

Patterns of Adolescent Physical Activity

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Abstract

Introduction

It is well known that regular physical activity (PA) is associated with myriad physical and mental health benefits. These benefits may be proximal in time to the performance of PA, such as reduced anxiety-like feelings, lower blood pressure, and enhanced cognitive function, or they may be more distal, such as increased strength and cardio-respiratory fitness, decreased depression-like symptoms, and long-term reduction of blood pressure (Piercy KL, Troiano RP, Ballard RM, et al. *The Physical Activity Guidelines for Americans*. JAMA. 2018;320(19):2020–2028. doi:10.1001/jama.2018.14854). Regular PA is especially important for school-aged children (6-17 years old); PA has been shown to foster normal growth and development, improve mood and sleep quality, and greatly reduce the risk for developing chronic disease(s) as an adult (Piercy KL, Troiano RP, Ballard RM, et al. *The Physical Activity Guidelines for Americans*. JAMA. 2018;320(19):2020–2028. doi:10.1001/jama.2018.14854). Aside from these physiological benefits, physically active students tend to have better educational outcomes (e.g., better grades, enhanced cognitive performance, and decreased behavioral problems) when compared to their less-active peers (Centers for Disease Control and Prevention. *The Association Between School-Based Physical Activity, Including Physical Education, and Academic Performance*. Atlanta, GA; Centers for Disease Control and Prevention, US Department of Health and Human Services; 2010.). As outlined by the U.S. Department of Health and Human Services 2nd edition of the “Physical Activity Guidelines for Americans” (2018), the recommended daily dose of moderate- to vigorous-intensity physical activity (MVPA) for school-aged youth in the United States (US) is 60 minutes (CITE <https://health.gov/our-work/nutrition-physical-activity/physical-activity-guidelines/current-guidelines>). Despite these recommendations and knowledge of benefits of meeting them, less than a quarter (24%) of school-aged children in the US achieve the recommended 60 minutes of MVPA a day (The Child & Adolescent Health Measurement Initiative (CAHMI). 2016 National Survey of Children's Health. Data Resource Center for Child and Adolescent Health;2016). NEED ANOTHER PARAGRAPH THAT TOUCHES ON THE SPECIFICS IN THE LITERATURE ASSOCIATED WITH OUR RESEARCH QUESTIONS, TO LEAD INTO STATING OUR RQs.

Research Questions

1. How do patterns of physical activity for adolescents vary by BMI and other individual characteristics?
2. Does minutes of physical activity performed during the week differ by the type of school attended (private, public, home, or other)

Hypotheses

1. Patterns of physical activity of adolescents will vary by calculated BMI, sex, and age.

2. There will be a significant association between the type of school attended at the weekday minutes of physical activity performed by adolescents.

Methods

Data Source

This project uses data from the Family Life, Activity, Sun, Health and Eating (FLASHE) study. FLASHE data was collected cross-sectionally using an internet-based survey (*CITE from <https://cancercontrol.cancer.gov/brp/hbrb/flashe-study>*). Data collection occurred between April and October of 2014 and was last updated in 2017. The FLASHE study asked questions enabling researchers to examine correlates of cancer-related behaviors using behavioral measures of diet and physical activity, and other behaviors associated with cancer risk, such as sun-safety, sleep, and tobacco consumption. Sampling for the FLASHE study was drawn from a Consumer Opinion Panel and sampling design was intended to collect a representative sample reflective of demographics for the United States general population (e.g., sex, education, income, age, region, household size). The conceptual model for the FLASHE study can be seen in Figure 1. It is important to note that data collection took place by sampling dyads of parent/caregiver-adolescent(ages 12-17) pairs. The FLASHE Enrollment and Design structure can be seen in Figure 2.

Figure 1: FLASHE Conceptual Model

Figure 2: FLASHE Enrollment and Design

Sample Selection

In our study, we aim to examine patterns of adolescent (PA), including when and how much PA they perform, and to explore the association between weekly minutes of (MVPA) adolescent BMI, sex, and school type with their exercise patterns. For the purpose of this study, our final sample will be composed of teenagers (13-17 years old) who gave responses for all physical activity and demographic variables. This process and final sample size is explained in the following sections.

