with a much higher walking pace. Previous research also found walking among African American and Hispanic girls to be on par with the activity levels of boys, but not other forms of physical activity (Belcher, Berrigan, Dodd, Emken, Chou, Spruijt-Metz, 2010).

**Parental Support Predicting Physical Activity**

Parental support has been a consistent predictor of adolescent physical activity in the literature and the findings from this study support this association by providing evidence that perceptions of parental support is a moderate predictor of physical activity among urban, minority adolescents. Of the three parental support predictors, perceptions of parental encouragement and engagement consistently predicted physical activity, whereas perceptions of parental modeling inconsistently predicted physical activity. Perceptions of parental encouragement were the strongest predictor of total physical activity ($\beta=.25$), type of physical activity (running ($\beta=.20$), walking ($\beta=.12$ and other types ($\beta=.31$), and time of week physical activity ($\beta=.25$ and ($\beta=.23$). This finding is consistent with the tenets of SCT as parents play a pivotal role in behavioral change of their children. Parental encouragement and engagement can be instrumental in helping establish adequate amounts of physical activity participation by being actively involved and supportive of their children’s physical activity behavior. Bauer, Nelson, Boutelle, and Neumark-Sztainer (2008) found that parental encouragement towards physical activity influenced physical activity at a later time.

The findings of this study highlight the importance that mothers and fathers may have if they are actively involved in physical activity with their children or act as facilitators of physical
activity. This finding suggests the need for increased parental involvement to sustain physical activity levels among adolescents.

Perception of parental modeling was not positively associated with adolescent physical activity, and it was negatively associated with running and weekday physical activity. Others have also found that parental modeling had no effect on adolescent physical activity (Barnett, O’Loughlin, & Paradis, 2002; DiLorenzo, Stucky-Ropp, Vander Wal, & Gotham, 1998). The finding that adolescents did not exercise even if they perceived their parents to exercise was an interesting finding. One possible explanation for this complicated relationship may be the type of exercise in which the parents engaged may not be of interest to the child. Another interpretation is parent exercise may not have any bearing on promoting adolescent physical activity.

The Role of Intrinsic Motivation as a Mediator

A hypothesized model was tested to explain the perceptions of parental support and intrinsic motivation sequence as it relates to physical activity. Based on the findings of this study, the hypothesized model is justifiable for girls as it relates to total physical activity, but it is not tenable for boys. The effect of perceptions of parental encouragement on later adolescent physical activity is explained by intrinsic motivation in this study. Girls who perceive encouragement from their parents to be physically active are much more likely to be intrinsically motivated to be physically active, thus resulting in physical activity participation. When adolescent girls perceive encouragement, it appears that it serves to activate their motivation. This finding is similar to the Beets et al. (2010) finding that encouragement from parents facilitated physical activity participation. The significance of this finding is paramount to the need to understand the role parents may need to play to be facilitators of girls’ physical activity because girls have lower amounts of physical activity than boys. The need to increase physical
activity for adolescents is important; however, physical activity for girls remains historically low when compared to boys. Thus, this study illustrates a potential avenue to circumvent the lack of physical activity associated with girls by focusing on parents as a means to increase motivation.

The findings for this study suggest that girls need to receive encouragement from their parents to activate their motivation to be physically active. Of particular interest is how intrinsic motivation completely mediated the effect of perceptions of parental encouragement for girls only, but not for boys. Complete mediation rarely occurs in the social sciences so the findings of the study point future research in a positive direction for potentially increasing how physical activity promotion of girls is examined. This is particularly interesting given the physical activity disparities between boys and girls found in this study and suggests that encouragement is essential for girls to have adequate levels of physical activity. Another interesting finding indicated that the effect of perceptions of parental encouragement on later adolescent running among girls as a type of physical activity is explained by intrinsic motivation. This is of particular interest because running is a unique behavior that requires some level of motivation.

The significant residual direct effect found between perceptions of parental engagement and total physical activity suggests that another mediator other than intrinsic motivation is the mechanism through which perceptions of parental engagement works to increase physical activity. There is not enough research to support this finding; however, a possible mediator may be intention to participate in physical activity. Parental engagement may facilitate adolescent intention through the active role of being actively involved in physical activity. Another possible mediator may be adolescent’s attitudinal beliefs toward physical activity behavior. Active participation among parents and their children may have a positive effect on attitudes, which may in turn lead to increased physical activity.
The data from two time points strengthens the mediational link between perceptions of parental encouragement and intrinsic motivation on physical activity. According to Maxwell and Cole (2007) and Cole and Maxwell (2003), at least two time points are needed to adequately test mediation.

**The Role of Identified/task Oriented Motivation as a Mediator**

A hypothesized model was tested to explain the perceptions of parental support and identified/task oriented motivation sequence as it relates to physical activity. Based on the findings of this study, the hypothesized model is justifiable for both boys and girls as it relates to total physical activity and it is also tenable for the total sample as it relates to all types of physical activity time of week of physical activity. The effect of perceptions of parental encouragement on later adolescent physical activity is explained by identified/task oriented motivation. Adolescents who receive encouragement about being physically active gain a better understanding of the benefits and awards associated with being physically active and are much more likely to have higher levels of goal oriented behavior to be physically active, thus resulting in physical activity participation. When adolescents receive encouragement, it serves as an activation of their motivation that triggers higher rates of participation in physical activity.

The findings for this study suggest that adolescents need to receive encouragement from their parents to activate their motivation to be physically active. There were no gender differences found in how identified/task oriented motivation explains the effect of perceptions of parental encouragement on physical activity. Both boys and girls who received high amounts of parental encouragement had increased amounts of motivation resulting in higher levels of physical activity. Unlike the intrinsic motivation model, this model suggests that being goal oriented is no different for boys or girls. Another interesting finding indicated that the effect of...
perceptions of parental encouragement was mediated by identified/task oriented motivation for all types of physical activity. Again, being goal oriented and having encouragement from parents is important for walking, running and participating in other forms of physical activity.

