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CENTER *for* HEALTHY LIVING



Healthy children in a healthy world.

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Funding for this webinar series provided by:



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Tuesday, April 2, 2024, 1-2 PM (CDT)

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Understanding Youth Movement Behaviors: Texas School Physical Activity and Nutrition (Texas SPAN) Survey Insights

Chris Pfladderer, PhD

Assistant Professor

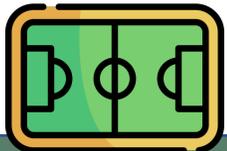
Health Promotion and Behavioral Sciences

Michael & Susan Dell Center for Healthy Living

UTHealth Houston, School of Public Health in Austin



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Youth Movement Behaviors

What we'll cover

 24-hr movement behaviors

 Defining context and understanding its importance when exploring youth movement behaviors

 Highlighting examples of how context can be addressed in movement behavior research

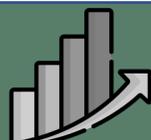
 Next steps in movement behavior research

 Q&A



24-hr Movement Behaviors

(24-hr Activity Cycle)



Youth Movement Behaviors

24-hr Movement Behaviors

(24-hr Activity Cycle)



Physical Activity



Sedentary

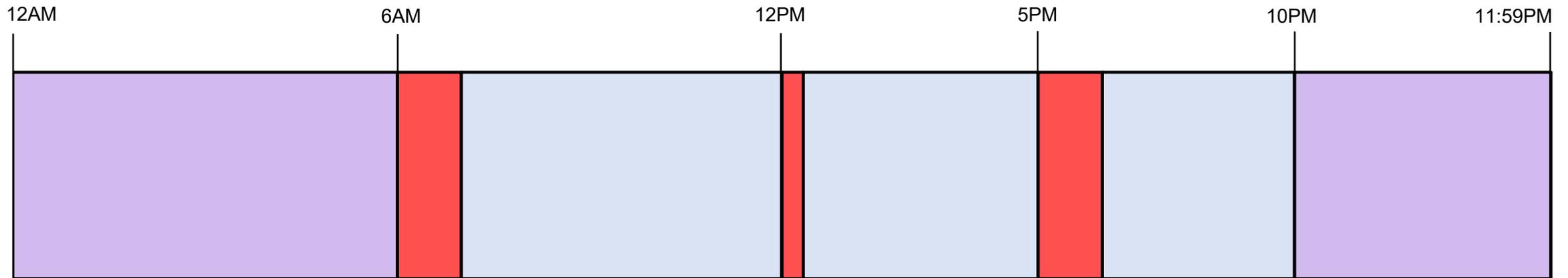


Sleep



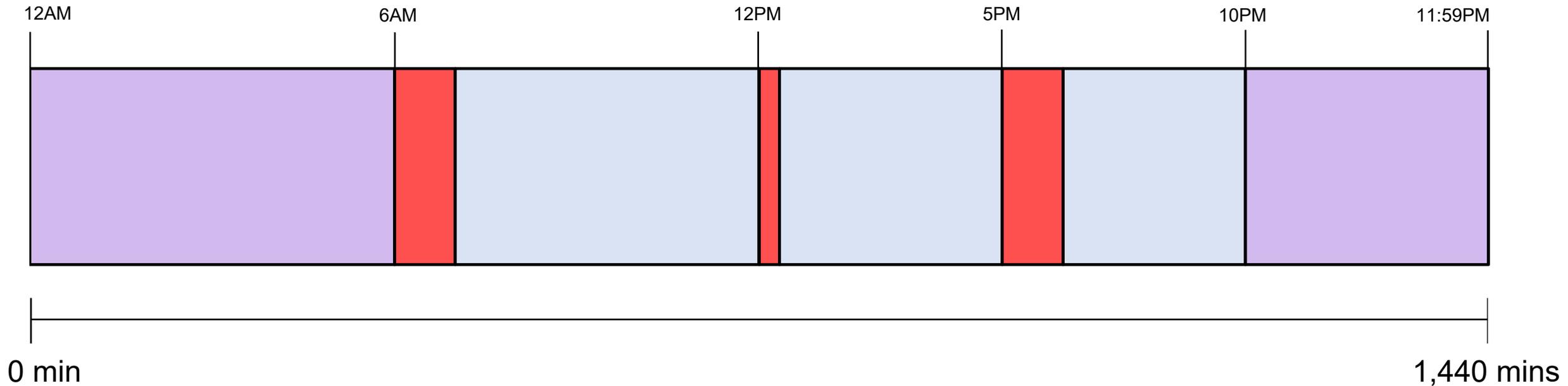
24-hr Movement Behaviors

(24-hr Activity Cycle)



24-hr Movement Behaviors

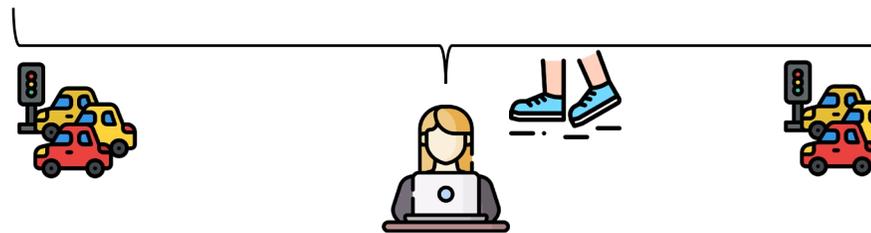
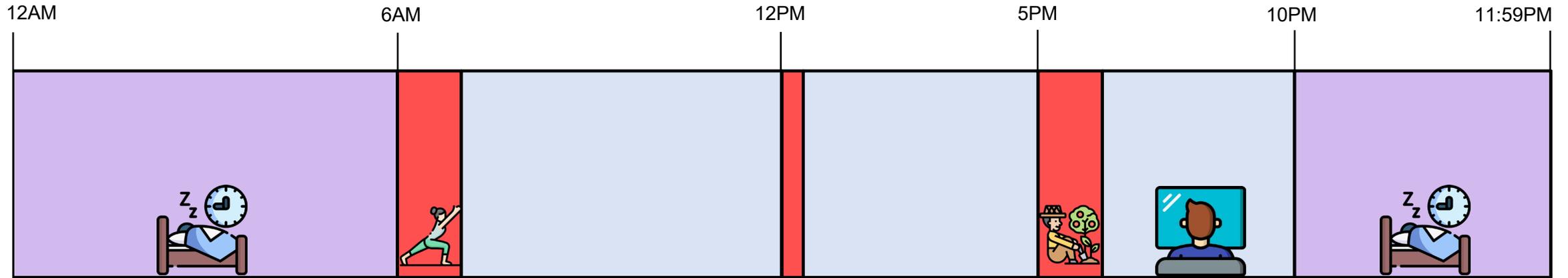
(24-hr Activity Cycle)



Youth Movement Behaviors

24-hr Movement Behaviors

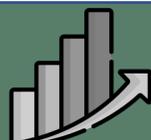
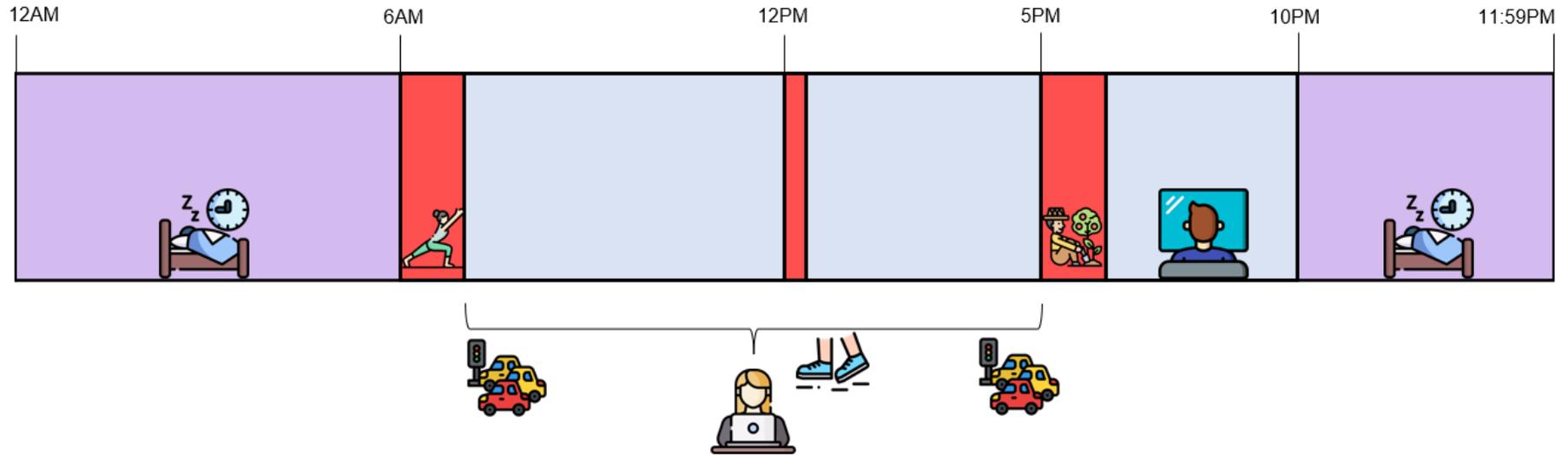
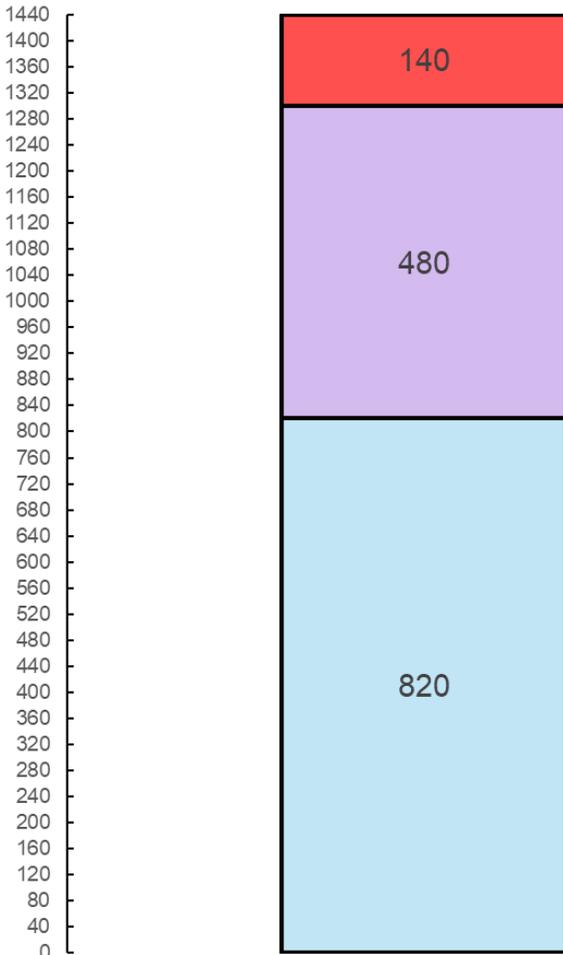
(24-hr Activity Cycle)



Youth Movement Behaviors

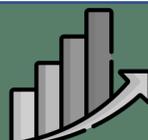
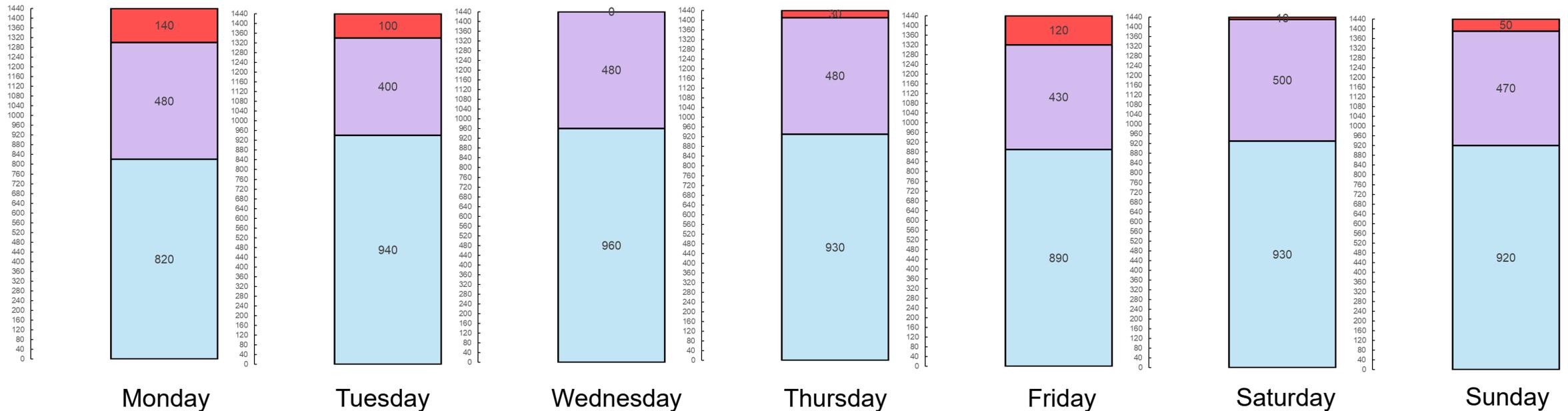
24-hr Movement Behaviors

(24-hr Activity Cycle)



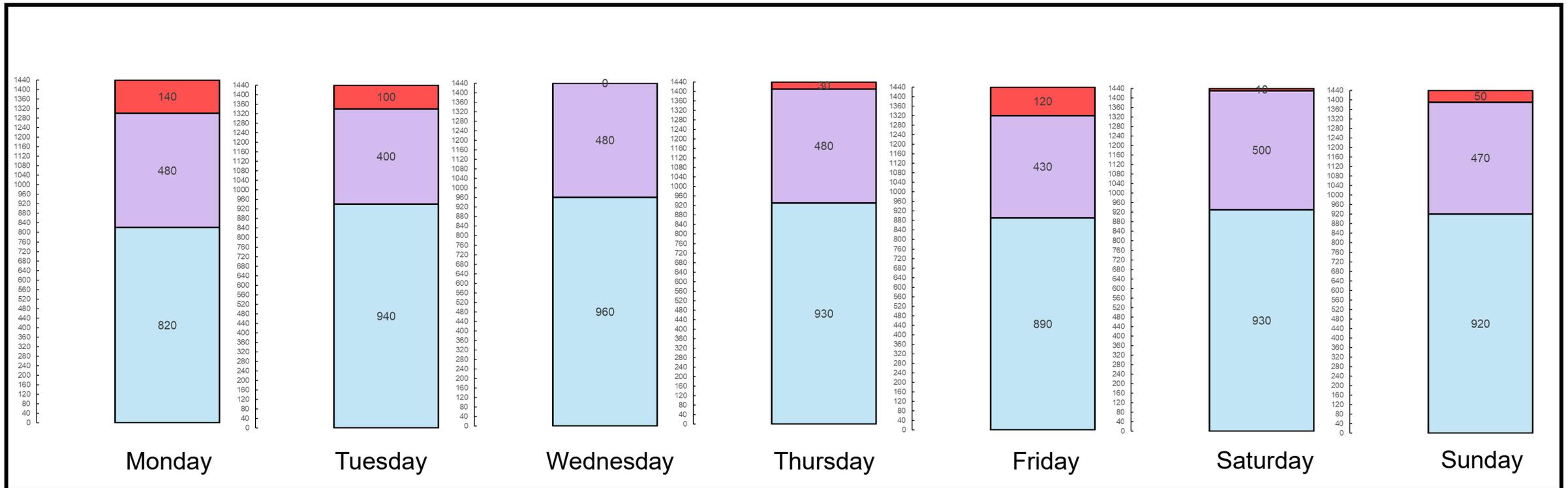
24-hr Movement Behaviors

(24-hr Activity Cycle)

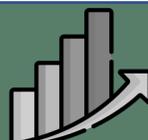


24-hr Movement Behaviors

(24-hr Activity Cycle)

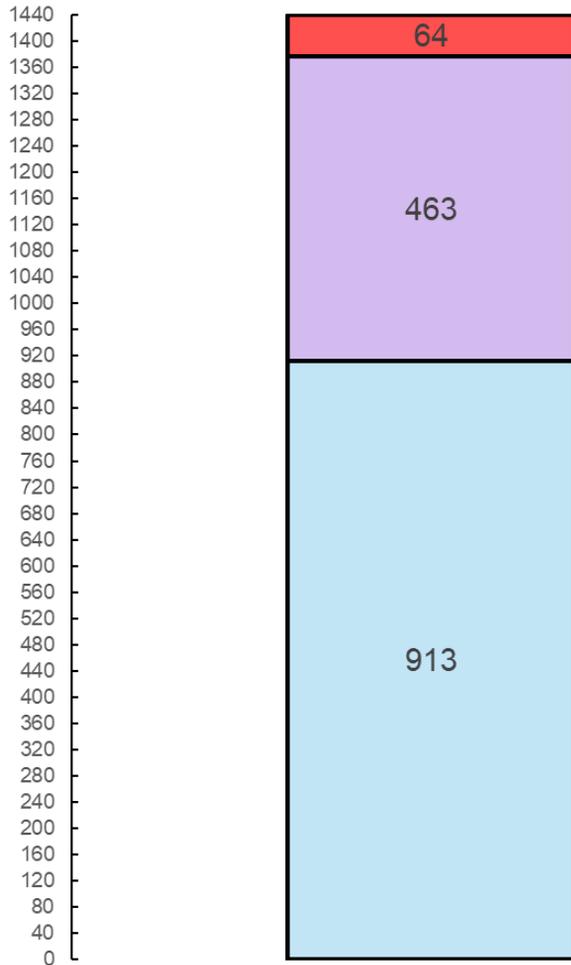


Weekly Average



Youth Movement Behaviors

24-hr Movement Behaviors



24-hr Movement Behaviors

1440
1400
1360
1320
1280
1240
1200
1160
1120
1080
1040
1000
960
920
880
840
800
760
720
680
640
600
560
520
480
440
400
360
320
280
240
200
160
120
80
40
0