Joining Data Sets

Our data was split into two files for size/downloadable reasons: adolescent demographic and adolescent physical activity surveys. Each of these files contained a column containing the variable “PID,” or participant identification. The PIDs are unique to each individual who completed the surveys. We used this variable to join these two data sets. This was done using the full join function from the dplyr package. (*CITE DPLYR PACKAGE*) This was used so we could retain all variables contained within both data sets for each specific participant, identified by their unique PID. After fully joining these two data sets, we then needed to tidy up data using functions from the tidyverse and dplyr packages (*cite tidyverse and dplyr*). (*Load & Join Data Sets Code CHUNK*)

Cleaning data - {select}, {characterize}, and {filter}

We then wanted to characterize only select variables, hence the use of the {select}-> {characterize} functions. We could not find a way to characterize the data set as a whole without turning some variables’ values to NA, so we selected certain variables, characterized them, then rejoined the data sets with the newly characterized data.

(*Cleaning Code Chunks*)

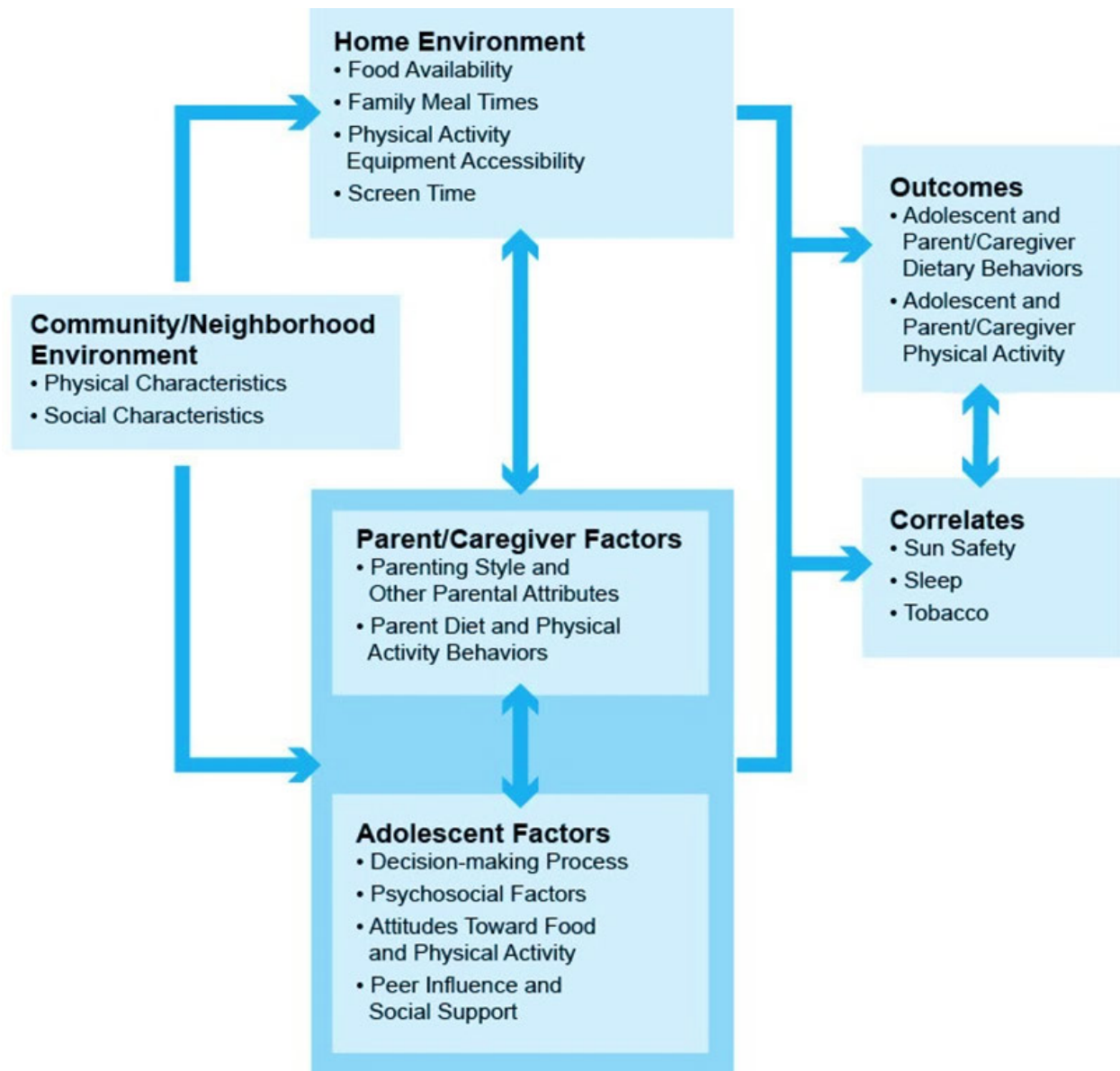


Figure 1: FLASHE Conceptual Model

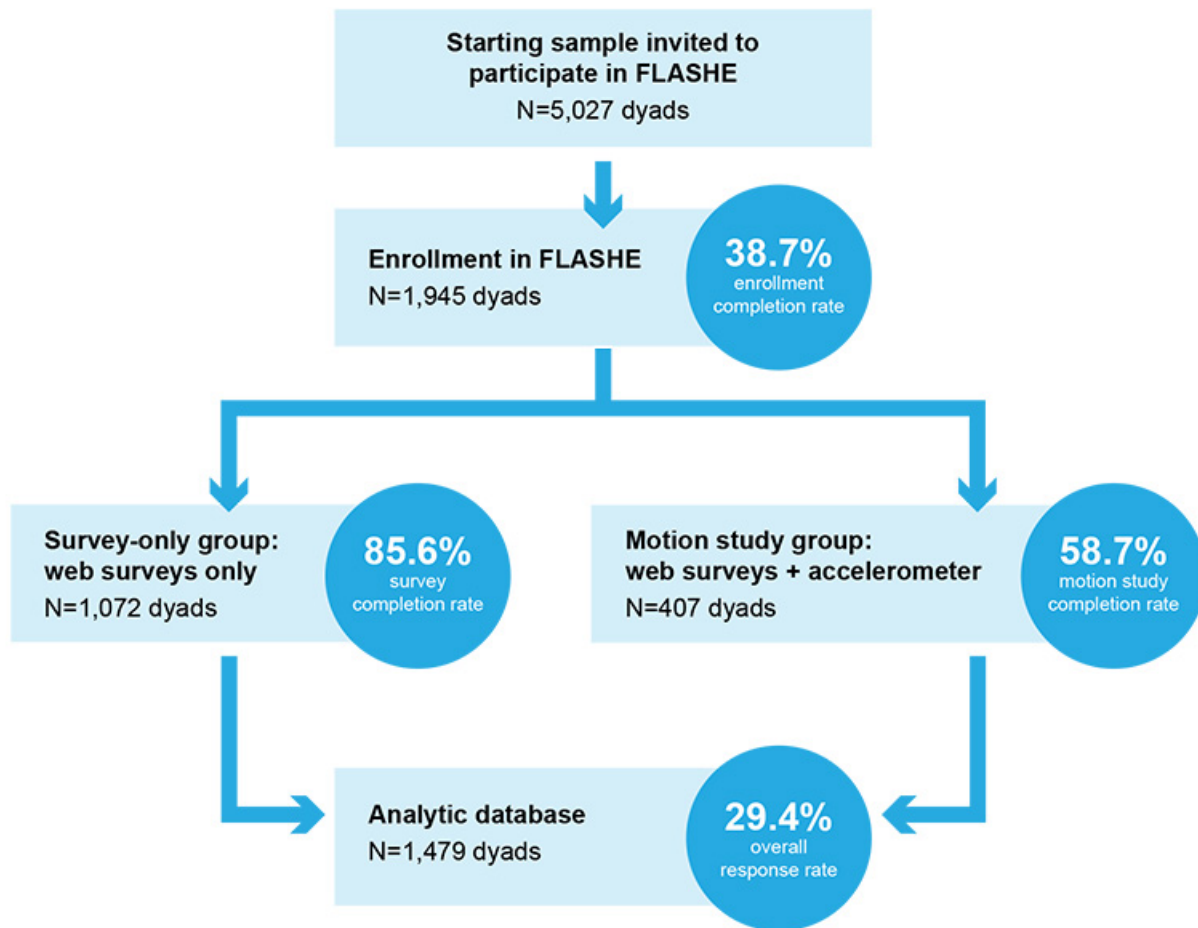


Figure 2: FLASHE Enrollment and Design

Calculating BMI - {mutate}

Body Mass Index (BMI) is an effective measure of _____(Esme and Zach this is your wheel house, so leaving this definition and noting importance of BMI to you :) To calculate BMI, we utilized the {mutate} function.

(Add code chunk for this calc)

Calculating Mean Physical Activity - {summarize} and {group_by}

The {group_by} function allowed us to organize our data by school type and sex to appropriately assess for associations between those demographic variables and average total weekly physical activity.

{pivot_longer} for organizing when physical activity occurs

The initial data set divided when physical activity was completed by during the week in school (XTPREDWEEKS), during the week out of school (XTPREDWEEKOFS), and on the weekend(XTPREDWEEKW). Using {pivot_longer}, we combined the variables of when/where the physical activity was completed to better visualize across the pattern of when/where and any associations with demographic variables.