**Application of the Theoretical Frameworks**

Social Cognitive Theory has been extensively used to examine physical activity among youth in a variety of contexts, but this study broadly used the SCT theoretical framework with the notion that children learn from their parents. One of the key principles of SCT, modeling, was not significant in this study; however, other principles of SCT can be applied to this study such as parental encouragement and engagement. Theories of motivation are needed for a better understanding of explaining human behavior, particularly physical activity behavior. Motivation is the underlying explanation for human behavior and intrinsic and identified/task oriented motivation seek to explain why adolescents are physically active and also why they choose not to be physically active. Motivation varies from individual to individual and it also varies within each individual, which is a complex phenomenon. This dissertation posed a critical perspective of what activates one’s motivation to be physically active. The continuous process of motivation according to SDT may explain the role of parents using SCT as a theoretical framework. As adolescents shift between intrinsic and identified/task oriented motivation, parents are able to activate both types of motivation through encouragement and still have a positive effect on adolescent physical activity. This finding is of particular interest because little is understood about the mechanisms through which parental support works to increase physical activity among adolescents.

Furthermore, intrinsic and identified motivation was salient for girls while only identified motivation was salient for boys. This finding is of particular interest because it provides
evidence that parental support serves to activate both types of motivation in girls to influence physical activity at a later time. Historically, girls remain less active than boys, but this study provides insight into a possible way to increase physical activity among girls. For boys, intrinsic motivation was not salient which suggests that boys do not need encouragement from parents to activate their intrinsic motivation; however, they do no need encouragement to activate their identified motivation. This finding is unique because it suggests that boys still need to be supported to better understand the rewards and goals associated with being physically active, but boys do not necessarily need to have their inherent motivations increased.

Limitations

There are several limitations to this study. This study focused on length of time engaged in physical activity as no measures of level or intensity of physical activity were collected in the survey. The time of year in which both time points of data were collected may have had an adverse effect on physical activity given the climate of the geographic location in which the participants were located. Although the data were collected in two waves, the amount of time between data collection was two months so the processes of parents increasing adolescents’ motivation may not have been long enough for those processes to develop; however, little to no research exists to support how much time is needed for these putative mediators to develop. Although findings of this study add to the body of research on adolescent physical activity as it pertains to parental support and motivation, the conclusions from this study are limited to the sample population. Another important consideration is the exclusion of parental engagement construct from many of the structural equation models. Parental engagement was highly correlated with the parental encouragement construct and acted as a suppressor in some model testing and thus was removed from data analysis.
The high amounts of total physical activity are the result of questionnaire language and overlapping of time periods within the same day. Therefore, the questionnaire design impacted the results of this study constraining the findings of this study to the participants only disallowing for generalizability to other populations.

**Measurement.** Physical activity data were collected via self-report. Though commonly used, self-reporting of physical activity is a subjective measurement that increases the likelihood of introducing recall bias when compared to other more objective measurements like accelerometers. Additionally, this study used a new scale to determine physical activity which has not been extensively tested for reliability and validity. The lack of having a reliable objective measurement of physical activity such as an activity monitor or pedometer for comparison of the self-report measures contributed to measurement error. It must be noted that each question addressed daily amounts of physical activity resulting in an inflation in the total amounts of daily physical activity for the entire sample. Possible reasons for inflation stem from participants possibly from inflating actual time spent being of physically active and double-counting amounts of physical activity. Adolescents tend to overestimate physical activity participation and possibly counting minutes of walking and running within the other physical activity measures may lead to further overestimation of self-reported amount of physical activity. In addition, participants responded to how much time they participated in each type of physical activity (walking and running) for both afternoon and evening times during the week which may have further inflated the amounts of physical activity by possibly double counting amounts twice per day rather than just once.
Implications

The findings from this dissertation aim to contribute to the growing body of literature on how to increase physical activity among adolescents, but also aim to spark discussion in prevention research. Several programs and initiatives have been developed to increase adolescent physical activity with varying results. Some of these programs have specifically targeted parents as a potential conduit for increasing their children’s physical activity, but this study shows specific ways in which parents can be a conduit to increase activity levels. Parental encouragement through the lens of SCT can activate adolescent motivation thus increasing one’s propensity to be physically active. Minority populations are at higher risks of suffering from physical inactivity related diseases and illnesses, but this study provides a means to potentially mitigate the low rates of activity among minorities by providing an avenue through parental encouragement to increase adolescent physical activity.

Future Research

Researchers should design a study focused more on individuals rather than the activity levels. Practically every study involving physical activity examines youth as if they are equals and little information is gleaned as to exactly why certain individuals have higher rates of physical activity than others. Investigators should add one critical question to distinguish youth involved in organized sports from those who do not participate in organized sports. Youth who are involved in organized sports are more likely to engage in physically active leisure as means of training or simply the actions required of the sport or activity. I believe much of the physical activity research is being skewed by youth who are heavily involved in sports. The results of this type of study may show lower rates of physical activity for youth who are not part of organized sports and higher rates for those who are involved in organized sports.
Another critical question involving the hair type African American girls has been explored qualitatively, but not quantitatively in the literature. Past research has shown hair type to be a delimiting factor in the lack of physical activity among African American women, but little attention has been given to this key factor which may help to explain why African American women have the lowest rates of physical activity than any other group. Furthermore, a future study should address how parental attitudes toward hair type and physical activity play a role in how African American girls view hair type as a potential constraint to physical activity participation. Harley et al. (2009) found hair type to have a negative influence on African American women’s participation in physical activity in their qualitative analysis. To my knowledge, there is no quantitative research on this intriguing area.