(24-hr Activity Cycle)



150 min/week
of moderate-intensity aerobic
activity or
75 min/week
of vigorous aerobic activity or
a combination of both



< 2 hours/day of screentime

Sit less



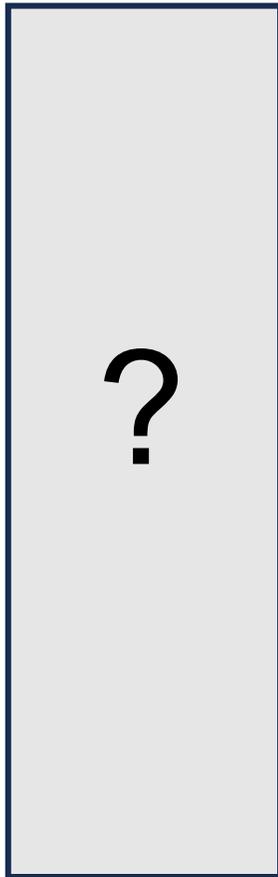
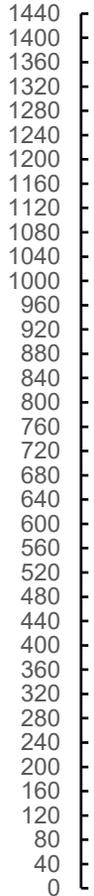
≥ 7 hours/night

24-hr Movement Behavior Guidelines
(for adults)



Youth Movement Behaviors

24-hr Movement Behaviors



(24-hr Activity Cycle)



60 min/day
of moderate-to-vigorous
intensity physical activity



< 2 hours/day of screentime

Sit less



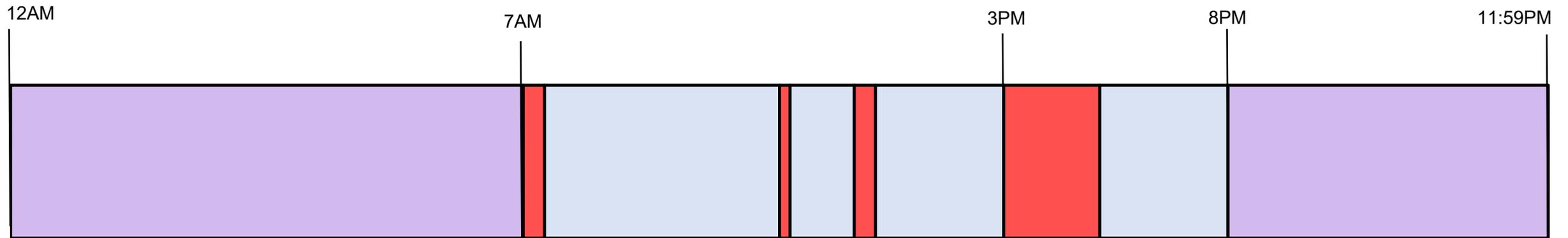
9-12 hours/night
(6-12 years)
8-10 hours/night
(13-17 years)

24-hr Movement Behavior Guidelines
(for youth)



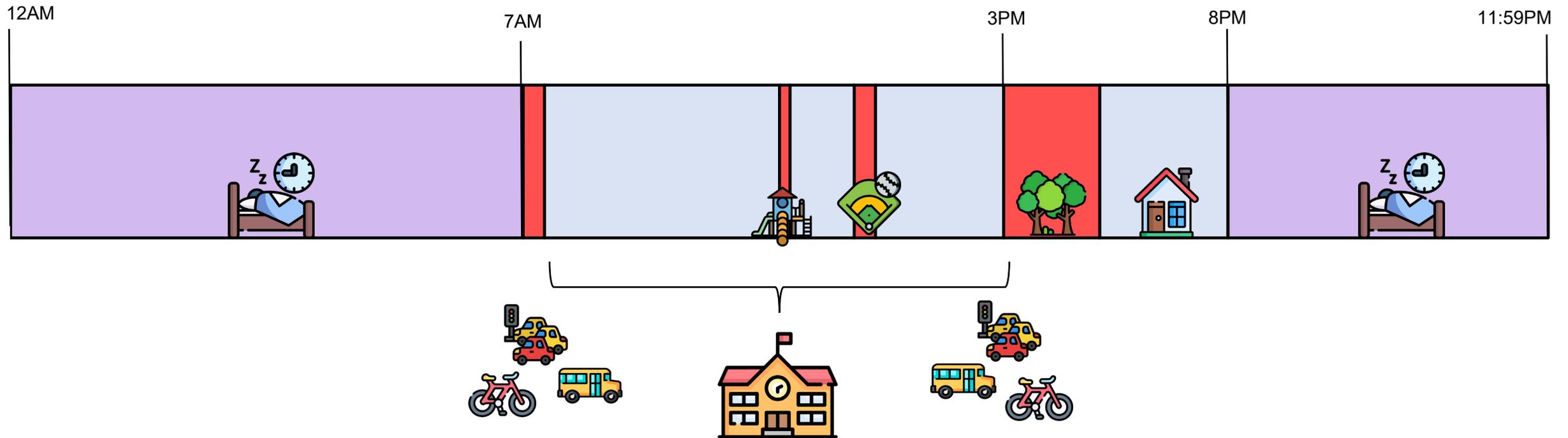
24-hr Movement Behaviors

(24-hr Activity Cycle)



24-hr Movement Behaviors

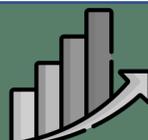
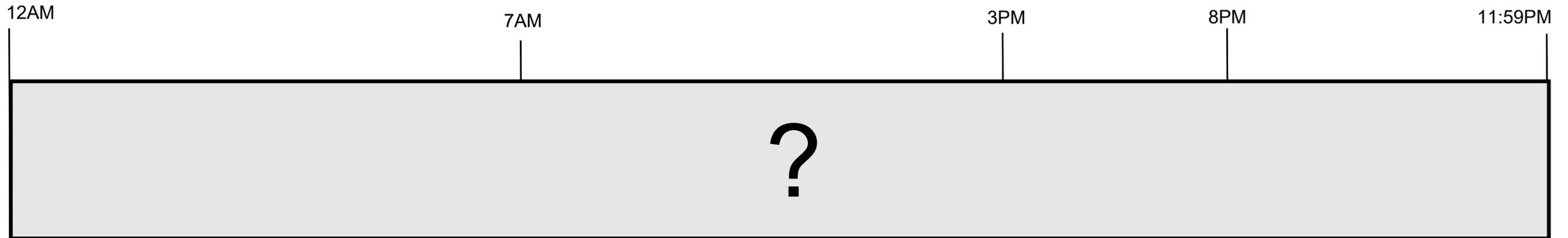
(24-hr Activity Cycle)

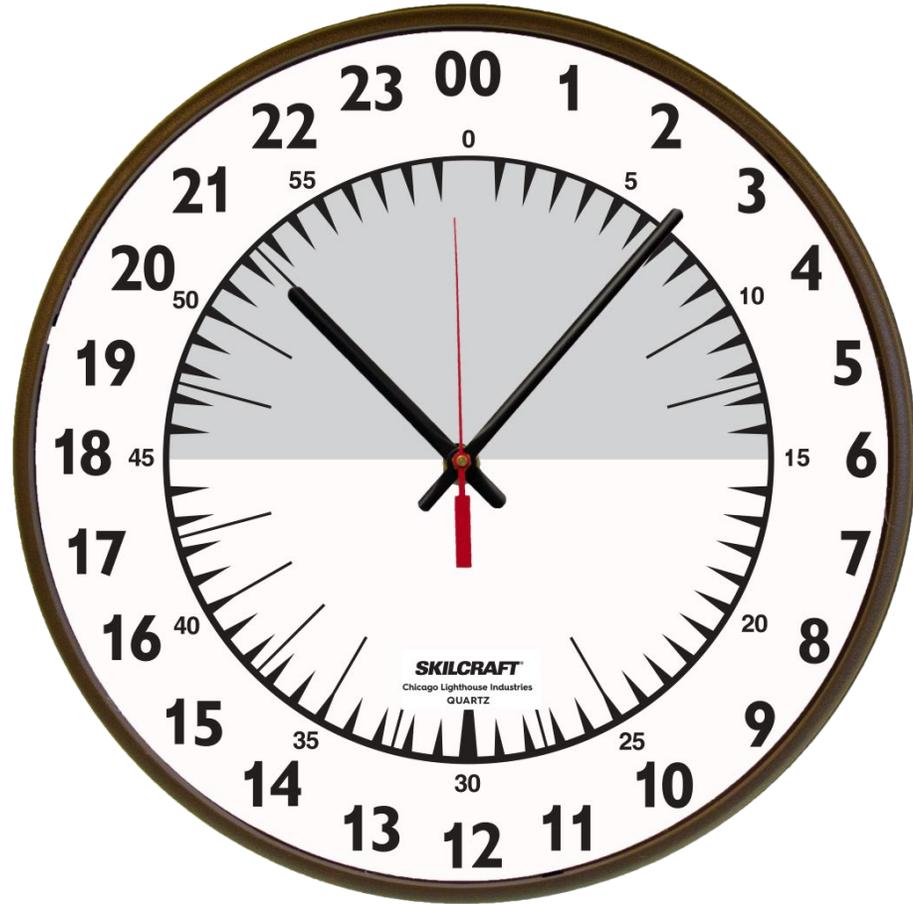


Youth Movement Behaviors

24-hr Movement Behaviors

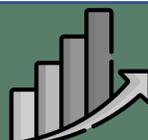
(24-hr Activity Cycle)

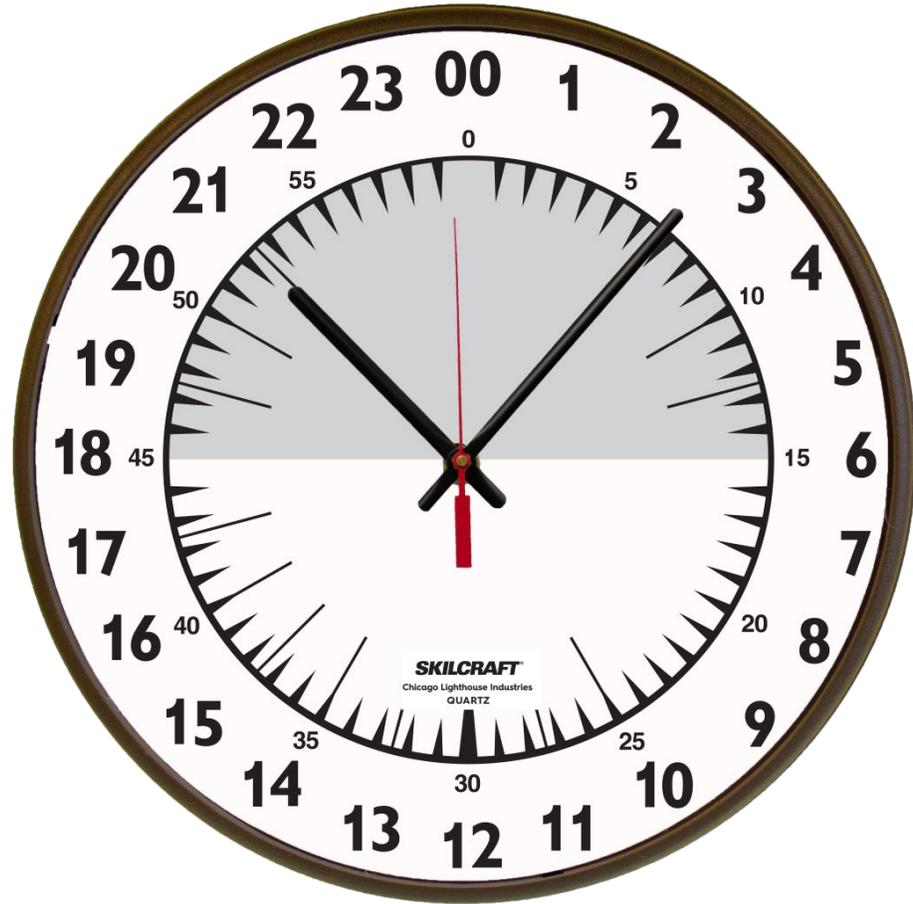




“For disappearing acts, it’s hard to beat what happens to the eight hours supposedly left after eight of sleep and eight of work.”

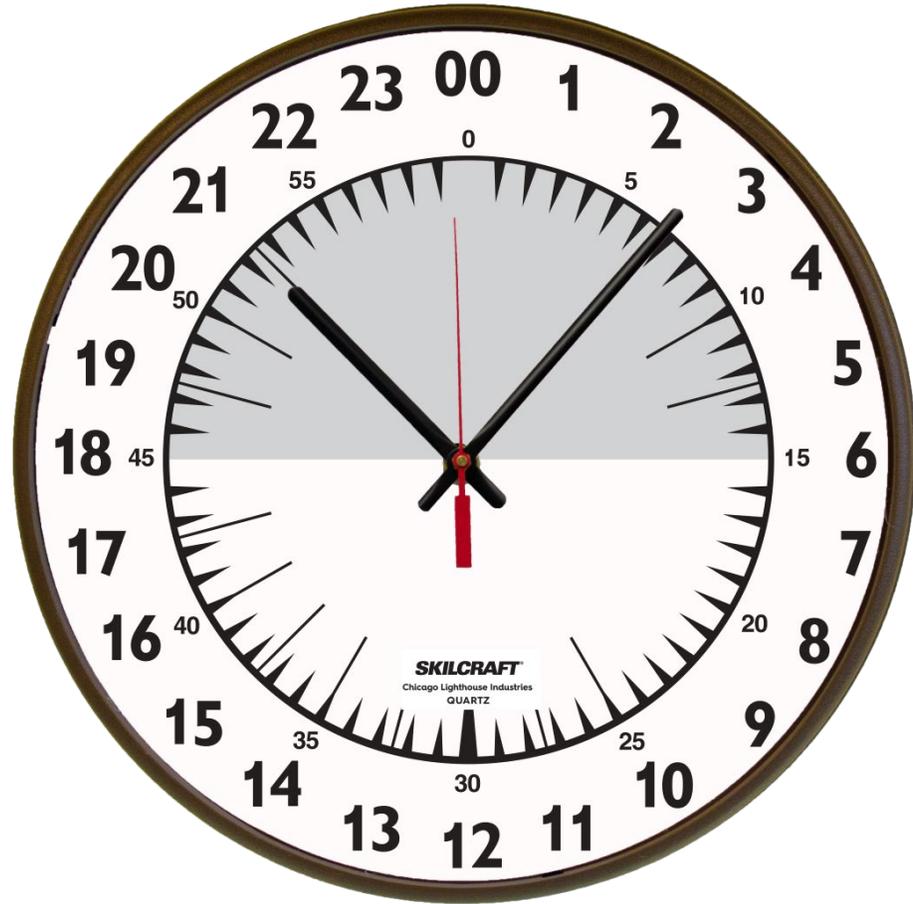
Doug Larson, American columnist, 1926-2017





“For disappearing acts, it’s hard to beat what happens to the eight hours supposedly left after eight of sleep and eight of **school.”**



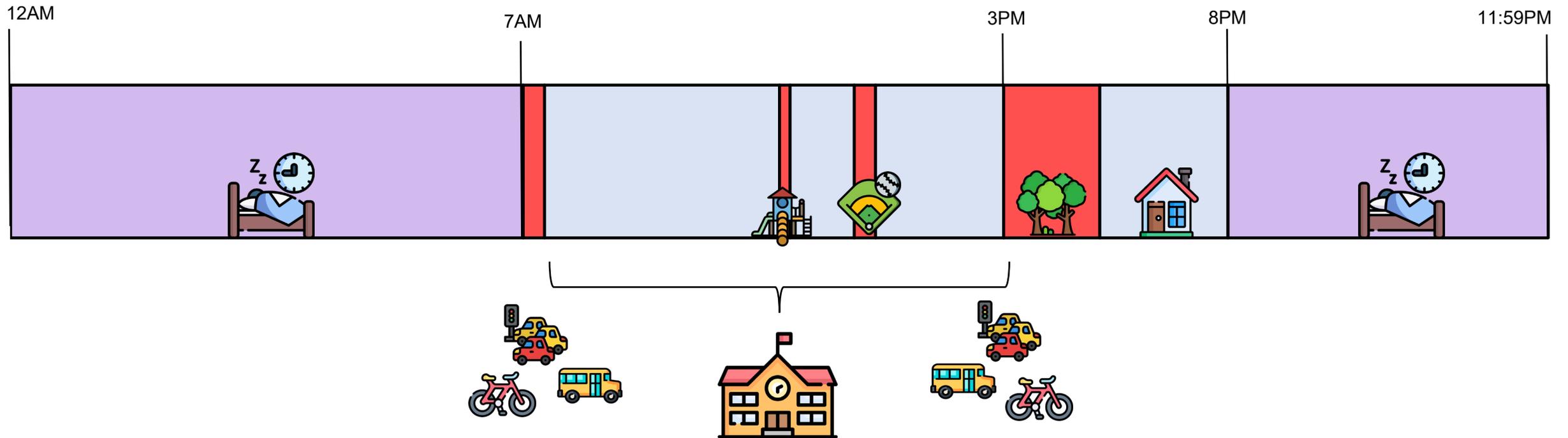


“For disappearing acts, it’s hard to beat what happens **on the weekends and during summer.**”



24-hr Movement Behaviors

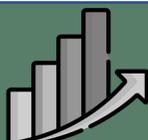
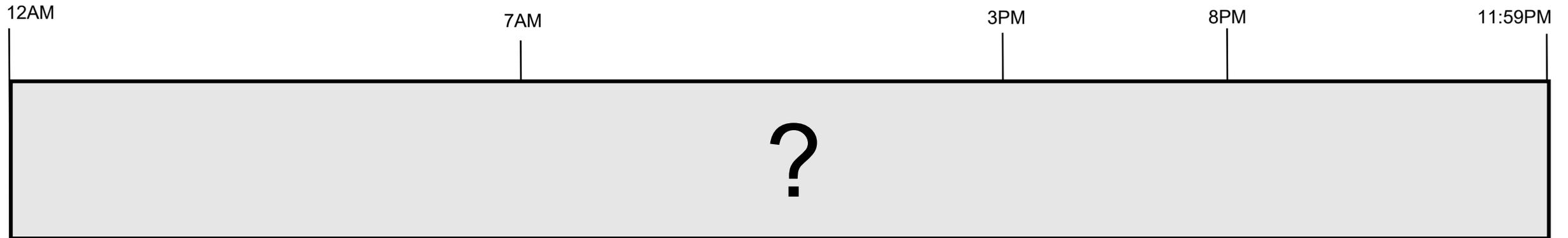
(24-hr Activity Cycle)



Youth Movement Behaviors

24-hr Movement Behaviors

(24-hr Activity Cycle)



RESEARCH

Open Access



The impact of different data handling strategies on the proportion of children classified as meeting 24-h movement guidelines and associations with overweight and obesity

Christopher D. Pfledderer^{1*}, Sarah Burkart², Roddrick Dugger², Hannah Parker², Lauren von Klinggraff², Anthony D. Okely², R. Glenn Weaver² and Michael W. Beets²

Abstract

Background Despite the widespread endorsement of 24 h movement guidelines (physical activity, sleep, screen time) for youth, no standardized processes for categorizing guideline achievement exists. The purpose of this study was to illustrate the impact of different data handling strategies on the proportion of children meeting 24 h movement guidelines (24hrG) and associations with overweight and obesity.