Data Analysis

Results

Add in-text code showing mean bmi, age distribution, school-type %, average weekly mvpa.

Summary Table

Table 1. Descriptive Characteristics

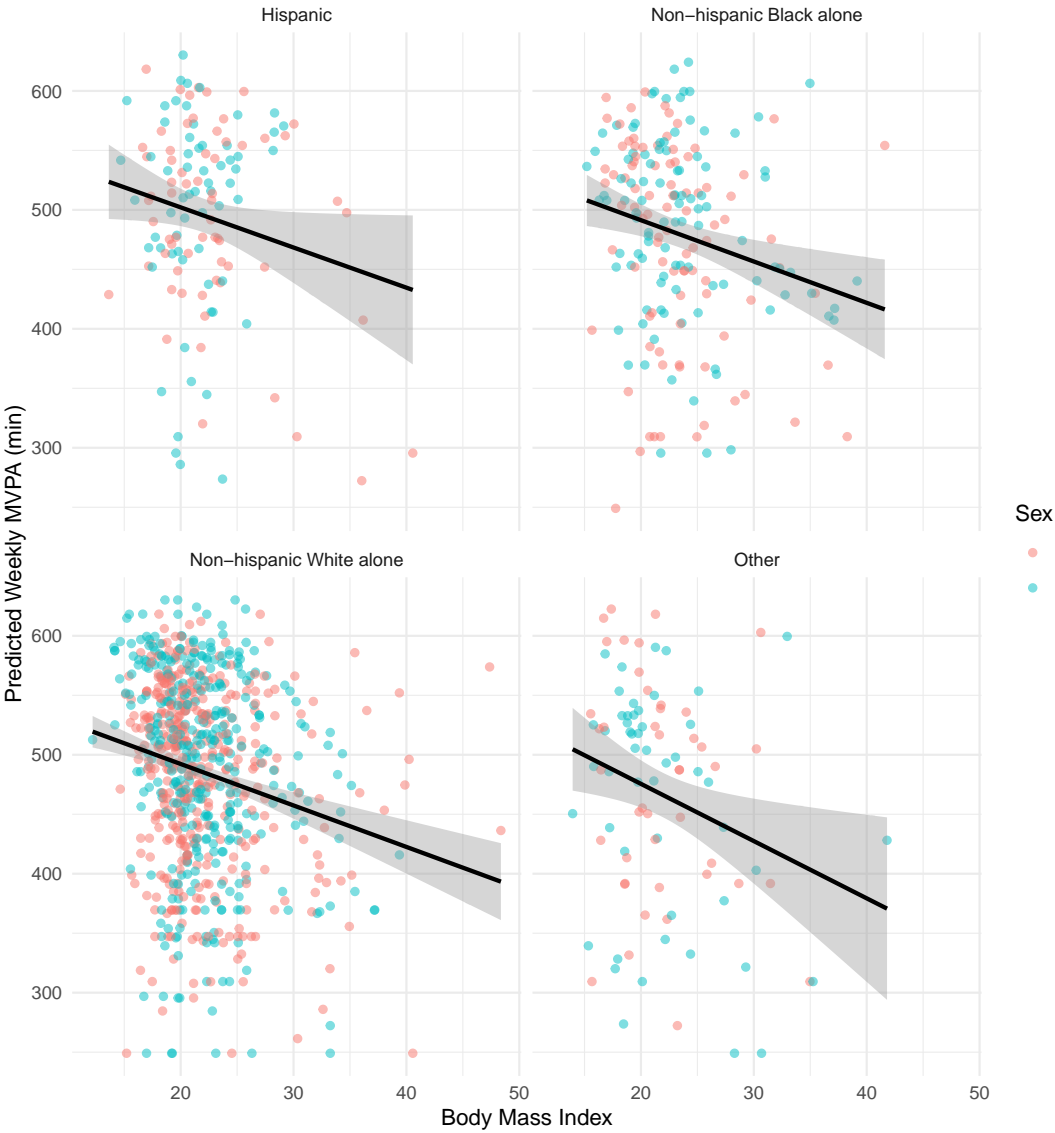
Characteristic	N = 1,192 ¹
Sex	
Female	599 (50%)
Male	593 (50%)
School Type	
Another kind of school	18 (1.5%)
Home-schooled	65 (5.5%)
Private school	84 (7.0%)
Public school	1,025 (86%)
Race/Ethnicity	
Hispanic	127 (11%)
Non-hispanic Black alone	195 (16%)
Non-hispanic White alone	775 (65%)
Other	95 (8.0%)
Age	
13 years old	280 (23%)
14 years old	223 (19%)
15 years old	241 (20%)
16 years old	286 (24%)
17 years old	162 (14%)