Physical activity occurs in many forms and can be an intermittent activity, but much of the physical activity research is primarily based on the more commonly held activities such as walking, running, and sports-related activities. Although, the CDC’s recommended guidelines encourage resistance training and flexibility, those activities are rarely examined when determining physical activity levels. Future research questions should examine how much time adolescents spend participating in resistance and flexibility training because those amounts of physical activity are missing from the current literature.

The findings from this study showed high levels of physical activity among urban, minority adolescents, but the findings did not explore socioeconomic status as a possible explanation. Some studies have shown physical activity levels to be lower in lower income populations regardless of age, gender or ethnicity suggesting that maybe individuals from lower incomes are more concerned with life’s daily struggles rather than meeting the CDC’s recommended physical activity guidelines (Boykin, Diez-Roux, Carnethon, Shrager, Ni, Whitt-
Glover, 2011). The findings of the Boykin et al. (2011) study found heterogeneity in socioeconomic status was more salient than race and ethnicity. Over 90% of the sample in this study qualified for free and/or reduced lunch, but specific questions related to income were not examined as a possible predictor of physical activity, thus I was unable to explore the socio-economic dynamics of this sample.

Chapter Five Summary

This study suggested that physical activity among urban, minority adolescents is pretty high; however, given how the survey questions were worded the high amounts of physical activity must be judged solely for this sample. High amounts of daily physical activity found in this study are not consistent with previous research, particularly among minority populations. Findings did suggest that adolescent perceptions of parental encouragement and engagement can influence adolescent physical activity among this population because adolescents feel more motivated to participate in physical activity. The physical activity disparities that exist among minority populations may lessen if more parental support is perceived, which may lead to increases in individual motivation to be physically active. In particular, if girls perceive that parents encourage their physical activity participation, it seems to foster both intrinsic and identified motivation. For boys, this encouragement seems to foster only identified motivation. Despite these interpretations, the limitations of this study should be considered; however, the findings should spark continued interest in the need to address how parents influence adolescent physical activity.
References


Li, S., Treuth, M. S., & Wang, Y. (2010). How active are American adolescents and have they become less active? *Obesity Reviews, 11*(12), 847-862. doi: 10.1111/j.1467-789X.2009.00685.x


Webber, L. (2007). Weekend and weekday patterns of physical activity in overweight
and normal-weight adolescent girls. Obesity, 15(7), 1782-1788. doi:
http://dx.doi.org/10.1038/oby.2007.212

Physical Activity in the United States Measured by Accelerometer. Medicine & Science
in Sports & Exercise, 40(1), 181-188. doi: 10.1249/mss.0b013e31815a51b3

Trost, S. G., & Kerr. (2001). Physical activity and determinants of physical activity in obese and

Evaluating a model of parental influence on youth physical activity. American Journal of
Preventive Medicine, 25(4), 277-282.

Physical Activity Recall (PDPAR) in fifth-grade children. Pediatric Exercise Science,
11(4), 341.

Tucker, L. R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor
analysis. Psychometrika, 38, 1-10.

health: A report of the surgeon general.

advisory committee report.

for a Healthy and Fit Nation.
Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation

*Advances in experimental social psychology, Vol. 29. (pp. 271-360): Academic Press, San Diego, CA.*


Appendix
Penn State Health Behavior Survey
7-Day Physical Activity Recall

x
Circle just one letter for your answer to each question.

This Whole Page is about **GETTING TO SCHOOL**

**Getting to School: Walking, Running, or Riding a Bicycle**

1. During the past 5 school days, how many days did you **walk**, **run**, or **ride a bicycle** to school?
   a. 0 days
   b. 1 day
   c. 2
   d. 3
   e. 4
   f. 5 days

**Getting to School: Riding in a bus or car**

2. During the past 5 school days, how many days did you **ride to school in a bus or car**?
   a. 0 days
   b. 1
   c. 2
   d. 3
   e. 4
   f. 5 days
This Whole Page is about **DURING SCHOOL**

**During School: Walking**

3. During the past 5 school days, how much time DURING SCHOOL did you usually spend *walking* each day?
   a. 0 minutes
   b. about 10 minutes
   c. about 20 minutes
   d. about 30 minutes
   e. about 40 minutes
   f. about 50 minutes
   g. about an hour (60 minutes) or more

**During School: Jogging or Running**

4. During the past 5 school days, how much time DURING SCHOOL did you usually spend *jogging* or *running* each day?
   a. 0 minutes
   b. about 10 minutes
   c. about 20 minutes
   d. about 30 minutes
   e. about 40 minutes
   f. about 50 minutes
   g. about an hour (60 minutes) or more

**During School Other physical activity** (other than walking or running)

5. During the past 5 school days, if you did any of the following physical activities, DURING SCHOOL, circle the **ONE** you did most.
   a. Baseball
   b. Basketball
   c. Boxing or Karate
   d. Cheerleading
   e. Dancing
   f. Football
   g. Gym Class
   h. Jump Rope
   i. Kickball
   j. Rode a bike
   k. Tag
   l. Volleyball
   m. Weights or other strength exercise
   n. Other
   o. I did NOT do any of these

6. How many days did you do this activity DURING SCHOOL?
   a. 0 days – I did not do any of these activities
   b. 1
   c. 2
   d. 3
   e. 4
   f. 5 days
This Whole Page is about **GETTING HOME FROM SCHOOL**

Getting Home From School: Walking, Running, or Riding a Bicycle (It counts as walking home, even if you did not go straight home after school)