Methods A subset of 524 children (ages 5–12 years) with complete 24-h behavior measures on at least 10 days was used to compare the impact of data handling strategies on estimates of meeting 24hrG. Physical activity and sleep were measured via accelerometry. Screen time was measured via parent self-report. Comparison of meeting 24hrG were made using (1) average of behaviors across all days (AVG-24 h), (2) classifying each day and evaluating the percentage meeting 24hrG from 10 to 100% of their measured days (DAYS-24 h), and (3) the average of a random sample of 4 days across 10 iterations (RAND-24 h). A second subset of children (N=475) with height and weight data was used to explore the influence of each data handling strategy on children meeting guidelines and the odds of overweight/obesity via logistic regression.

Results Classification for AVG-24 h resulted in 14.7% of participants meeting 24hrG. Classification for DAYS-24 h resulted in 63.5% meeting 24hrG on 10% of measured days with < 1% meeting 24hrG on 100% of days. Classification for RAND-24 h resulted in 15.5% of participants meeting 24hrG. Across 10 iterations, 63.6% of participants never met 24hrG regardless of the days sampled, 3.4% always met 24hrG, with the remaining 33.0% classified as meeting 24hrG for at least one of the 10 random iterations of days. Using AVG-24 h as a strategy, meeting all three guidelines associated with lower odds of having overweight/obesity (OR = 0.38, 95%CI: 0.21–0.70, p < 0.05). The RAND-24 h strategy produced a range of odds from 0.27 to 0.56. Using the criteria of needing to meet 24hrG on 100% of days, meeting all three guidelines associated with the lowest odds of having overweight and obesity as well (OR = 0.04, 95%CI: 0.01–0.18, p < 0.05).

Conclusions Varying estimates of meeting the 24hrG and the odds of overweight and obesity results from different data handling strategies and days sampled.

*Correspondence:

Christopher D. Pfledderer
christopher.pfledderer@bmc.edu
Full list of author information is available at the end of the article



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Youth Movement Behaviors

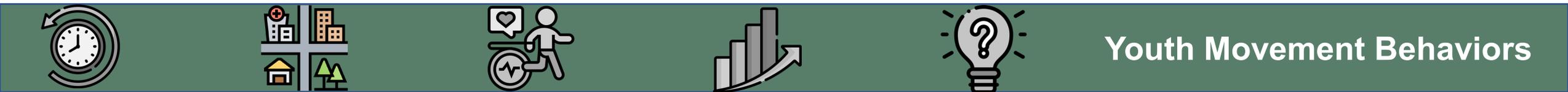
Common practice in handling movement behavior data is to average behaviors across multiple days (even current guidelines are based on averages)

Guidelines are framed as “daily”

Studies have demonstrated natural day-to-day variability in youth movement behavior patterns

Using averages allows for children to have “days off” from meeting the guidelines

This variability may have implications for how we interpret the proportion of children meeting 24-hr guidelines and may underscore the need for context.



RESEARCH

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DATA DESCRIPTION and METHODS

Characteristic	Count
Total Participants	524
Total Observation Days	12,393
Weekdays	8,814 (71.9%)
Weekend days	3,479 (28.1%)
Mean Days/Child	12.5 ± 1.5
Female	257 (49.1%)
K-3 rd grade	335 (63.9%)
4 th -6 th grade	189 (36.1%)



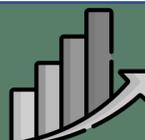
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GT9X



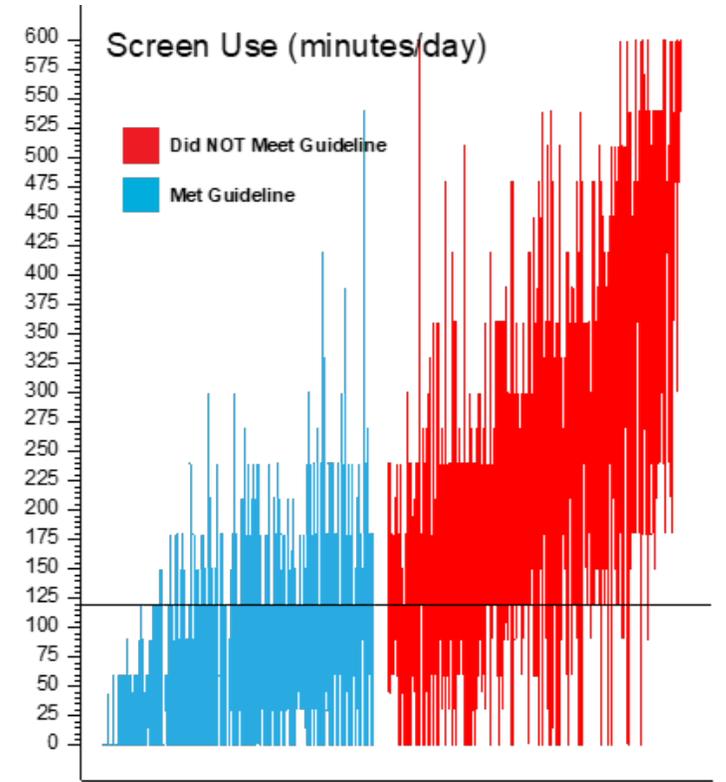
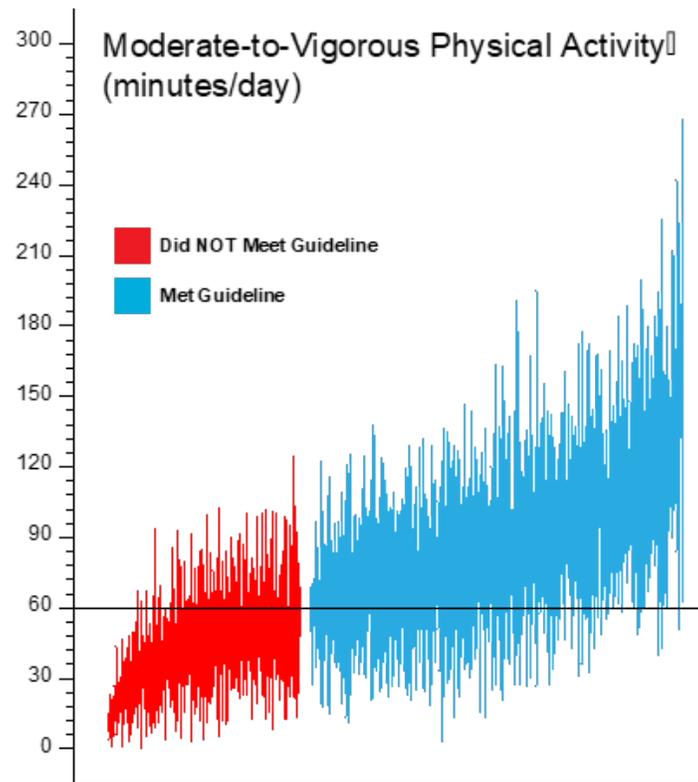
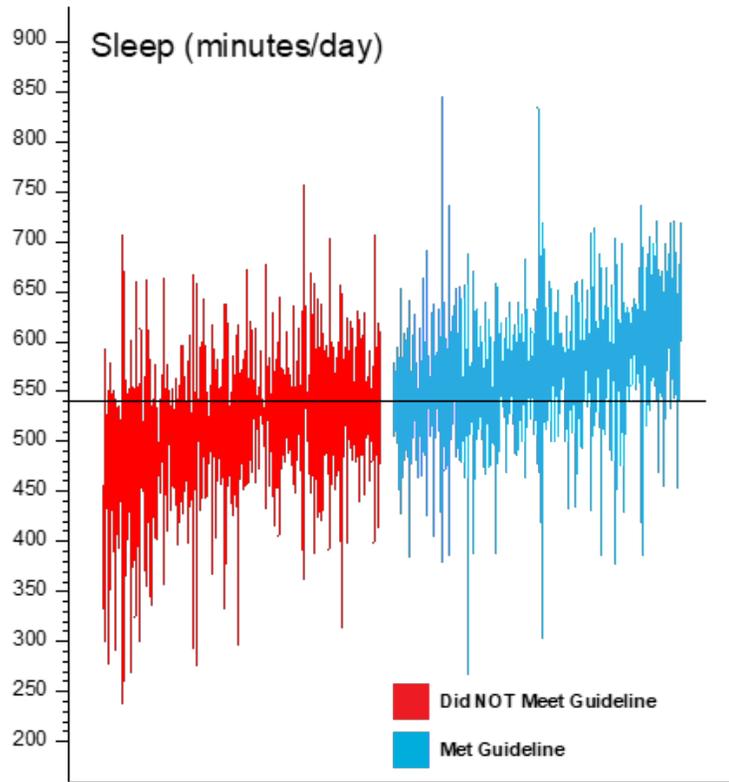
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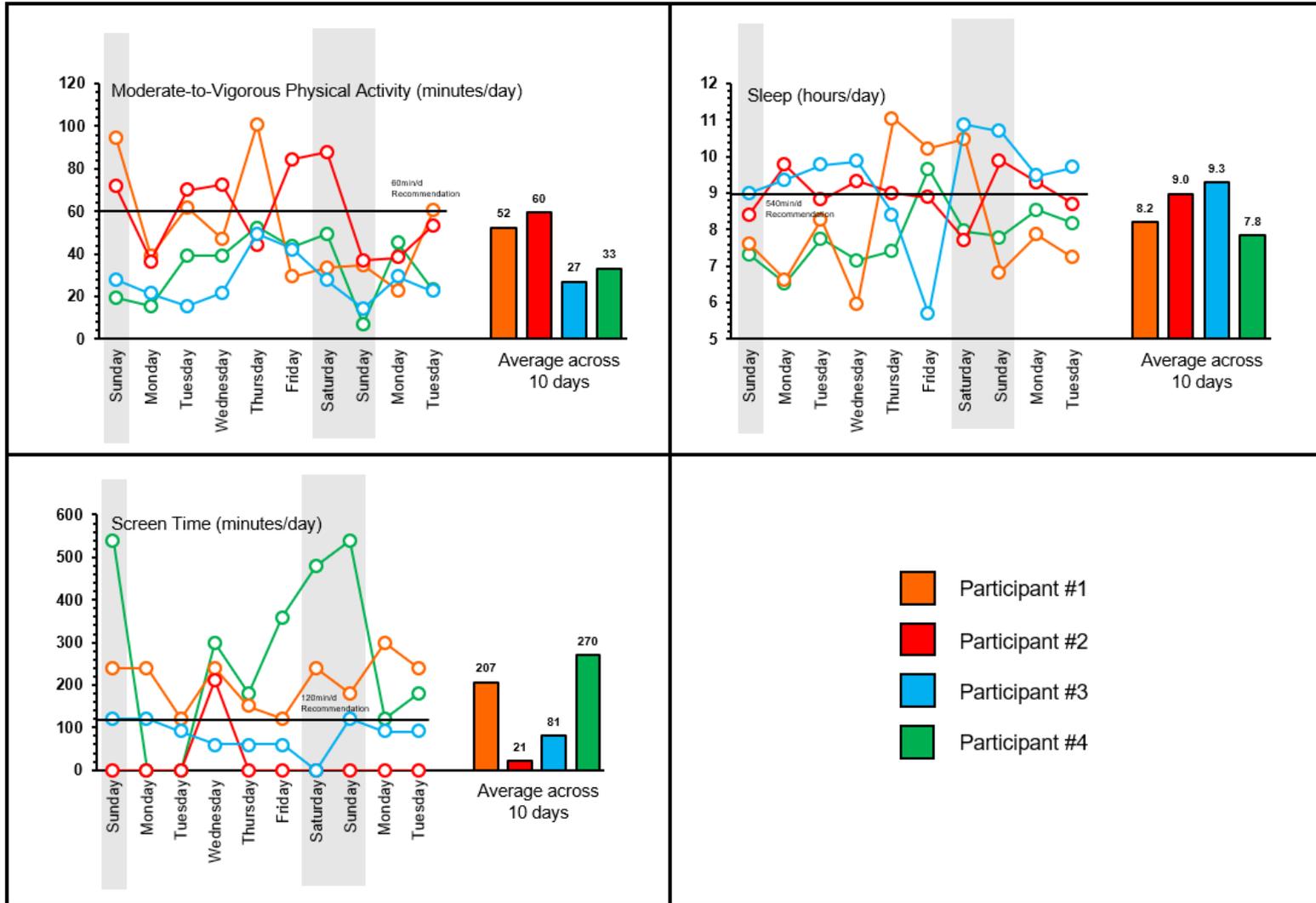