¹n (%)

References

have code for the summary table in script and can turn it into a plot like bar/col or error bars ## MVPA by

Figure 1
Physical Activity and Body Mass Index
by Race/Ethnicity



Demographic Variables

MVPA by School Type

Figure 2

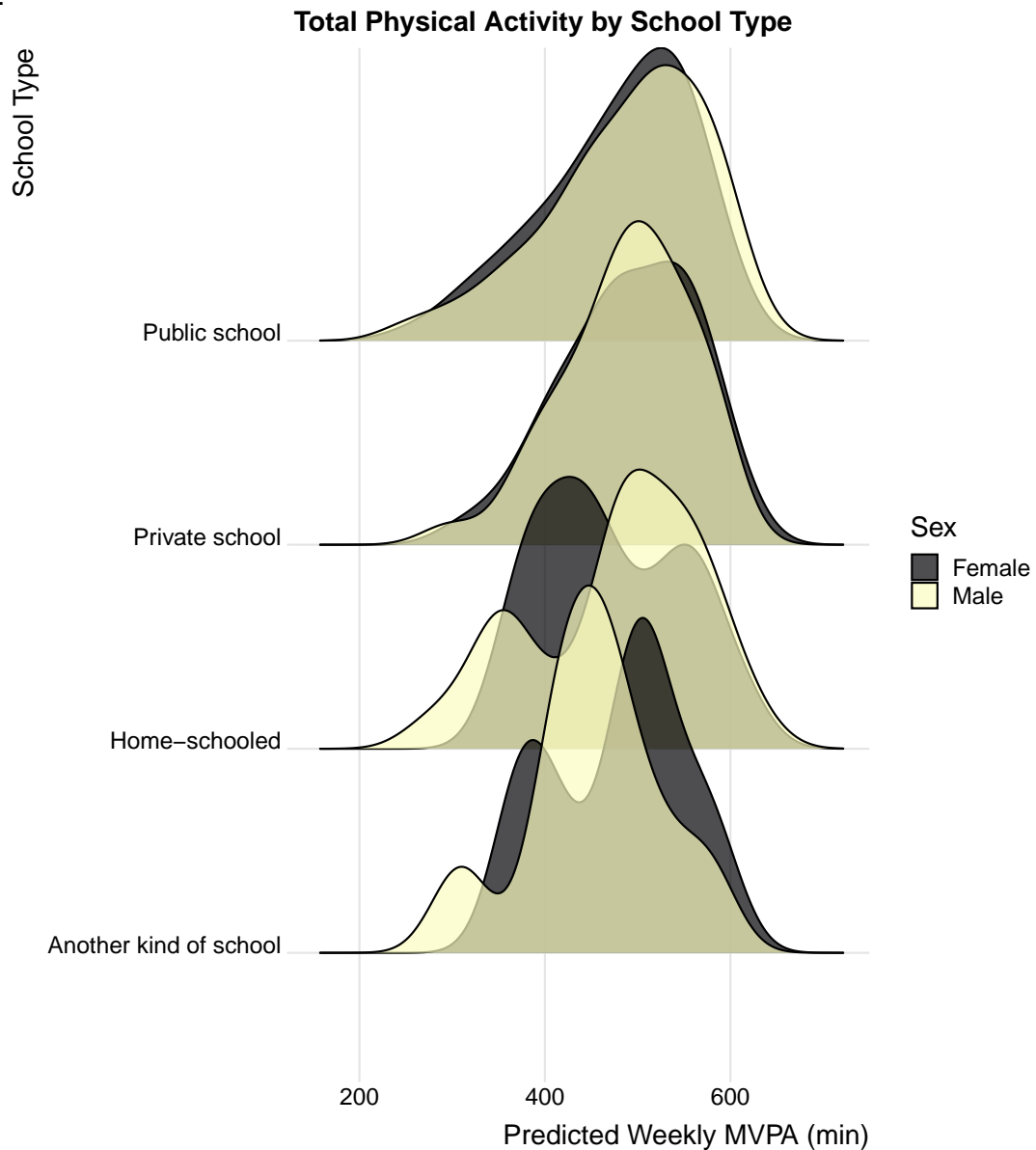


Figure 3

Discussion

Based on our analysis of adolescents who participated in the FLASE study... Implications for programs to promote physical activity in or out of school.. Implications for policy.. Next steps for research include examining what motivates adolescents to complete physical activity, and how their environment moderates or mediates the amount of physical activity they complete.

Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.

References

note I cannot correctly format US Dept of HHS