7. During the past 5 school days, how many days did you **walk**, **run**, or **ride a bicycle** home from school?
   a. 0 days
   b. 1 day
   c. 2
   d. 3
   e. 4
   f. 5 days

Getting Home From School: Riding in a Bus or Car
(it counts as riding home, even if you did not go straight home after school)

8. During the past 5 school days, how many days did you **ride home from school in a bus or car**?
   a. 0 days
   b. 1
   c. 2
   d. 3
   e. 4
   f. 5 days
This Whole Page is about **AFTER SCHOOL (until 6:00 pm)**

**AFTER SCHOOL (til 6pm): Walking** (don't count getting home from school)

9. During the past 5 school days, how much time AFTER SCHOOL did you usually spend **walking** each day?
   a. 0 minutes
   b. about 10 minutes
   c. about 20 minutes
   d. about 30 minutes
   e. about 40 minutes
   f. about 50 minutes
   g. about an hour (60 minutes) or more

**After School: Jogging or Running** (don't count getting home from school)

10. During the past 5 school days, how much time AFTER SCHOOL did you usually spend **jogging or running** each day?
   a. 0 minutes
   b. about 10 minutes
   c. about 20 minutes
   d. about 30 minutes
   e. about 40 minutes
   f. about 50 minutes
   g. about an hour (60 minutes) or more

**After School: Other Physical Activity**
   (other than walking or running)

11. During the past 5 school days, if you did any of the following physical activities AFTER SCHOOL, circle the **ONE** activity you did most.
   a. Baseball
   b. Basketball
   c. Boxing or Karate
   d. Cheerleading
   e. Dancing
   f. Football
   g. Gym Class
   h. Jump Rope
   i. Kickball
   j. Rode a bike
   k. Tag
   l. Volleyball
   m. Weights or other strength exercise
   n. Other
   o. I did NOT do any of these

12. How many days did you do this activity after school?
   a. 0 days – I did not do any of these activities
   b. 1
   c. 2
   d. 3
   e. 4
   f. 5 days
This Whole Page is about **EVENINGS of School Days (after 6:00 pm)**

**Evening of School Day: Walking**

13. During the past 5 school days, how much time IN THE EVENING, did you usually spend *walking* each day?

   a. 0 minutes  
   b. about 10 minutes  
   c. about 20 minutes  
   d. about 30 minutes  
   e. about 40 minutes  
   f. about 50 minutes  
   g. about an hour (60 minutes) or more

**EVENING of School Day: Jogging or Running**

14. During the past 5 school days, how much time IN THE EVENING did you usually spend *jogging* or *running* each day?

   a. 0 minutes  
   b. about 10 minutes  
   c. about 20 minutes  
   d. about 30 minutes  
   e. about 40 minutes  
   f. about 50 minutes  
   g. about an hour (60 minutes) or more

**Evening of School Day: Other Physical Activity**
(Other than walking or running)

15. During the past 5 school days, if you did any of the following physical activities IN THE EVENING, circle the **ONE** activity you did most.

   a. Baseball  
   b. Basketball  
   c. Boxing or Karate  
   d. Cheerleading  
   e. Dancing  
   f. Football  
   g. Gym Class  
   h. Jump Rope  
   i. Kickball  
   j. Rode a bike  
   k. Tag  
   l. Volleyball  
   m. Weights or other strength exercise  
   n. Other  
   o. I did NOT do any of these

16. How many school days did you do this activity IN THE EVENING?

   a. 0 days – I did not do any of these activities  
   b. 1  
   c. 2  
   d. 3  
   e. 4  
   f. 5 days
This Whole Page is about **AFTER SCHOOL AND EVENINGS OF SCHOOL DAYS** (this past week)

**AFTER SCHOOL AND EVENING: Watched TV or Movies**

17. During the past 5 school days, how much time did you usually spend *watching TV or Movies* after school (and evening) each day?
   a. None
   b. about 15 minutes or less
   c. about 30 minutes
   d. about 1 hour
   e. about 1.5 hours
   f. about 2 hours
   g. about 3 hours
   h. about 4 hours or more

**After School and Evening: Used a Computer / Internet**

18. During the past 5 school days, how much time did you usually spend *Using a Computer or Internet* after school (and evening) each day?
   a. None
   b. about 15 minutes or less
   c. about 30 minutes
   d. about 1 hour
   e. about 1.5 hours
   f. about 2 hours
   g. about 3 hours
   h. about 4 hours or more

**AFTER SCHOOL and EVENING: Played Non-active Video Games (sitting down)**

19. During the past 5 school days, how much time did you usually spend *Playing non-active video games* after school (and evening) each day?
   a. None
   b. about 15 minutes or less
   c. about 30 minutes
   d. about 1 hour
   e. about 1.5 hours
   f. about 2 hours
   g. about 3 hours
   h. about 4 hours or more
This Whole Page is about Last **SATURDAY MORNING**

**SATURDAY MORNING: Walking**

20. How much time Saturday MORNING did you spend **walking**?
   
a. 0 minutes
b. about 10 minutes
c. about 20 minutes
d. about 30 minutes
e. about 40 minutes
f. about 50 minutes
g. about an hour (60 minutes) or more

**SATURDAY MORNING: Jogging or Running**

21. How much time Saturday MORNING did you spend **jogging** or **running**?
   
a. 0 minutes
b. about 10 minutes
c. about 20 minutes
d. about 30 minutes
e. about 40 minutes
f. about 50 minutes
g. about an hour (60 minutes) or more