Parent
Survey



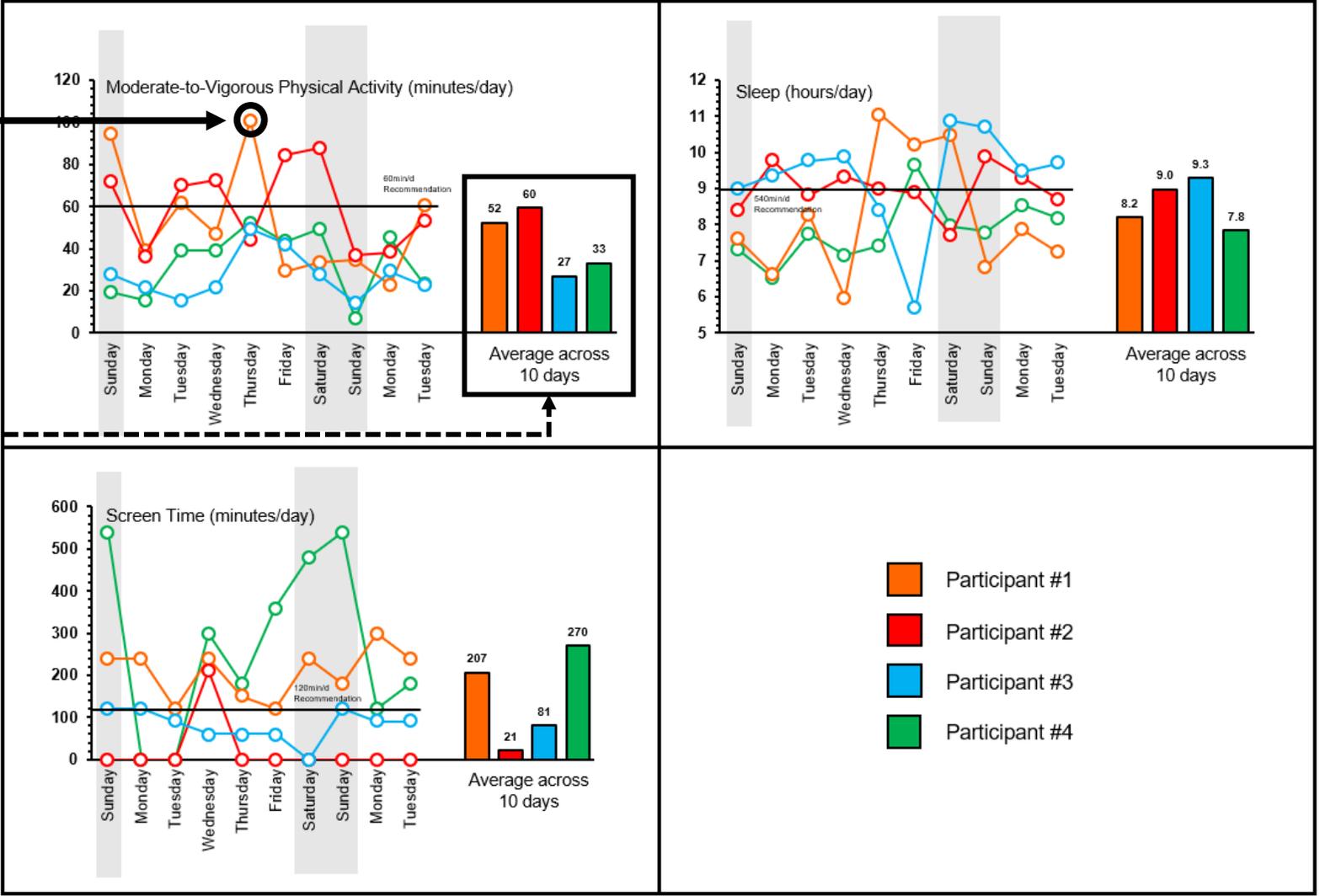
Youth Movement Behaviors

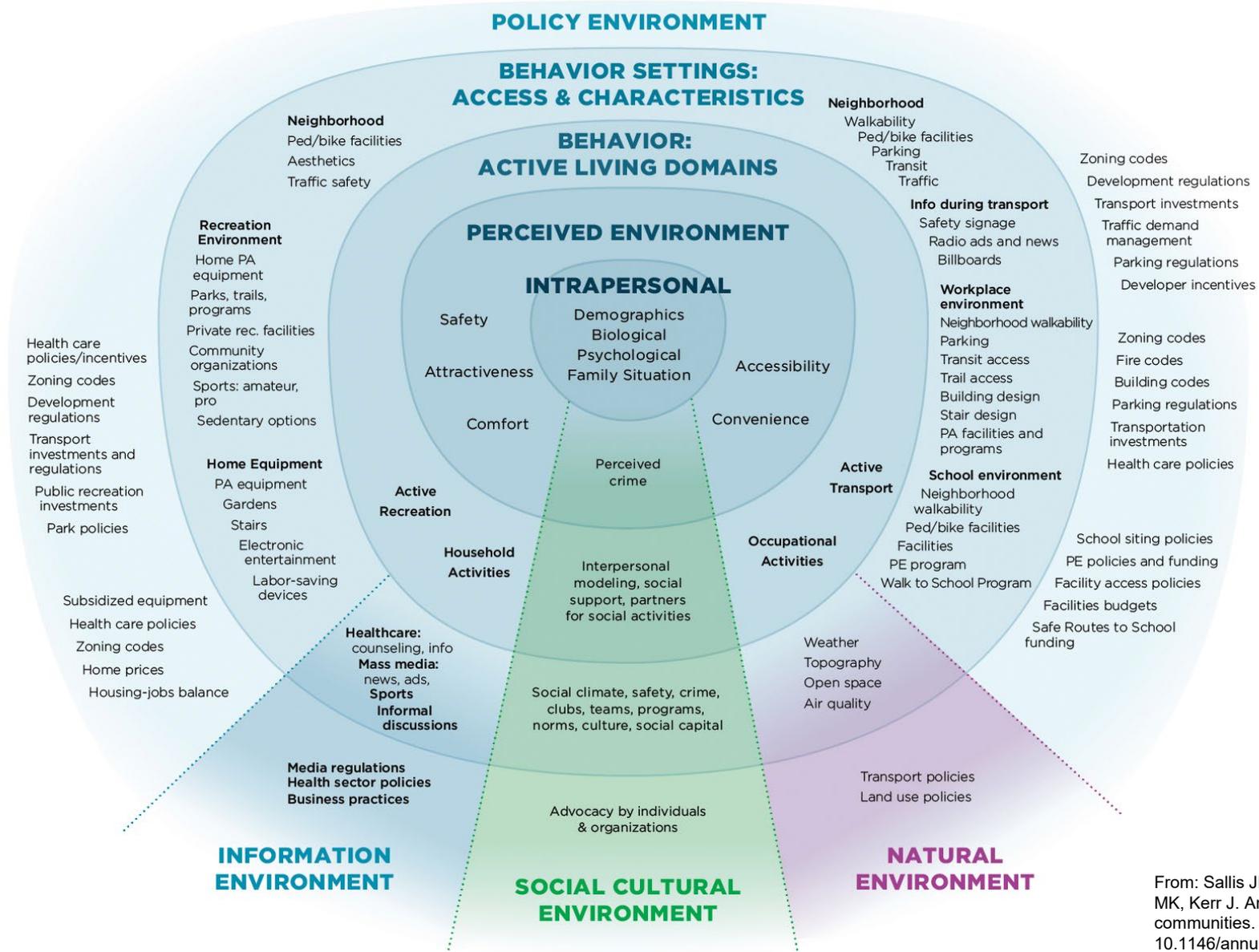




Day-Level

Weekly/Whole-of-Data Averages





From: Sallis JF, Cervero RB, Ascher W, Henderson KA, Kraft MK, Kerr J. An ecological approach to creating active living communities. *Annu Rev Public Health*. 2006;27:297-322. doi: 10.1146/annurev.publhealth.27.021405.102100. PMID: 16533119. Sallis, 2006; NCCOR, 2016



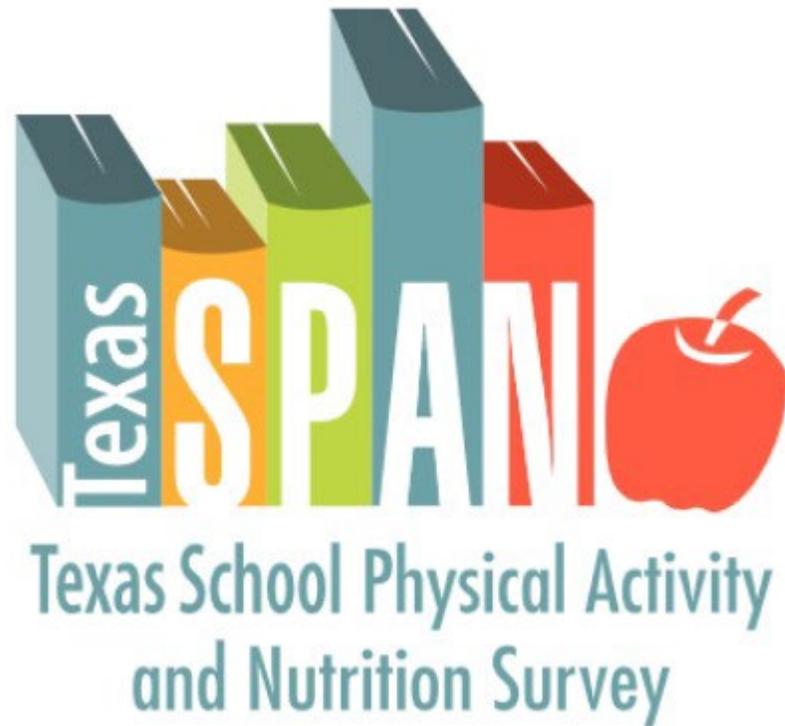
Youth Movement Behaviors



Funded by the Texas Department of State Health Services with funds from the Title V Maternal and Child Health Block Grant to Texas, Centers for Disease Control and Prevention Health and Human Services Block Grant, and the Michael & Susan Dell Foundation through the Michael & Susan Dell Center for Healthy Living.



Youth Movement Behaviors



Examining associations between physical activity context and children meeting daily physical activity guidelines: The role of outdoor play, sports, and other organized activities

Pfledderer, C.D., Brown, D.M.Y., Ranjit, N., Springer, A.E., Malkani, R.I., Salvo, D., & Hoelscher, D.M.

Context-specific screentime and sleep: The differential effects of electronic media use type on sleep duration among 8th and 11th grade adolescents in Texas.

Pfledderer, C.D., Ranjit, N., Saxton, D., Ingram, A., Pérez, A., Hoelscher, D., Archer, N.P.

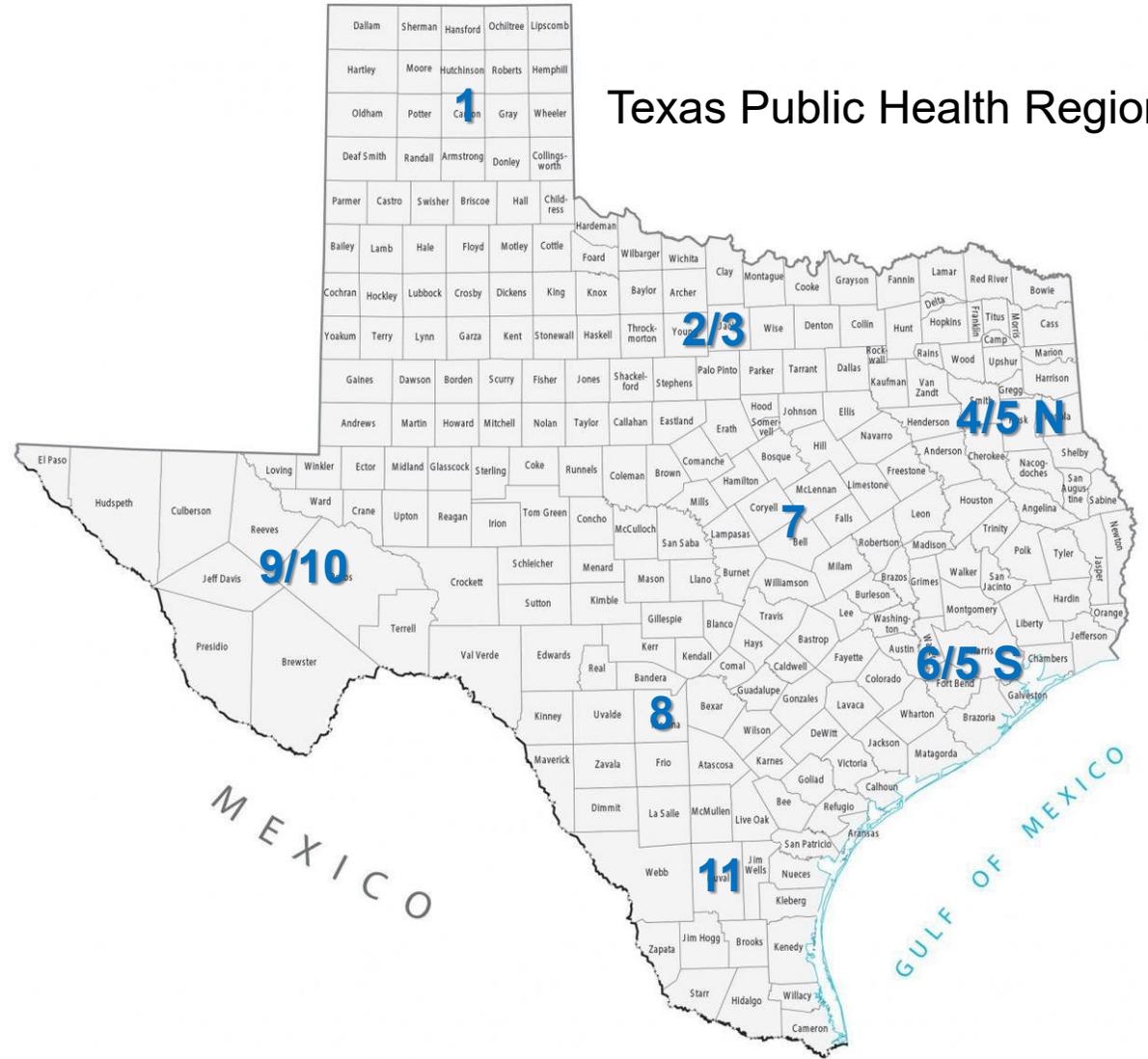
Funded by the Texas Department of State Health Services with funds from the Title V Maternal and Child Health Block Grant to Texas, Centers for Disease Control and Prevention Health and Human Services Block Grant, and the Michael & Susan Dell Foundation through the Michael & Susan Dell Center for Healthy Living.





Texas School Physical Activity and Nutrition Survey

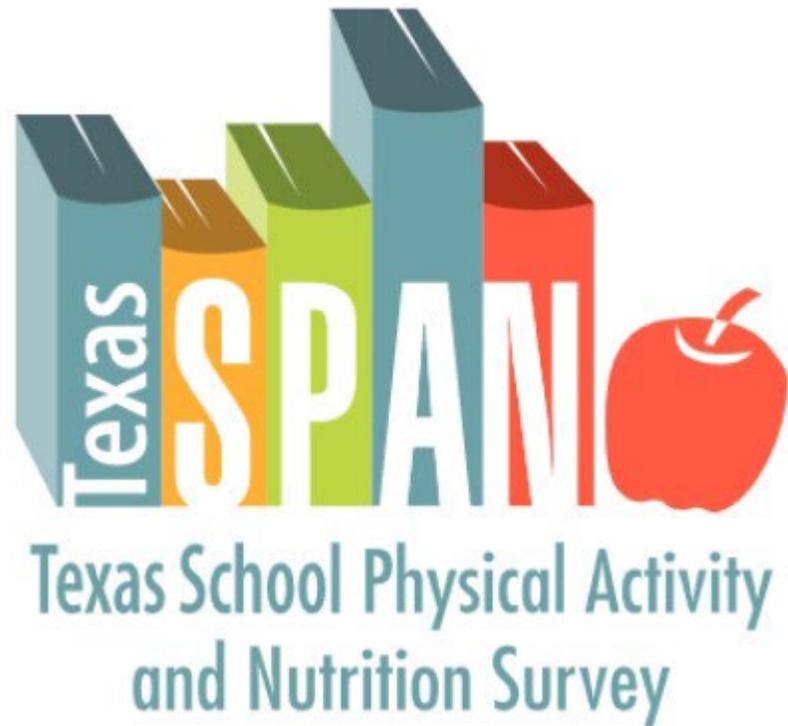
Funded by the Texas Department of State Health Services with funds from the Title V Maternal and Child Health Block Grant to Texas, Centers for Disease Control and Prevention Health and Human Services Block Grant, and the Michael & Susan Dell Foundation through the Michael & Susan Dell Center for Healthy Living.



Texas Public Health Regions

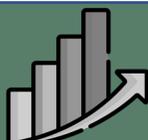


Youth Movement Behaviors

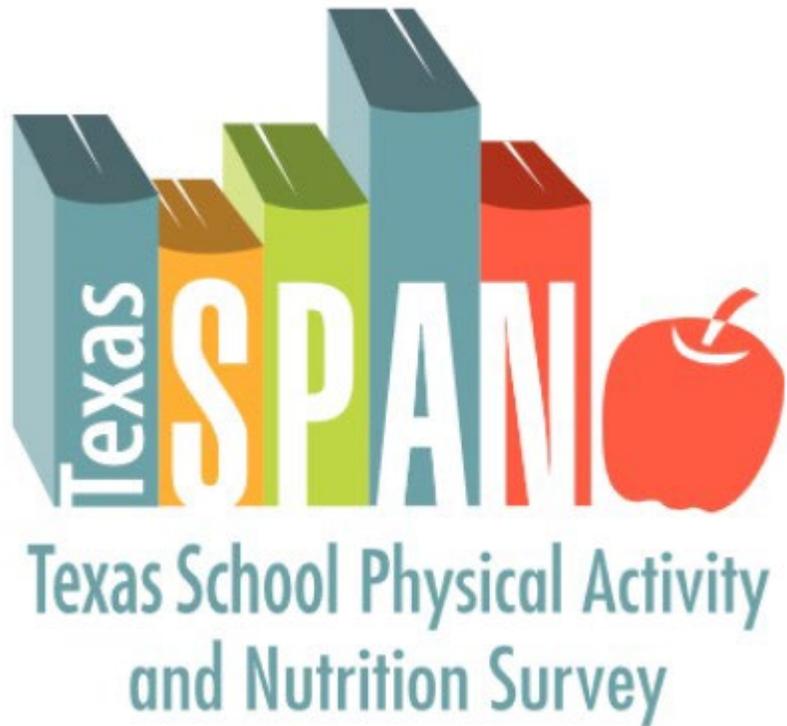


The goal of the Texas School Physical Activity and Nutrition (SPAN) Project is to monitor the trends in body mass index (BMI) of school-age children in the 2nd, 4th, 8th, and 11th grades within ethnic, gender, and geographic subpopulations using a statewide surveillance system.

Funded by the Texas Department of State Health Services with funds from the Title V Maternal and Child Health Block Grant to Texas, Centers for Disease Control and Prevention Health and Human Services Block Grant, and the Michael & Susan Dell Foundation through the Michael & Susan Dell Center for Healthy Living.



Youth Movement Behaviors



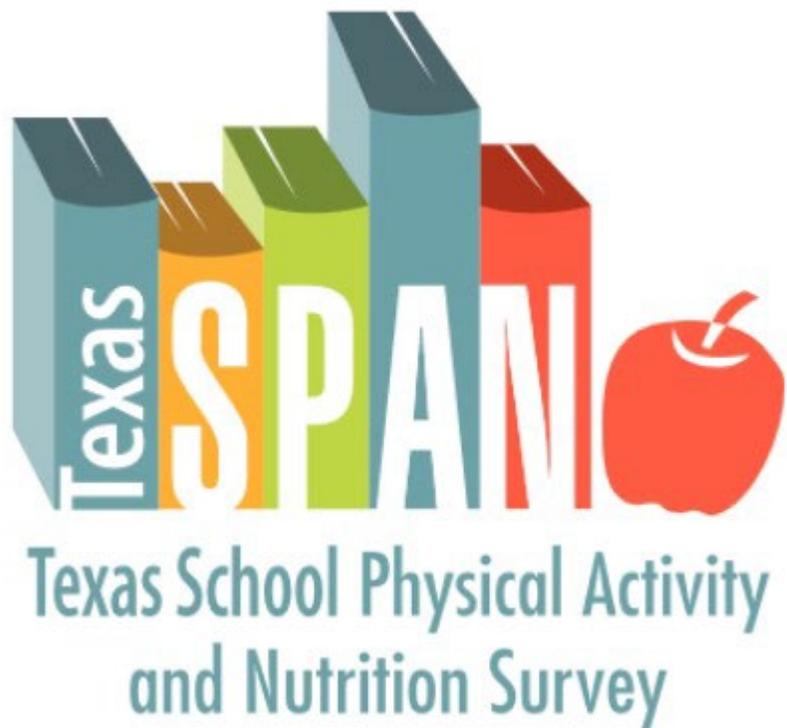
Funded by the Texas Department of State Health Services with funds from the Title V Maternal and Child Health Block Grant to Texas, Centers for Disease Control and Prevention Health and Human Services Block Grant, and the Michael & Susan Dell Foundation through the Michael & Susan Dell Center for Healthy Living.