**SATURDAY Morning: Other Physical Activity**

22. If you did any of the following physical activities Saturday MORNING circle the **ONE** activity you did most.
   
a. Baseball
b. Basketball
c. Boxing or Karate
d. Cheerleading
e. Dancing
f. Football
g. Gym Class
h. Jump Rope
i. Kickball
j. Rode a bike
k. Tag
l. Volleyball
m. Weights or other strength exercise
n. Other
o. I did NOT do any of these

23. How much time Saturday MORNING did you spend doing this?
   
a. 0 minutes – I did not do any of these activities
b. about 10 minutes
c. about 20 minutes
d. about 30 minutes
e. about 40 minutes
f. about 50 minutes
g. about an hour (60 minutes) or more
This Whole Page is about Last **SATURDAY AFTERNOON and EVENING**

**SATURDAY AFTERNOON and EVENING: Walking**

24. How much time Saturday AFTERNOON and EVENING did you spend *walking*?
   a. 0 minutes
   b. about 10 minutes
   c. about 20 minutes
   d. about 30 minutes
   e. about 40 minutes
   f. about 50 minutes
   g. about an hour (60 minutes) or more

**SATURDAY AFTERNOON and EVENING: Jogging or Running**

25. How much time Saturday AFTERNOON and EVENING did you spend *jogging* or *running*?
   a. 0 minutes
   b. about 10 minutes
   c. about 20 minutes
   d. about 30 minutes
   e. about 40 minutes
   f. about 50 minutes
   g. about an hour (60 minutes) or more

**SATURDAY AFTERNOON and EVENING: Other Physical Activity**

26. If you did any of the following physical activities Saturday AFTERNOON and EVENING, circle the **ONE** activity you did most.
   a. Baseball
   b. Basketball
   c. Boxing or Karate
   d. Cheerleading
   e. Dancing
   f. Football
   g. Gym Class
   h. Jump Rope
   i. Kickball
   j. Rode a bike
   k. Tag
   l. Volleyball
   m. Weights or other strength exercise
   n. Other
   o. I did NOT do any of these

27. How much time Saturday AFTERNOON and EVENING did you spend doing this?
   a. 0 minutes – I did not do any of these activities
   b. about 10 minutes
   c. about 20 minutes
   d. about 30 minutes
   e. about 40 minutes
   f. about 50 minutes
   g. about an hour (60 minutes) or more
This Whole Page is about Last **SUNDAY MORNING**

**SUNDAY Morning: Walking**

28. How much time Sunday MORNING did you spend **walking**?
   a. 0 minutes  
   b. about 10 minutes  
   c. about 20 minutes  
   d. about 30 minutes  
   e. about 40 minutes  
   f. about 50 minutes  
   g. about an hour (60 minutes) or more

**SUNDAY MORNING: JOGGING OR RUNNING**

29. How much time Sunday MORNING did you spend **jogging** or **running**?
   a. 0 minutes  
   b. about 10 minutes  
   c. about 20 minutes  
   d. about 30 minutes  
   e. about 40 minutes  
   f. about 50 minutes  
   g. about an hour (60 minutes) or more

**SUNDAY Morning: Other Physical Activity**

30. If you did any of the following physical activities Sunday MORNING, circle the **ONE** activity you did most.
   a. Baseball  
   b. Basketball  
   c. Boxing or Karate  
   d. Cheerleading  
   e. Dancing  
   f. Football  
   g. Gym Class  
   h. Jump Rope  
   i. Kickball  
   j. Rode a bike  
   k. Tag  
   l. Volleyball  
   m. Weights or other strength exercise  
   n. Other  
   o. I did NOT do any of these

31. How much time Sunday MORNING did you spend doing this?
   a. 0 minutes – I did not do any of these activities  
   b. about 10 minutes  
   c. about 20 minutes  
   d. about 30 minutes  
   e. about 40 minutes  
   f. about 50 minutes  
   g. about an hour (60 minutes) or more
This Whole Page is about Last **Sunday AFTERNOON and EVENING**

**SUNDAY AFTERNOON and EVENING: Walking**

32. How much time Sunday AFTERNOON and EVENING did you spend *walking*?
   a. 0 minutes
   b. about 10 minutes
   c. about 20 minutes
   d. about 30 minutes
   e. about 40 minutes
   f. about 50 minutes
   g. about an hour (60 minutes) or more

**SUNDAY AFTERNOON and EVENING: Jogging or Running**

33. How much time Sunday AFTERNOON and EVENING did you spend *jogging* or *running*?
   a. 0 minutes
   b. about 10 minutes
   c. about 20 minutes
   d. about 30 minutes
   e. about 40 minutes
   f. about 50 minutes
   g. about an hour (60 minutes) or more

**SUNDAY AFTERNOON and EVENING: Other Physical Activity**

34. If you did any of the following physical activities Sunday AFTERNOON and EVENING, circle the **ONE** activity you did most.
   a. Baseball
   b. Basketball
   c. Boxing or Karate
   d. Cheerleading
   e. Dancing
   f. Football
   g. Gym Class
   h. Jump Rope
   i. Kickball
   j. Rode a bike
   k. Tag
   l. Volleyball
   m. Weights or other strength exercise
   n. Other
   o. I did NOT do any of these

35. How much time Sunday AFTERNOON and EVENING did you spend doing this?
   a. 0 minutes – I did not do any of these activities
   b. about 10 minutes
   c. about 20 minutes
   d. about 30 minutes
   e. about 40 minutes
   f. about 50 minutes
   g. about an hour (60 minutes) or more
This Whole Page is about **ALL DAY SATURDAY and SUNDAY**

These Questions Are About This Past Weekend

36. How much time over both days did you spend **Watching TV or Movies** on SATURDAY and SUNDAY?
   a. None
   b. about 15 minutes or less
   c. about 30 minutes
   d. about 1 hour
   e. about 1.5 hours
   f. about 2 hours
   g. about 3 hours
   h. about 4 hours
   i. about 5 or 6 hours
   j. about 7 hours or more

37. How much time over both days did you spend **Using a Computer / Internet** on SATURDAY and SUNDAY?
   a. None
   b. about 15 minutes or less
   c. about 30 minutes
   d. about 1 hour
   e. about 1.5 hours
   f. about 2 hours
   g. about 3 hours
   h. about 4 hours
   i. about 5 or 6 hours
   j. about 7 hours or more

38. How much time over both days did you spend **Playing Non-Active Video Games (sitting down)** on SATURDAY and SUNDAY?
   a. None
   b. about 15 minutes or less
   c. about 30 minutes
   d. about 1 hour
   e. about 1.5 hours
   f. about 2 hours
   g. about 3 hours
   h. about 4 hours
   i. about 5 or 6 hours
   j. about 7 hours or more
39. How many times in a normal week do you work, play, or exercise hard enough to make you sweat and breathe heavily?
   a. 0 times
   b. 1 to 2 times
   c. 3 to 5 times
   d. 6 to 7 times
   e. More than 7 times

40. How many hours in a normal week do you sleep at night?
   a. Less than 5
   b. about 5
   c. about 6
   d. about 7
   e. about 8
   f. about 9
   g. 10 or more

41. What grades do you generally get in school?
   a. Mostly A's
   b. Mostly A's and B's
   c. Mostly B's
   d. Mostly B's and C's
   e. Mostly C's
   f. Mostly C's and D's
   g. Mostly D's
   h. Mostly D's and F's

42. Do you usually eat breakfast?
   a. Yes
   b. No

43. How many of your five best friends like being physically active?
   a. 0
   b. 1
   c. 2
   d. 3
   e. 4
   f. 5

44. Are you male or female?
   a. male
   b. female

45. How tall are you (in feet and inches)?
   _____ feet, _____ inches

46. How much do you weigh (in pounds)?
   ______________ pounds

47. How fast can you READ in the language used in this survey?
   a. Very fast
   b. Fast
   c. Moderately fast
   d. A little slow
   e. Slow

48. How much are you like this: Once I start something I want to do, I really want to finish it.
   a. Exactly like me
   b. Pretty much like me
   c. Somewhat like me
   d. A little like me
   e. Not at all like me

49. How much are you like this: If it is my duty to do something, I do it.
   a. Exactly like me
   b. Pretty much like me
   c. Somewhat like me
   d. A little like me
   e. Not at all like me

50. When was the last time you ran a mile or more all at once?
   a. today
   b. yesterday
   c. less than one week ago
   d. about 2-3 weeks ago
   e. about a month ago
   f. several months ago
   g. I have done that, but not in a long time
   h. I have never run a mile all at once
51. Do you think you will ever exercise or play active sports every day (or most days)?
   a. yes
   b. probably
   c. I don't think so
   d. no

52. How would you describe your current physical conditioning?
   a. Super-conditioned (e.g., marathon runner)
   b. Excellent
   c. Very good
   d. Good, and a bit above average
   e. Good, but a bit below average
   f. OK
   g. Poor
   h. Very poor

53. How would you rate your overall health?
   a. Excellent
   b. Very good
   c. Good, and a bit above average
   d. Good, but a bit below average
   e. OK
   f. Poor
   g. Very poor

54. How much does it upset you to miss a day of exercise?
   a. not at all
   b. a little bit
   c. a moderate amount
   d. a good deal
   e. very much
A
In this survey, we are asking you to think about your free time and in particular your physical activity. **Physical activity** means things you do that make you breathe harder than you do when you are just sitting or standing around. **Free time** means things that you do outside of school. These can include after-school activities like sports or clubs, and activities like 4h, music, spending time with friends, reading, and watching tv.

55. (D1) In the past 2 months, did you learn a new physical activity in your free time?
   a. yes
   b. no

56. (D3) In the past 2 months, did you make a new friend (or new friends) through your physical activities?
   a. yes
   b. no

57. (A7) How good is your **coordination** for doing physically active things during your free time?
   a. very good
   b. pretty good
   c. ok
   d. not very good
   e. really bad

58. (B2) How many places are **near where you live** where you can do the physically active things that you enjoy?
   a. none,
   b. 1
   c. 2
   d. 3
   e. 4 or more

59. (A6) Are you a physically active person?
   a. Yes, absolutely
   b. Yes
   c. Yes, somewhat
   d. No, not at all

60. Does exercising or doing active sports make it easier to be part of a group?
   a. yes, most of the time
   b. yes, sometimes
   c. yes, but hardly ever
   d. no, never

61. (H3) When you want to, how easy is it for you to make things challenging for yourself when you are being physically active?
   a. very easy
   b. pretty easy
   c. not very easy
   d. pretty hard

62. (H4) How often are you able to make things more fun for yourself when you are physically active?
   a. all the time, or nearly all the time
   b. quite often
   c. sometimes
   d. never or almost never
### Likert Scale Questions

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>63.</td>
<td>(D2) In the past two months, I developed an interest in a new physical activity that I now do on a regular basis.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>64.</td>
<td>(E4) The only way I'll be physically active is if my friends are too.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>65.</td>
<td>(E8) My physical activities are a central part of my life.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>66.</td>
<td>(H2) I know how to keep up my interest in my physical activities.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>67.</td>
<td>(G8) I do a lot of activities even though I'm not really interested in them.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>68.</td>
<td>(G7) I feel good about myself in my free time.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>69.</td>
<td>(A3) I can be physically active during my free time on most days no matter how busy I am.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>70.</td>
<td>(A4) I can ask one of my friends to be physically active with me during my free time on most days.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