Texas SPAN data collection consists of:

- (1) administration of a questionnaire which assesses food choice behaviors; food selection skills; weight perceptions and practices; nutrition knowledge; attitudes about food and eating; and **physical activity behaviors**
- (2) height and weight measurements
- (3) and school environment observations including a vending machine audit, healthy signage observations, and a school-level health policy questionnaire.



Youth Movement Behaviors

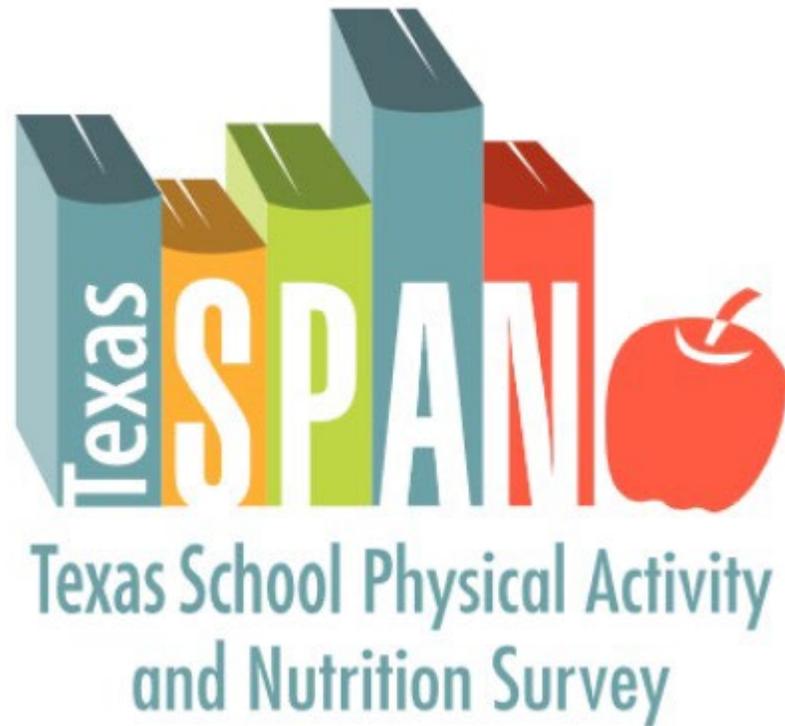


**Scan for more information
about Texas SPAN**

Funded by the Texas Department of State Health Services with funds from the Title V Maternal and Child Health Block Grant to Texas, Centers for Disease Control and Prevention Health and Human Services Block Grant, and the Michael & Susan Dell Foundation through the Michael & Susan Dell Center for Healthy Living.



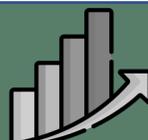
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Characteristics and Behaviors	Total N=2,897	
	Weighted N=355,314	
	Unweighted Count/Mean (SD)	Weighted Percent (%)
Age (years)	9.4 (0.6)	-
Race/Ethnicity		
African American	457	12.2
Hispanic	1535	51.8
White/Other	905	36.2
Urban-Rural Status		
Major Urban	934	22.4
Urban	925	68.4
Rural	1038	9.2
Percent economically disadvantaged 4 th graders (%)	70.5	-
Overweight/Obesity Status		
Healthy Weight	1518	54.0
Overweight/Obesity	1379	46.0
Days Meeting PA Guidelines		
0	344	11.2
1	337	11.7
2	277	9.6
3	367	13.8
4	443	14.3
5	407	14.4
6	216	8.3
7	467	16.7
Days Meeting PA Guidelines (Mean)	3.6 (2.3)	
Number of sports teams participated in past 12 months		
0	1,071	35.2
1	769	28.5
2	495	17.9
3 or more	506	18.4
Participated in any other organized physical activity		
No	1,481	50.9
Yes	1,261	49.1
Commute mode to school		
Walk	130	5.2
Bike	29	1.3
School Bus	661	19.8
City Bus	10	0.3
Car	2000	73.6
Carpool	-	-
Days of outdoor play in the past 7 days (Mean)	3.9 (2.4)	-



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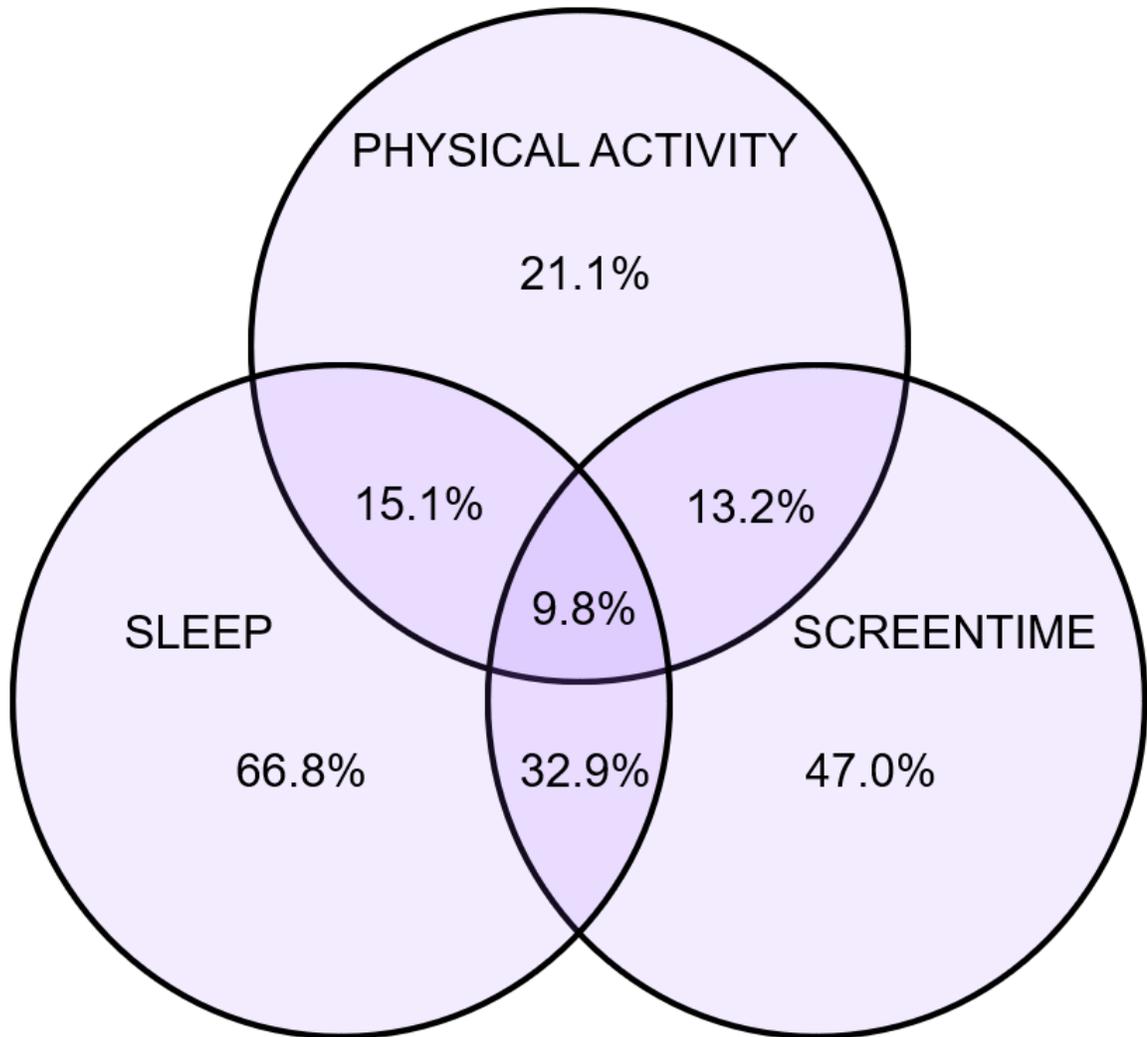
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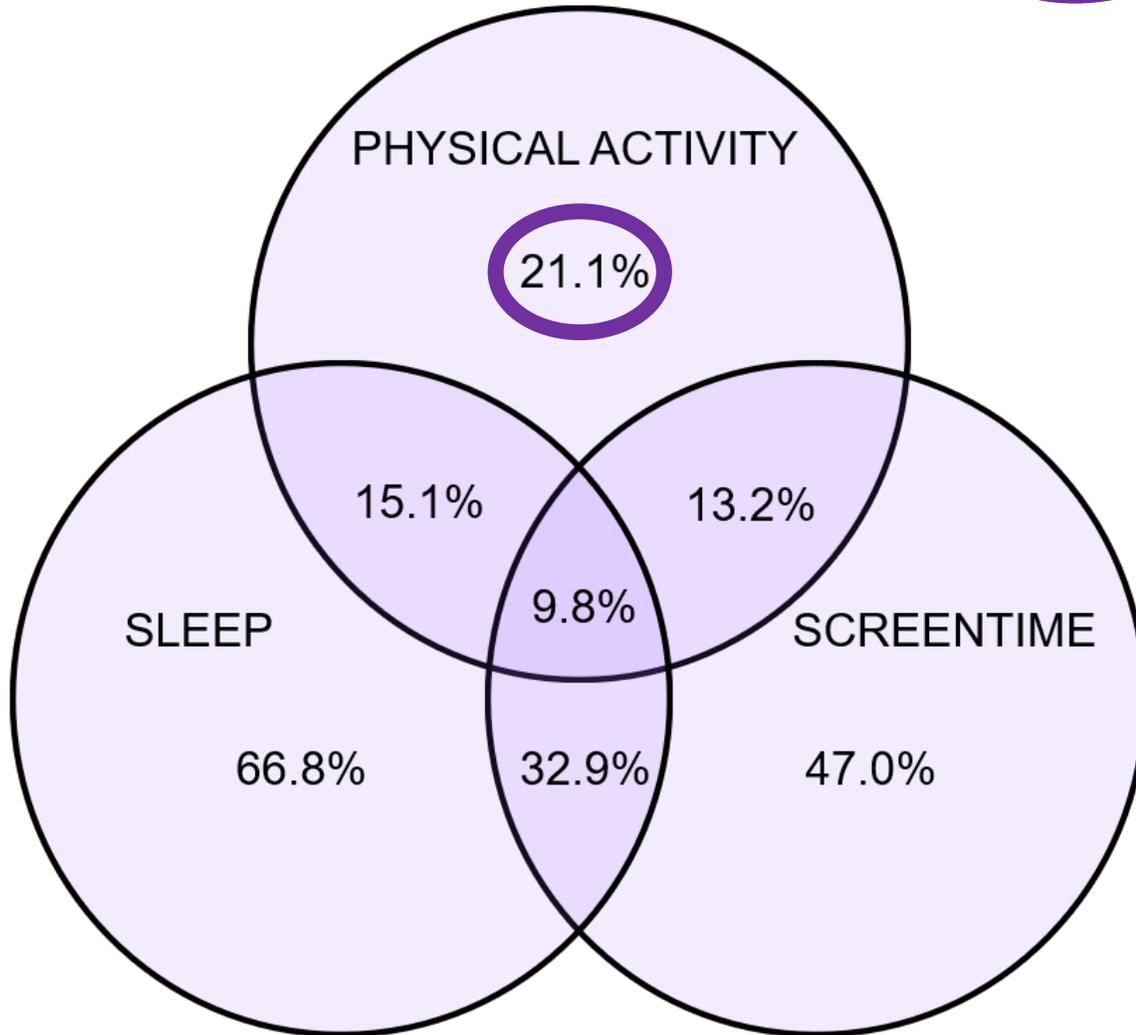
Data from the 2022 National Survey of Children's Health (mean age = 8.2 years)



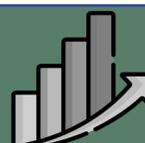
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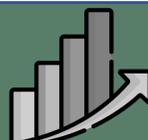
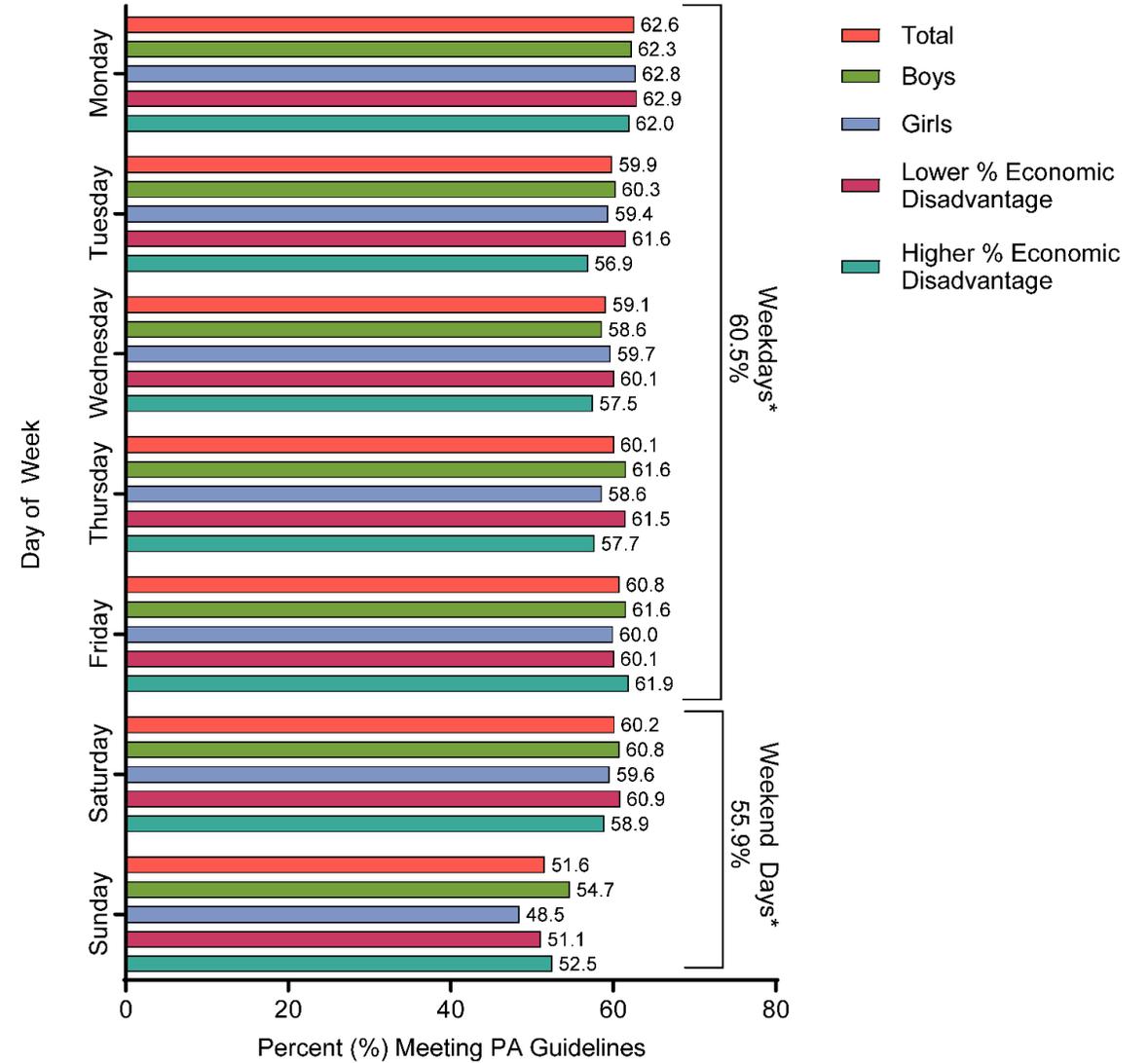
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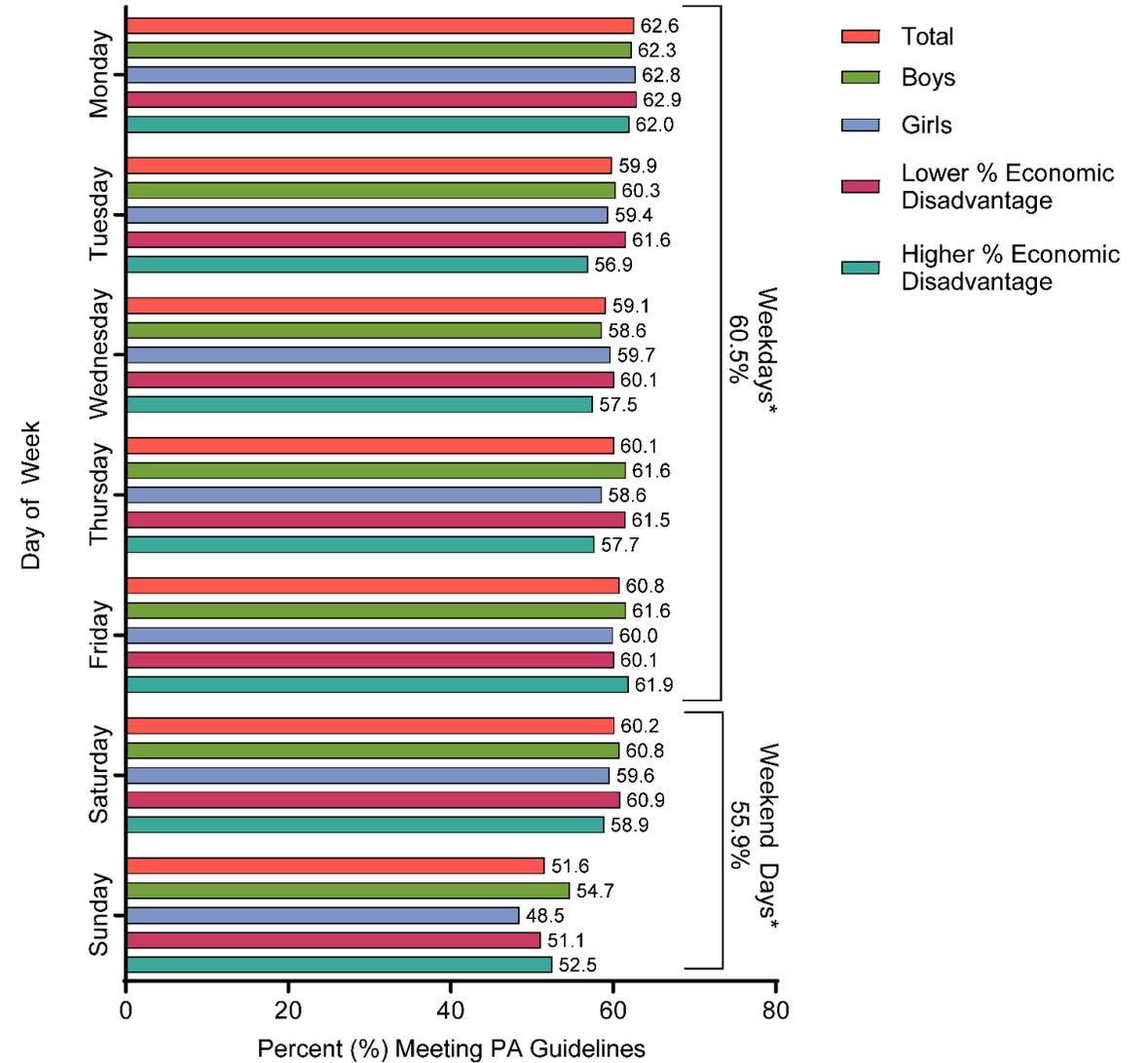
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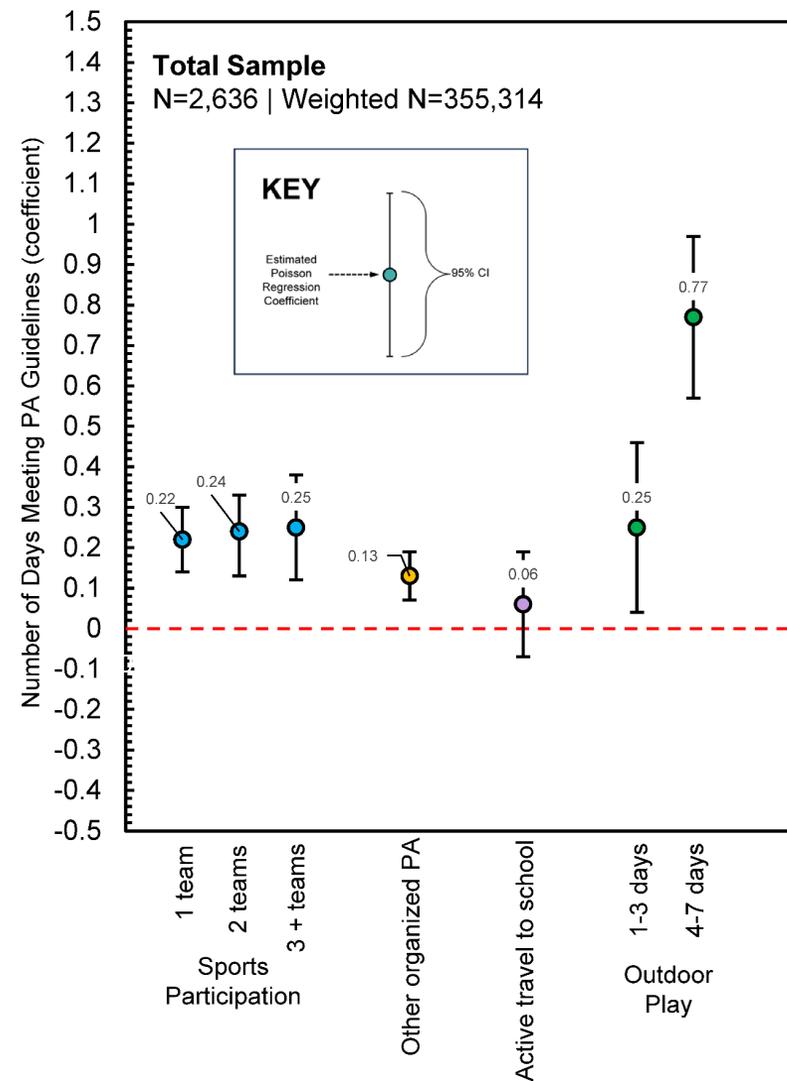
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Significantly fewer children met physical activity guidelines on the weekend