### Free Text Questions

71. (E2) How much do you like physical activity programs where there is an adult instructor or leader?  
   a. I like them very much  
   b. I like them  
   c. I like them a little  
   d. I don't like them

72. (E5) How many of your friends like being physically active?  
   a. none of them  
   b. less than half  
   c. about half  
   d. more than half  
   e. all or almost all of them

73. (E6) Do you have any physical activities that are very important to you?  
   a. no  
   b. yes

74. (E3) How often do you set goals for yourself related to being physically active?  
   a. very often  
   b. often  
   c. sometimes  
   d. rarely or never

75. (G1) How many of your free time activities are good for you?  
   a. all, or almost all of them  
   b. most of them  
   c. some of them  
   d. none, or almost none of them

76. (G2) How much do you like it when your free time activities are a little beyond your ability?  
   a. very much  
   b. pretty much  
   c. a little  
   d. not at all
77. (G3) How often do you like a challenge in your free time?
   a. all the time, or nearly all the time
   b. quite often
   c. sometimes
   d. never or almost never

78. Does exercising or doing active sports at a party make the party more fun?
   a. no, never
   b. yes, but hardly ever
   c. yes, sometimes
   d. yes, most of the time

79. (G5) How much do you like it when your free time activities challenge your skills?
   a. very much
   b. pretty much
   c. a little
   d. not at all

80. (H1) How often are you able to turn a boring situation into something more interesting?
   a. all the time, or nearly all the time
   b. quite often
   c. sometimes
   d. never or almost never

81. (H5) How often are you able to enjoy a physical activity even if you feel like you have to do it?
   a. all the time, or nearly all the time
   b. quite often
   c. sometimes
   d. never or almost never

82. Does exercising or doing active sports make it easier to have a good time with friends?
   a. no, never
   b. yes, but not very often
   c. yes, sometimes
   d. yes, most of the time

83. How often do you do moderate to vigorous exercise for 20 consecutive minutes or more?
   a. Never
   b. 1-2 times a year
   c. 6 times a year
   d. Once a month
   e. Twice a month
   f. 1-2 times a week
   g. 3-4 times a week
   h. 5-6 times a week
   i. Daily

84. How many times in the past two weeks did you perform moderate to vigorous exercise for 20 consecutive minutes or more?
   a. None
   b. 1
   c. 2
   d. 3
   e. 4-5
   f. 6-7
   g. 8-11
   h. 12 or more times

85. ON AVERAGE, how many times in a two week period do you perform moderate to vigorous exercise for 20 consecutive minutes or more?
   a. None
   b. 1
   c. 2
   d. 3
   e. 4-5
   f. 6-7
   g. 8-11
   h. 12 or more times
### How Often Do You Do the Following?

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Before, but not this year</th>
<th>Once or twice a year</th>
<th>Once or twice a month</th>
<th>Once or twice a week</th>
<th>Almost every day or daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>86. (I1) Participate in an organized sport activity.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>87. (I2) Go to a natural public area, like a park with fields and trails.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>88. (I3) Purposely damage someone's property or belongings.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>89. (I4) Participate in a school or community club (acting club, band, swimming club, etc.)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

### How Often Do These Apply to You?

<table>
<thead>
<tr>
<th></th>
<th>Never or almost never</th>
<th>Sometimes</th>
<th>Quite often</th>
<th>Always or almost always</th>
</tr>
</thead>
<tbody>
<tr>
<td>90. I think about the steps I will need to take to get or accomplish the things I want.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>91. I take action to do the things I want to do.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>92. I like having a sense of purpose when I do things.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>93. If I need it, I ask for help in order to reach my goals.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>94. I do things that I know will bring me satisfaction.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>95. I am confident that I can reach my goals.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>96. I feel inspired to do things that interest me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>97. I think of different ways to reach my goals.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>98. I try to find ways to do things that are really important to me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
99. I sometimes try to get even rather than forgive and forget.
   a. True
   b. False

100. I sometimes feel resentful when I don't get my way.
    a. True
    b. False

101. There have been occasions when I took advantage of someone.
    a. True
    b. False

102. No matter who I am talking to, I am always a good listener.
    a. True
    b. False

103. I'm always willing to admit it when I make a mistake.
    a. True
    b. False

104. I have never deliberately said something that hurt someone's feelings.
    a. True
    b. False

---

**When you are doing physically active things in your free time, how often…**

<table>
<thead>
<tr>
<th>Question</th>
<th>Never</th>
<th>Not very often</th>
<th>Often</th>
<th>Very often</th>
<th>All the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>105. (K2) do you hate it?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>106. (K3) do you feel bored?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>107. (K7) do you feel good about yourself?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>108. (K8) does it give you a sense of accomplishment?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>109. (K1) do you enjoy it?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>110. (K5) is it fun?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>111. (K6) are you absorbed with what you are doing?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
112. During the past 5 school days, how much time AFTER SCHOOL (and evenings) each day did you usually spend walking?
   a. 0 minutes
   b. About 10 minutes
   c. About 20 minutes
   d. About 30 minutes
   e. About 40 minutes
   f. About 50 minutes
   g. About an hour (60 minutes) or more

113. During the past 5 school days, how much time AFTER SCHOOL (and evenings) each day did you usually spend jogging or running?
   a. 0 minutes
   b. About 10 minutes
   c. About 20 minutes
   d. About 30 minutes
   e. About 40 minutes
   f. About 50 minutes
   g. About an hour (60 minutes) or more

114. During the past 5 school days, how much time AFTER SCHOOL (and evenings) each day did you usually spend doing some other active thing (e.g., playing basketball) that made you sweat and breathe hard?
   a. 0 minutes
   b. About 10 minutes
   c. About 20 minutes
   d. About 30 minutes
   e. About 40 minutes
   f. About 50 minutes
   g. About an hour (60 minutes) or more