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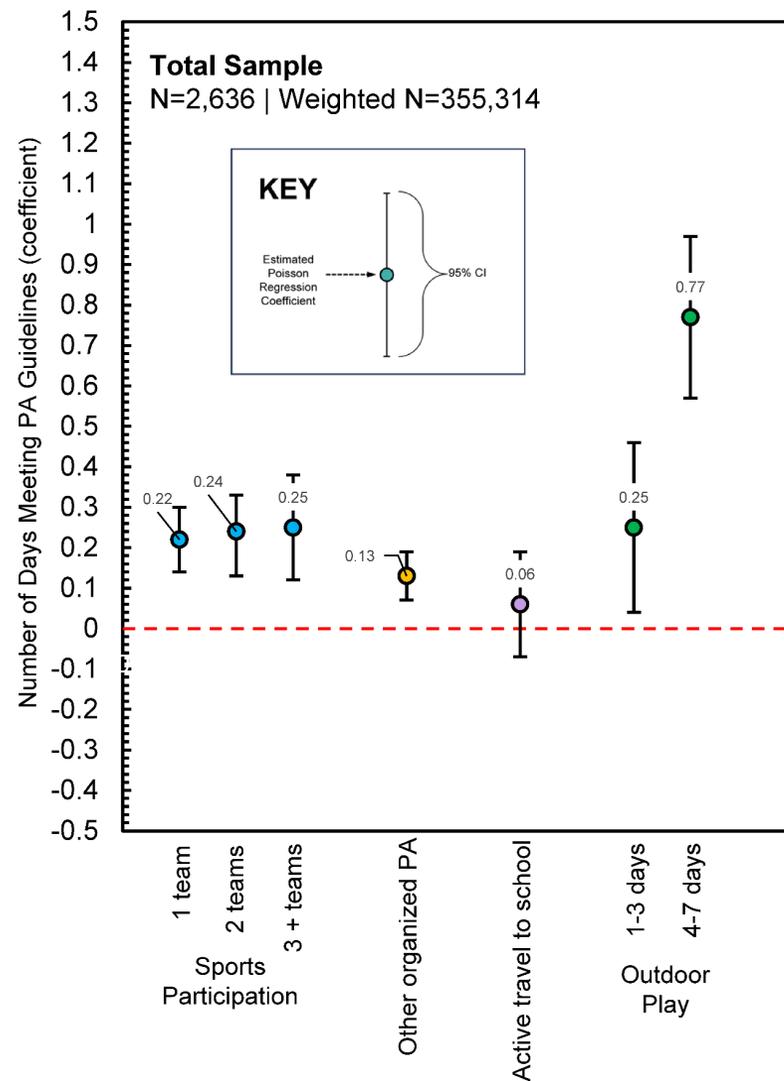
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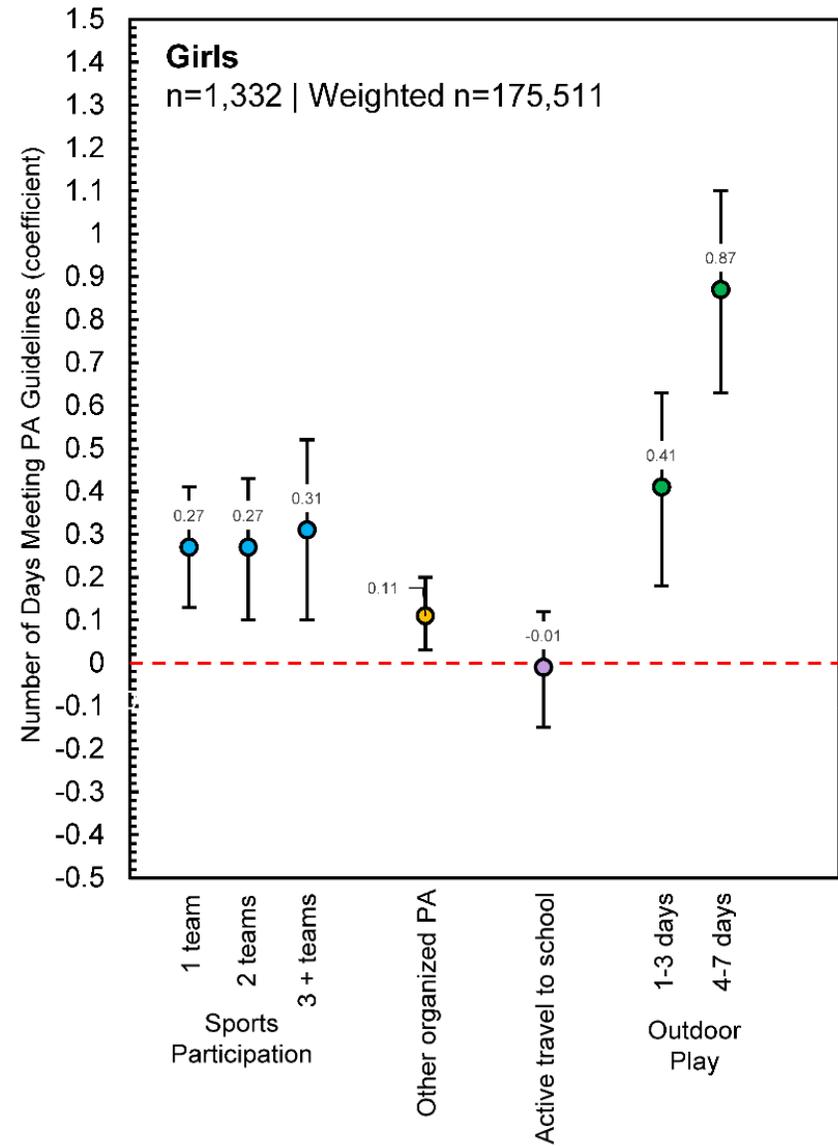
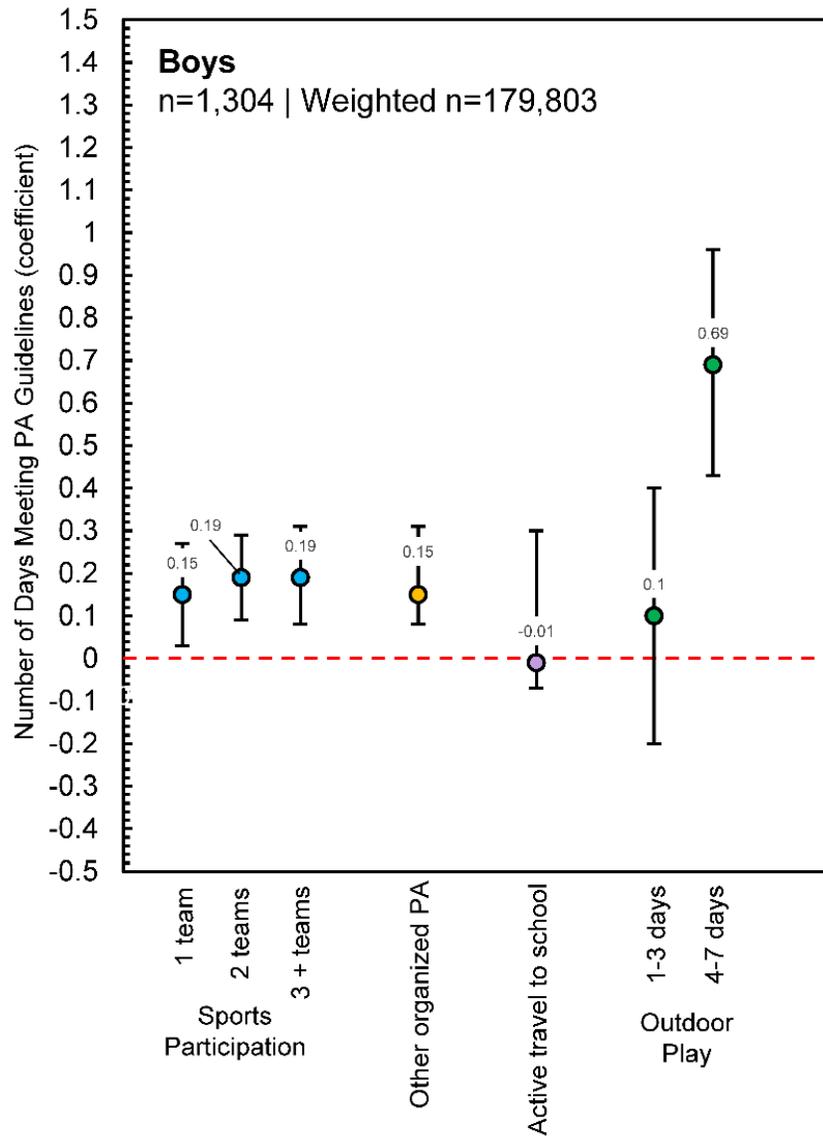


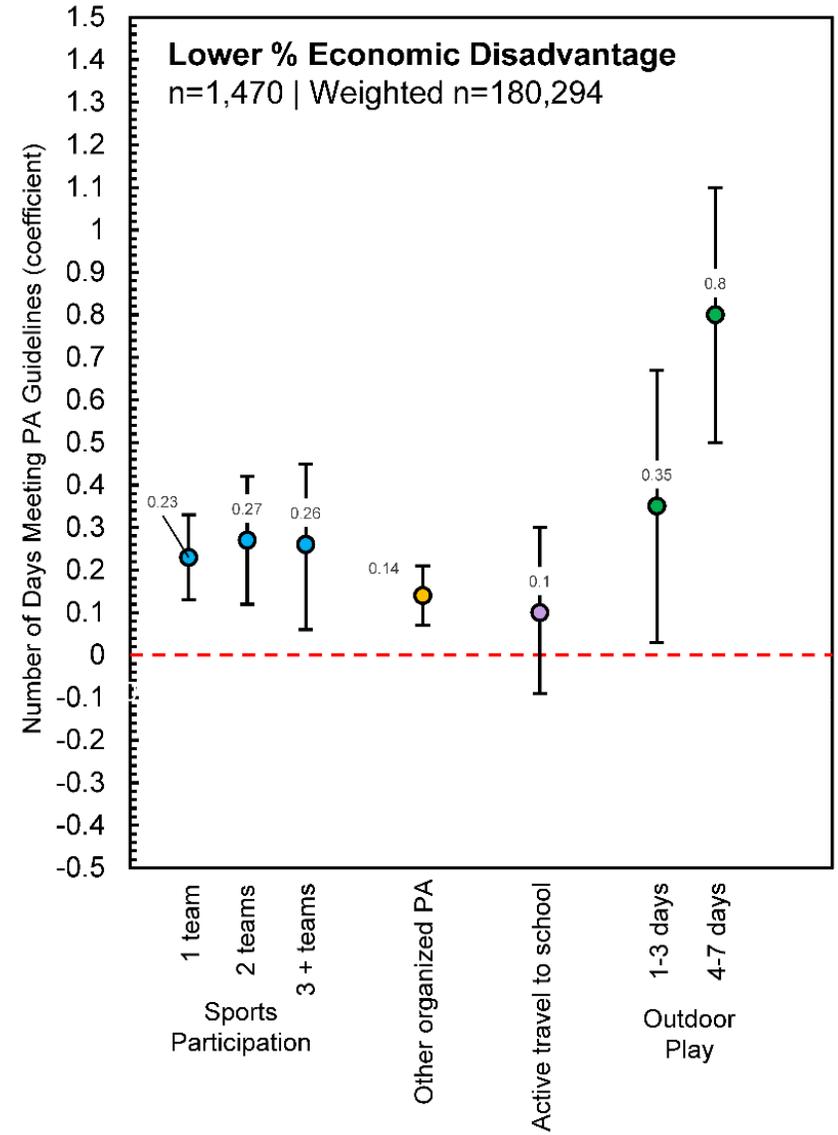
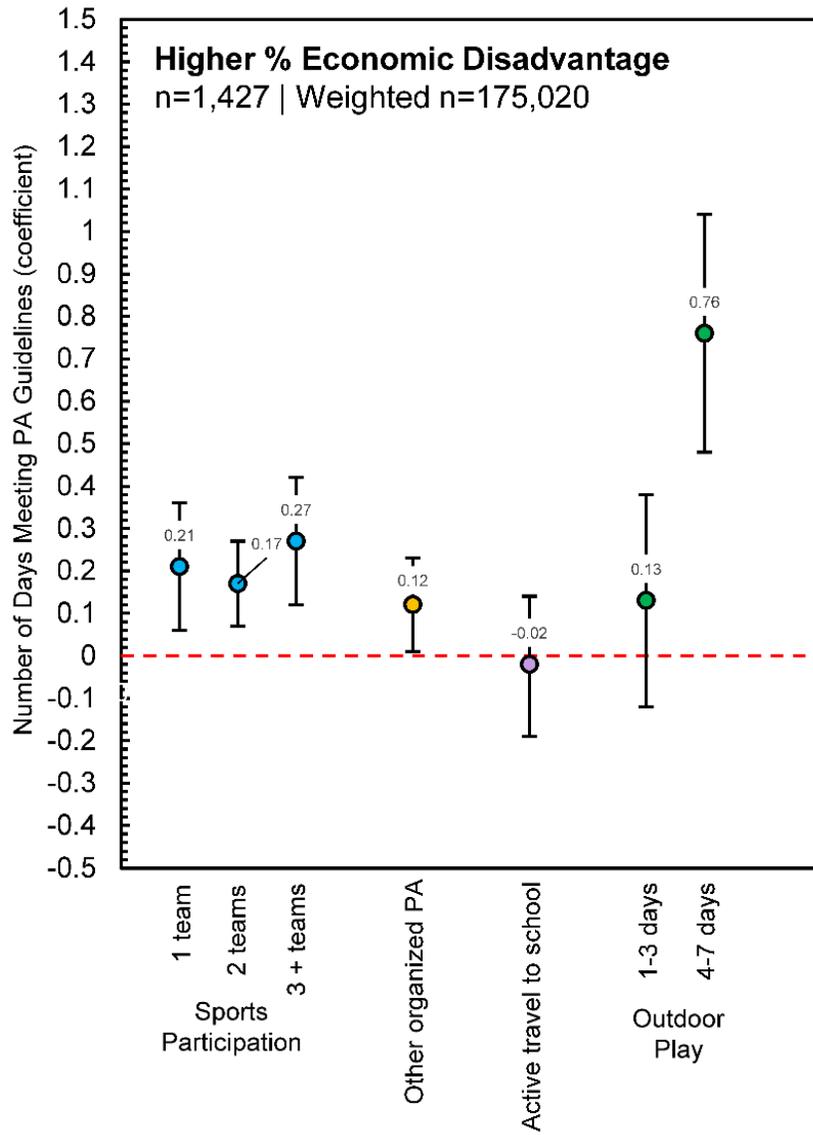
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Sports participation, other organized physical activity, and outdoor play positively associated with the number of days physical activity guidelines were met