115. During the past two weekend days (Saturday and Sunday) how much time each day did you usually spend walking?
   a. 0 minutes
   b. About 10 minutes
   c. About 20 minutes
   d. About 30 minutes
   e. About 40 minutes
   f. About 50 minutes
   g. About an hour (60 minutes)
   h. More than an hour

116. During the past two weekend days (Saturday and Sunday) how much time each day did you usually spend jogging or running?
   a. 0 minutes
   b. About 10 minutes
   c. About 20 minutes
   d. About 30 minutes
   e. About 40 minutes
   f. About 50 minutes
   g. About an hour (60 minutes)
   h. More than an hour

117. During the past two weekend days (Saturday and Sunday) how much time each day did you usually spend doing some other active thing (e.g., playing basketball) that made you sweat and breathe hard?
   a. 0 minutes
   b. About 10 minutes
   c. About 20 minutes
   d. About 30 minutes
   e. About 40 minutes
   f. About 50 minutes
   g. About an hour (60 minutes)
   h. More than an hour
In this survey, we are asking you to think about your free time and in particular your physical activity. **Physical activity** means things you do that make you breathe harder than you do when you are just sitting or standing around. **Free time** means things that you do outside of school. These can include after-school activities like sports or clubs, and activities like 4h, music, spending time with friends, reading, and watching tv.

<table>
<thead>
<tr>
<th>Why do you do physically active things in your free time?</th>
<th>Never</th>
<th>Not very often</th>
<th>Often</th>
<th>Very often</th>
<th>All the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>55. (C1) you want to make your body stronger?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>56. (C3) others in your family are physically active?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>57. (C4) you like the sense of achievement when you're done?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>58. (C5) you're proud when others compliment your performance?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>59. (C6) you enjoy sweating and working hard?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>60. (C8) you like to feel totally involved in an activity?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>61. (C9) it's fun?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>62. (C10) you like the competition: especially doing really well or better than others?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>63. (C11) you feel a connection to others in your family who are also physically active?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>64. (C15) you have to be active to keep up with your peers/others?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>65. (C17) you know you'll have fun with your friends or family?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>66. (C18) it will bring you better health?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>67. (C19) it helps you relieve stress?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>68. (C20) it helps you concentrate better in school?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>69. (C21) it will make you more attractive?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>70. (C22) you want to improve your mood?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
### How Often Do These Things Happen?

<table>
<thead>
<tr>
<th>Question</th>
<th>Never</th>
<th>Not Very Often</th>
<th>Often</th>
<th>Very Often</th>
<th>All the Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>(J3) Your parents ask you what happened during your physical activities.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>(J4) Your parents start conversations with you about being physically active.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>(J5) Your parents encourage you to be physically active.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>(J6) Your friends encourage you to be physically active with them</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>(J8) Your parents help you do things to be physically active.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

76. How often do you and your mother/stepmother/guardian do physically active things together that are fun?
   a. Never
   b. Once or twice a year
   c. Once or twice a month
   d. Once or twice a week
   e. 3-5 times a week
   f. Almost every day or daily

77. How often do you and your father/stepfather/guardian do physically active things together that are fun?
   a. Never
   b. Once or twice a year
   c. Once or twice a month
   d. Once or twice a week
   e. 3-5 times a week
   f. Almost every day or daily

78. If you knew that taking part in an active sport was going to be involved in a party, would you go?
   a. yes, I would definitely go
   b. yes, I might go
   c. no, I probably would not go
   d. no, I definitely would not go

79. Out of every 100 students your age, how many do you think exercise or do active sports at least three times a week?
   a. None of them
   b. About 10
   c. About 20
   d. About 30
   e. About 40
   f. About 50
   g. About 60
   h. About 70
   i. About 80
   j. About 90
   k. All of them

80. How satisfied are you with your relationship with your parents?
   a. Completely satisfied
   b. Satisfied
   c. Moderately satisfied
   d. A little satisfied
   e. Not satisfied at all
81. How often do you tell your parents what you are thinking about?
   a. never
   b. occasionally
   c. often
   d. very often
   e. all the time

82. Out of every 100 students your age, how many do you think smoke cigarettes at least once a month?
   a. None of them
   b. About 10
   c. About 20
   d. About 30
   e. About 40
   f. About 50
   g. About 60
   h. About 70
   i. About 80
   j. About 90
   k. All of them

83. How often do your parents exercise?
   a. very often
   b. often
   c. sometimes
   d. rarely
   e. never

84. How often do your parents like to hear your opinions, even when they don't agree with you?
   a. never
   b. occasionally
   c. often
   d. very often
   e. all the time

85. How many of your friends think it is ok for people your age to do NO exercise or active sports?
   a. all of them
   b. most of them
   c. about half
   d. some of them
   e. none of them

86. Does at least one of your parents ever listen to your point of view?
   a. No, never
   b. Yes, occasionally
   c. Yes, quite often
   d. Yes, all the time
VITA

Jason Lovejoy Scott

EDUCATION

2014  Ph.D., Recreation, Park and Tourism Management; The Pennsylvania State University
2008  M.S., Recreation and Leisure Studies; The University of Tennessee-Knoxville
2004  B.S., Exercise Science; The University of Tennessee-Knoxville

AWARDS

2014  Recipient of a Bunton-Waller Scholarship, Pennsylvania State University
2011-2013  Prevention and Methodology Training Pre-Doctoral Fellowship, National Institute on Drug Abuse
2009  Recipient of a Bunton-Waller Scholarship, Pennsylvania State University

PRESENTATIONS