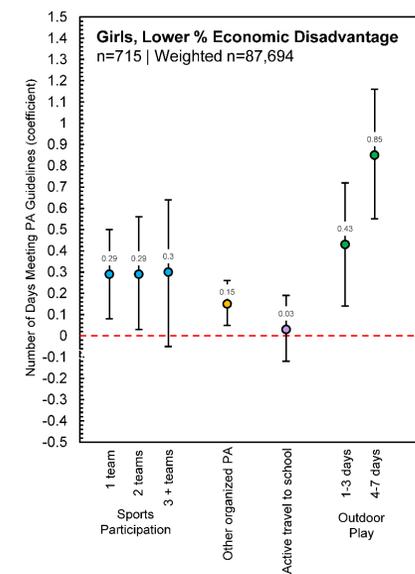
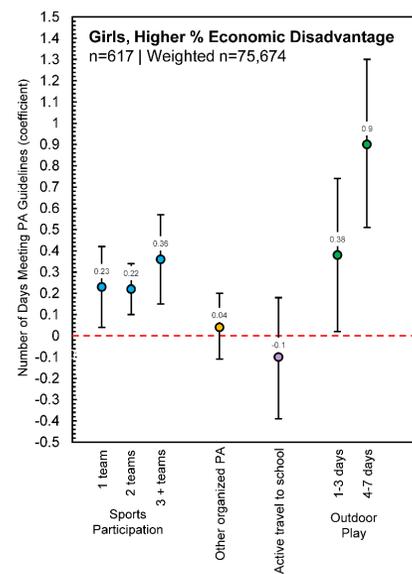
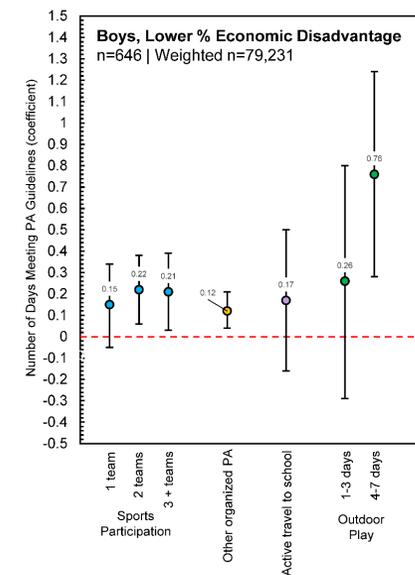
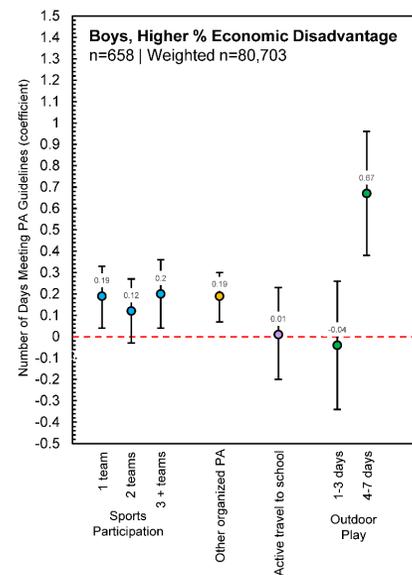






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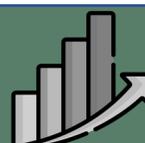
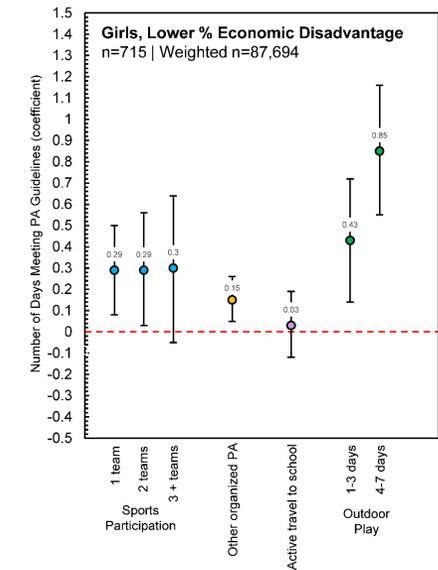
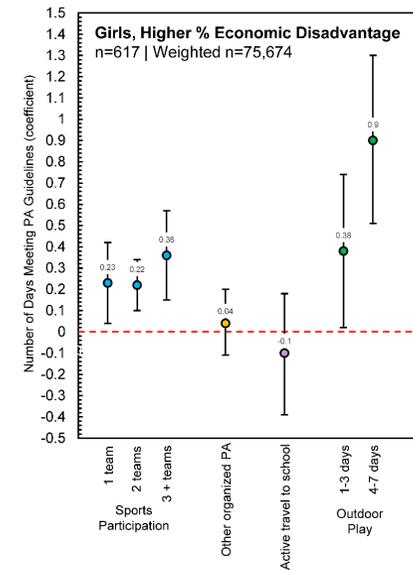
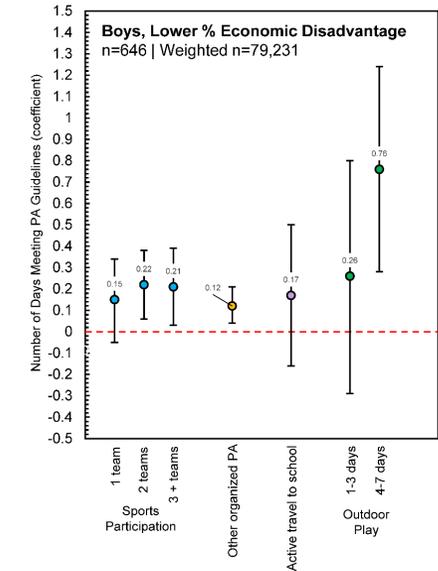
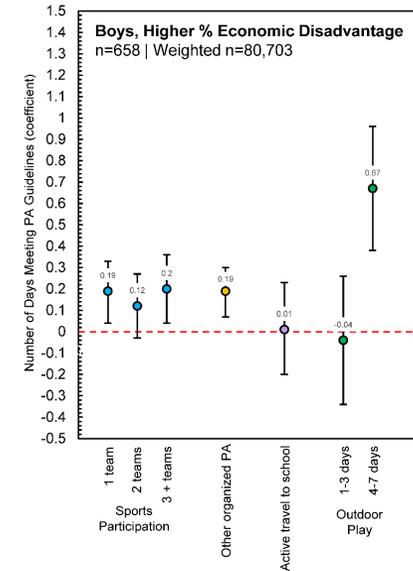
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Across all models, **outdoor play** was a consistent, positive predictor of the number of days children met physical activity guidelines



Context-specific screentime and sleep: The differential effects of electronic media use type on sleep duration among 8th and 11th grade adolescents in Texas.

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Youth Movement Behaviors

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Characteristic	8 th Graders weighted % (95% CI)	11 th Graders weighted % (95% CI)
<i>Unweighted total (n)</i>	4,520	3,382
<i>Weighted total (N)</i>	294,373	289,705
<i>Sex</i>		
Boy	51.0 (46.8–55.2)	50.3 (42.7–57.9)
Girl	49.0 (44.8–53.2)	49.7 (42.1–57.3)
<i>Ethnicity</i>		
Hispanic	48.3 (38.8 – 57.8)	49.1 (34.7 – 63.4)
Non-Hispanic	51.7 (42.2 – 61.2)	50.9 (36.6 – 65.3)
<i>Parental educational attainment</i>		
Less than high school	15.9 (10.9-20.9)	14.2 (9.1-19.2)
High school diploma or GED	23.2 (20.2-26.1)	27.6 (22.1-33.1)
More than high school	60.9 (54.1-67.7)	58.2 (48.5-68.0)
<i>Sleep duration*</i>		
Less than 8 hours	48.7 (44.1-53.4)	71.0 (64.6-77.5)
8 hours or more	51.3 (46.6-55.9)	29.0 (22.5-35.4)
<i>Daily television (TV) screentime</i>		
Don't watch TV	7.4 (5.7-9.1)	7.5 (5.0-9.9)
Less than 2 hours	36.4 (33.2-39.7)	36.1 (33.9-38.3)
2 hours or more	56.1 (51.7-60.6)	56.4 (53.3-59.6)
<i>Daily video/computer gaming time*</i>		
Don't play video games	32.2 (27.6-36.9)	46.2 (41.0-51.4)
Less than 2 hours	35.5 (30.4-40.6)	29.7 (26.4-33.1)
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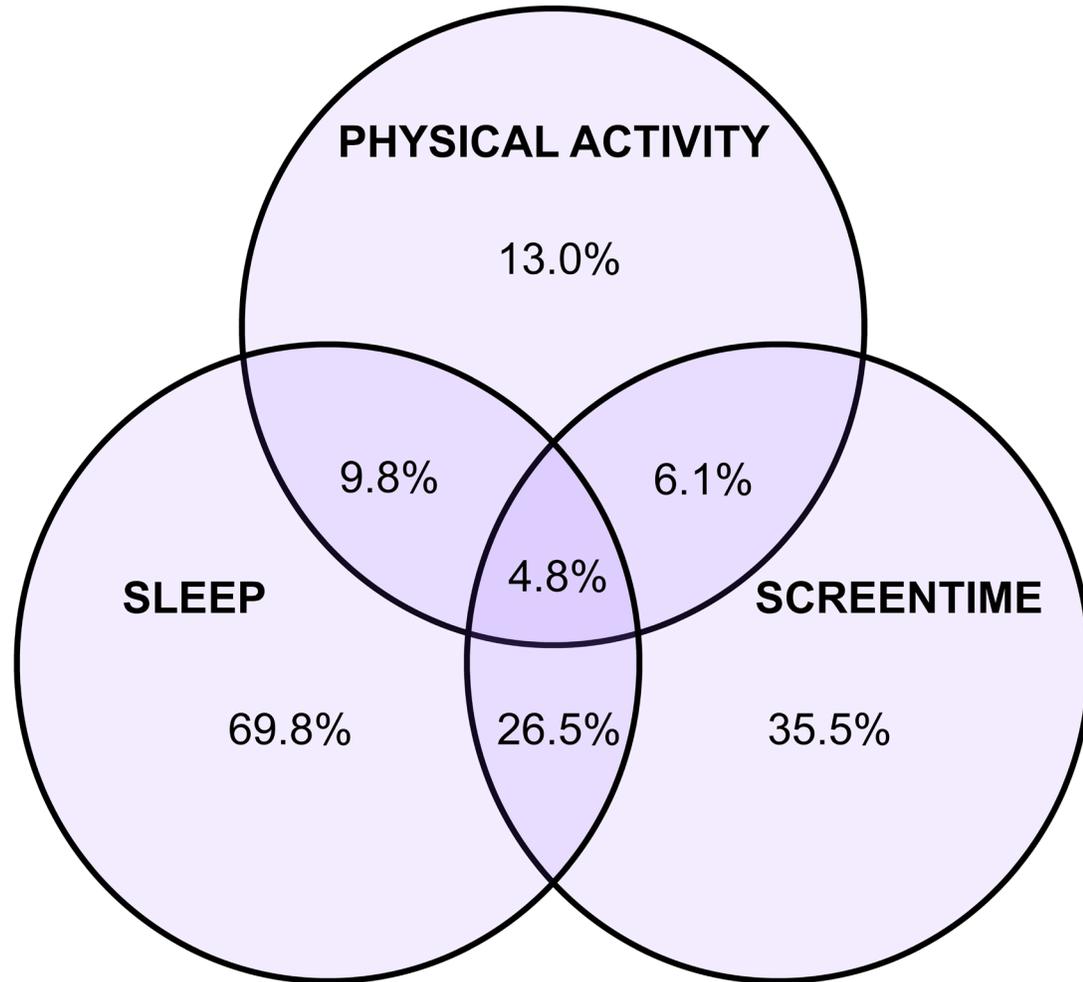
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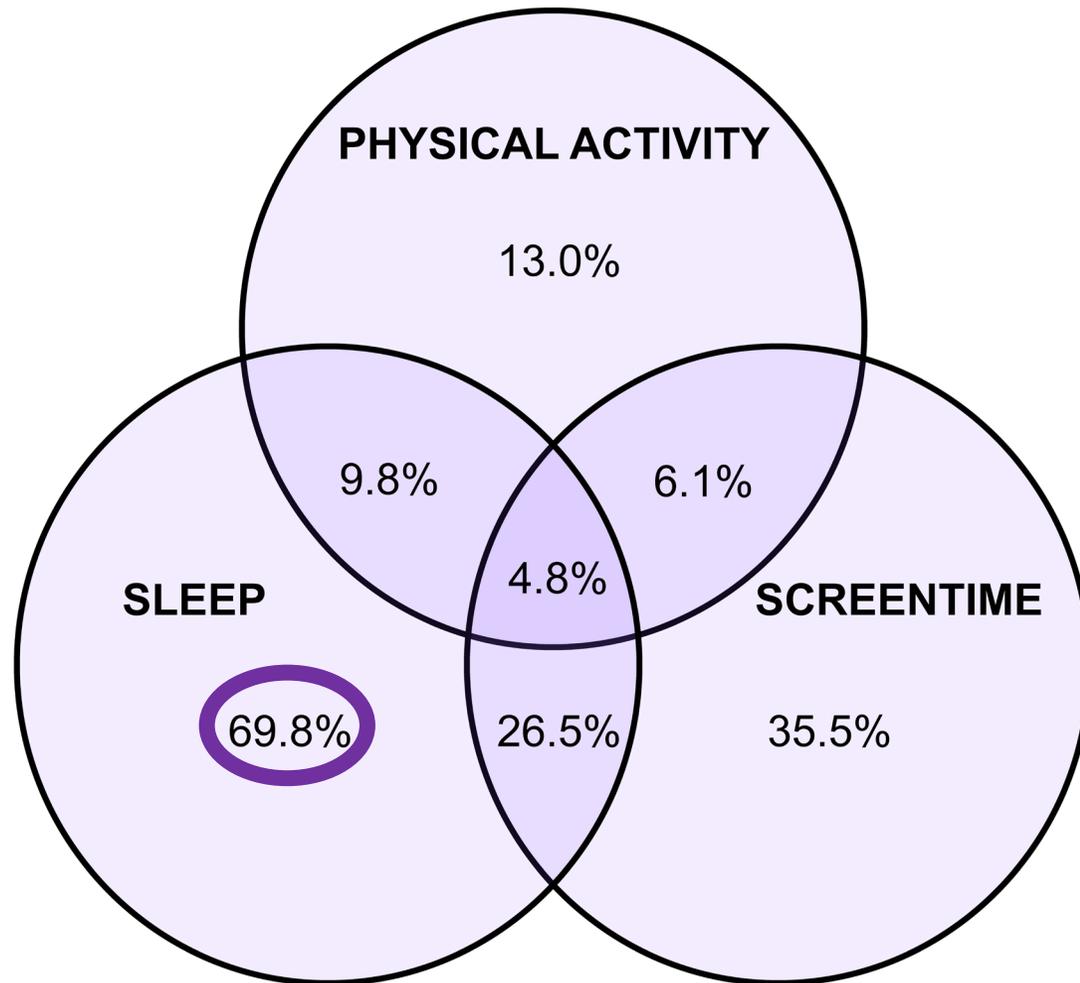
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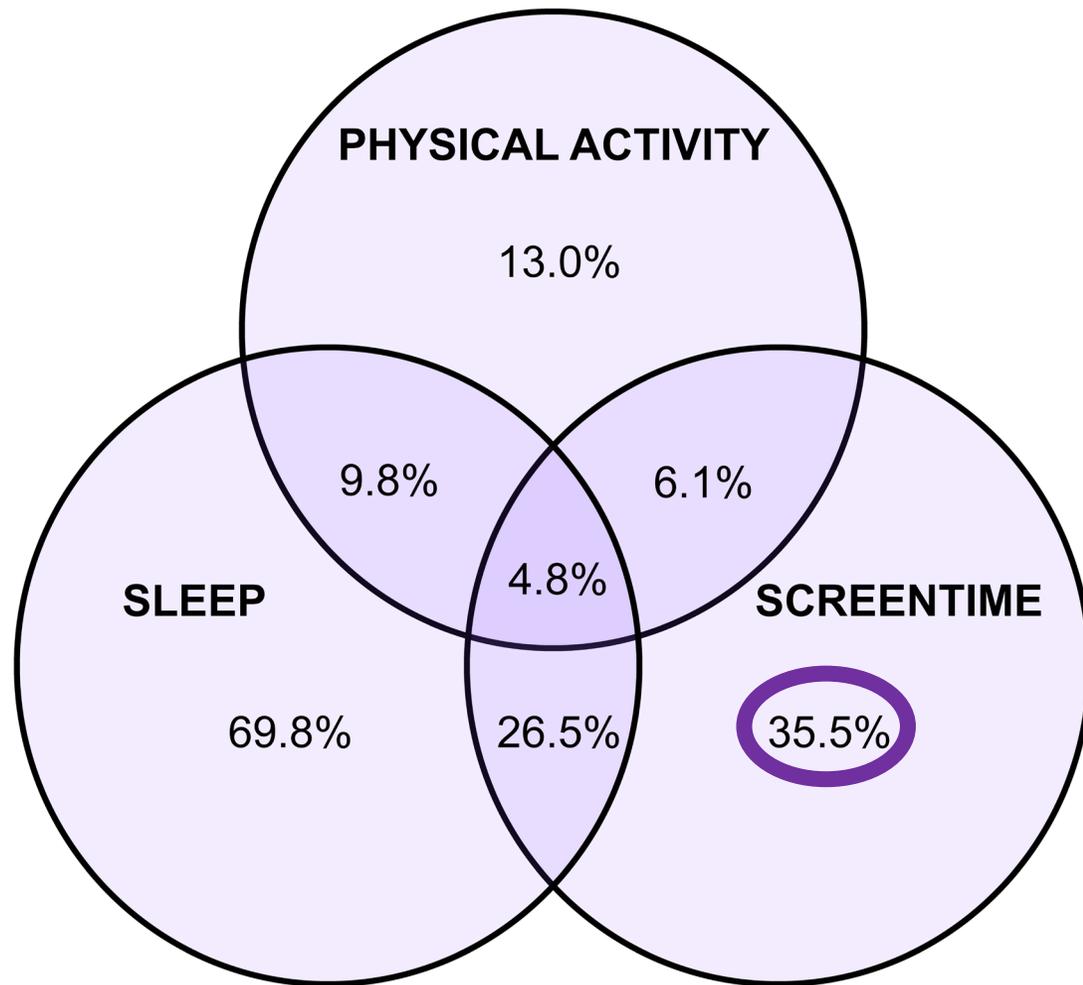
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Ethnicity		
Hispanic	48.3 (38.8 – 57.8)	49.1 (34.7 – 63.4)
Non-Hispanic	51.7 (42.2 – 61.2)	50.9 (36.6 – 65.3)
Parental educational attainment		
Less than high school	15.9 (10.9-20.9)	14.2 (9.1-19.2)
High school diploma or GED	23.2 (20.2-26.1)	27.6 (22.1-33.1)
More than high school	60.9 (54.1-67.7)	58.2 (48.5-68.0)
Sleep duration*		
Less than 8 hours	48.7 (44.4-53.4)	71.0 (64.6-77.5)
8 hours or more	51.3 (46.6-55.9)	29.0 (22.5-35.4)
Daily television (TV) screentime		
Don't watch TV	7.4 (5.7-9.1)	7.5 (5.0-9.9)
Less than 2 hours	36.4 (33.2-39.7)	36.1 (33.9-38.3)
2 hours or more	56.1 (51.7-60.6)	56.4 (53.3-59.6)
Daily video/computer gaming time*		
Don't play video games	32.2 (27.6-36.9)	46.2 (41.0-51.4)
Less than 2 hours	35.5 (30.4-40.6)	29.7 (26.4-33.1)
2 hours or more	32.3 (28.4-36.2)	24.1 (17.9-30.3)



Data from the 2022 National Survey of Children's Health
(subset of youth age 13-17 years)



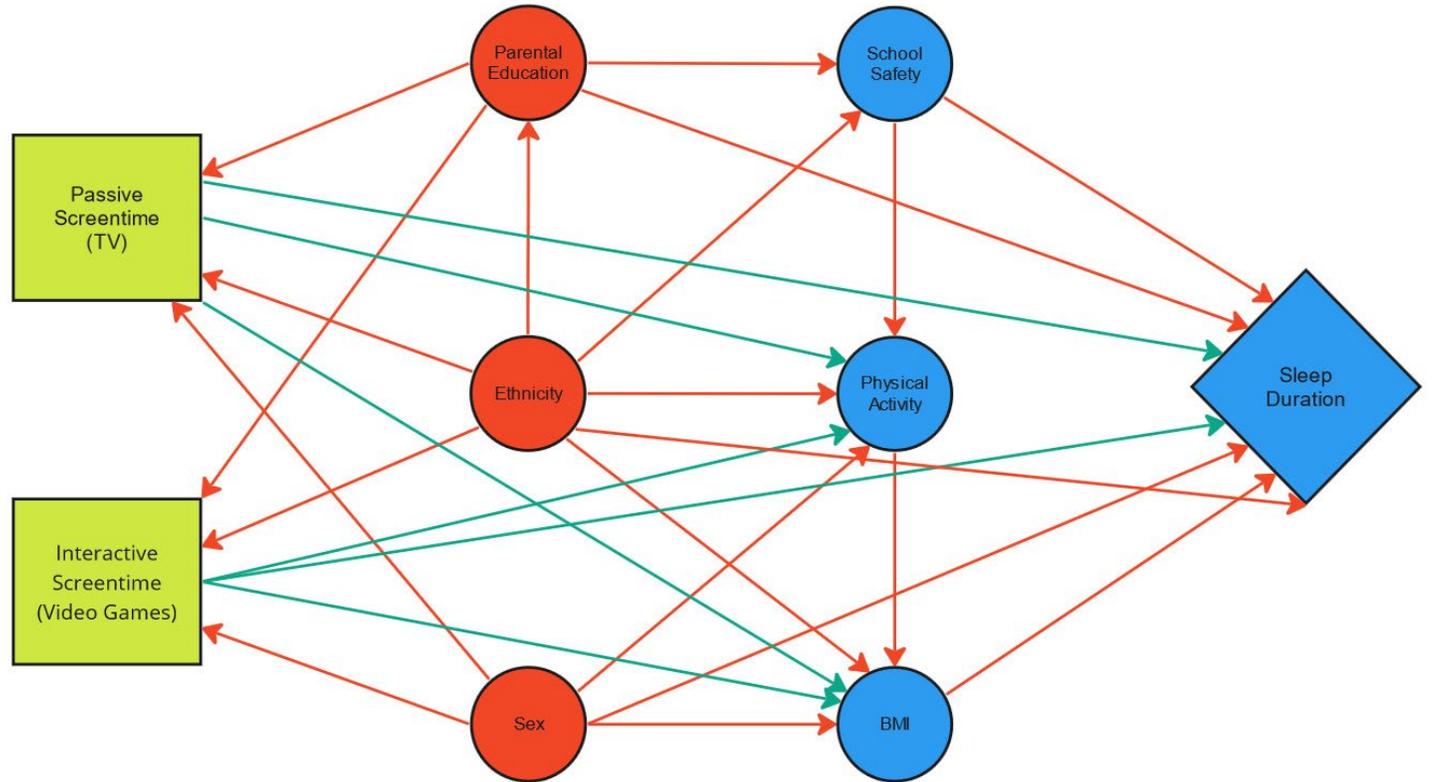
Characteristic	8 th Graders weighted % (95% CI)	11 th Graders weighted % (95% CI)
Unweighted total (n)	4,520	3,382
Weighted total (N)	294,373	289,705
Sex		
Boy	51.0 (46.8–55.2)	50.3 (42.7–57.9)
Girl	49.0 (44.8–53.2)	49.7 (42.1–57.3)
Ethnicity		
Hispanic	48.3 (38.8 – 57.8)	49.1 (34.7 – 63.4)
Non-Hispanic	51.7 (42.2 – 61.2)	50.9 (36.6 – 65.3)
Parental educational attainment		
Less than high school	15.9 (10.9-20.9)	14.2 (9.1-19.2)
High school diploma or GED	23.2 (20.2-26.1)	27.6 (22.1-33.1)
More than high school	60.9 (54.1-67.7)	58.2 (48.5-68.0)
Sleep duration*		
Less than 8 hours	48.7 (44.1-53.4)	71.0 (64.6-77.5)
8 hours or more	51.3 (46.6-55.9)	29.0 (22.5-35.4)
Daily television (TV) screentime		
Don't watch TV	7.4 (5.7-9.1)	7.5 (5.9-9.0)
Less than 2 hours	36.4 (33.2-39.7)	36.1 (33.9-38.3)
2 hours or more	56.1 (51.7-60.6)	56.4 (50.9-61.8)
Daily video/computer gaming time*		
Don't play video games	22.2 (21.5-23.0)	49.2 (41.0-57.4)
Less than 2 hours	35.5 (30.4-40.6)	29.7 (26.4-33.1)
2 hours or more	32.3 (28.4-36.2)	24.1 (17.9-30.3)



Context-specific screentime and sleep: The differential effects of electronic media use type on sleep duration among 8th and 11th grade adolescents in Texas.

Pfledderer, C.D., Ranjit, N., Saxton, D., Ingram, A., Pérez, A., Hoelscher, D., Archer, N.P.

Purpose: to determine whether and how two separate types of electronic media use, specifically TV screentime (passive media use) and time spent video/computer gaming (interactive media use), are associated with short sleep duration among 8th and 11th grade adolescents in a statewide representative sample in Texas, using the 2015-2016 Texas School Physical Activity and Nutrition Survey (Texas SPAN).

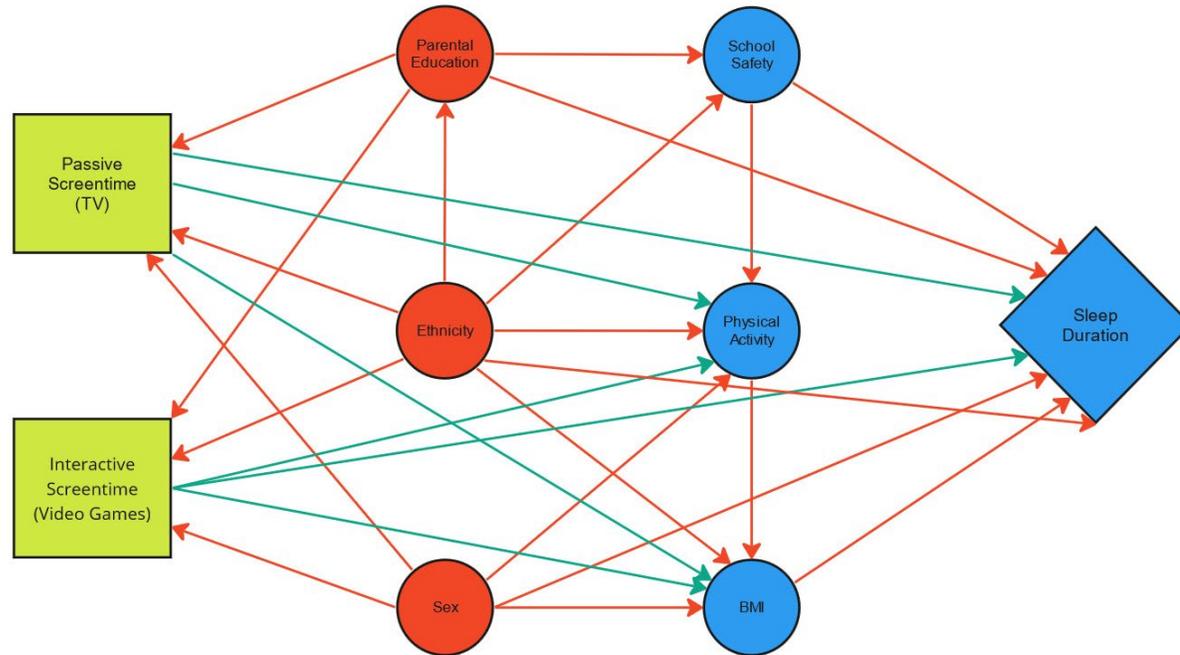


Directed acyclic graph (DAG) including predictors of interest, potential confounding variables, and outcome (sleep duration) for each grade level.



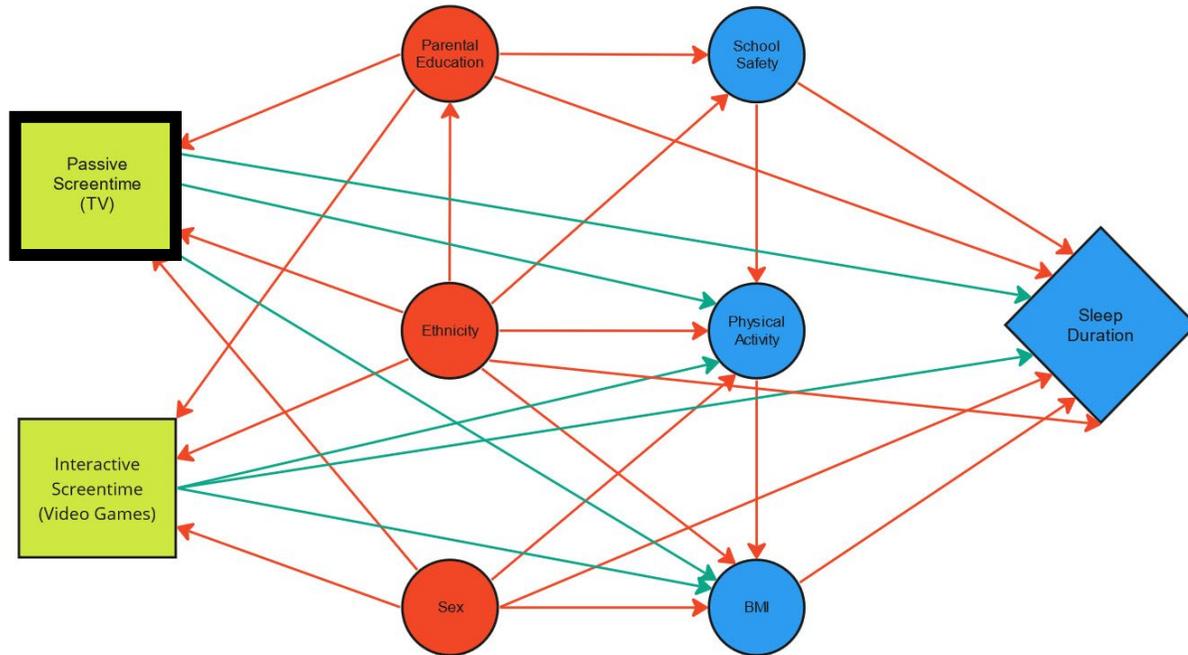
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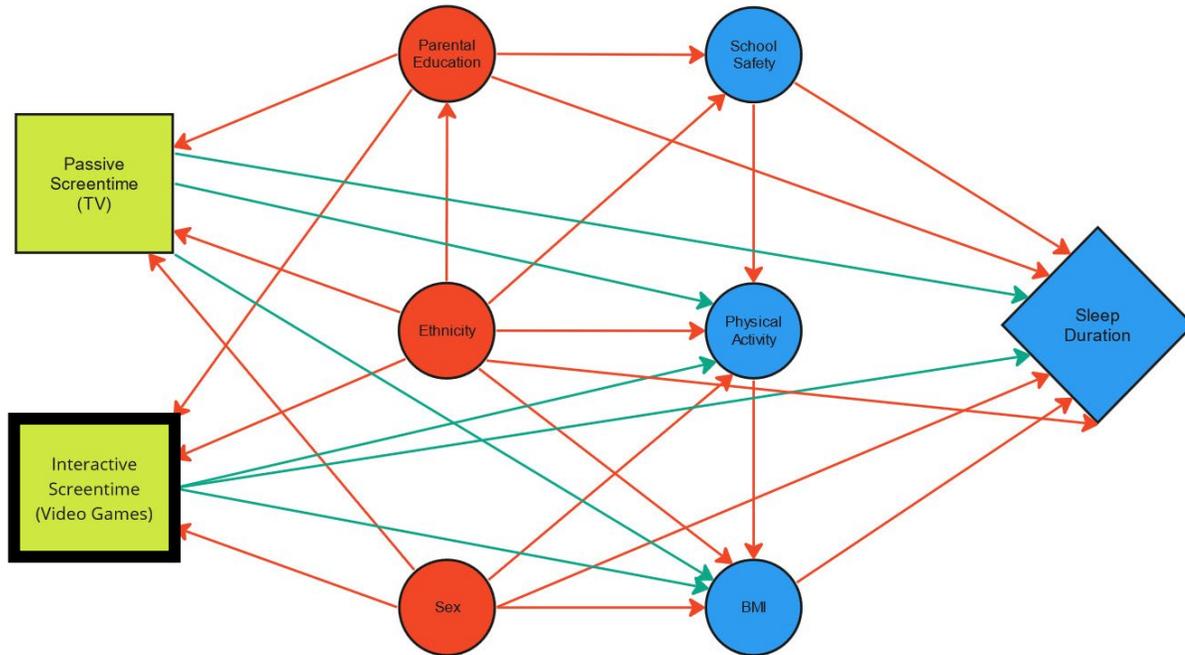


TV screentime had a protective association with sleep duration among 11th grade adolescents



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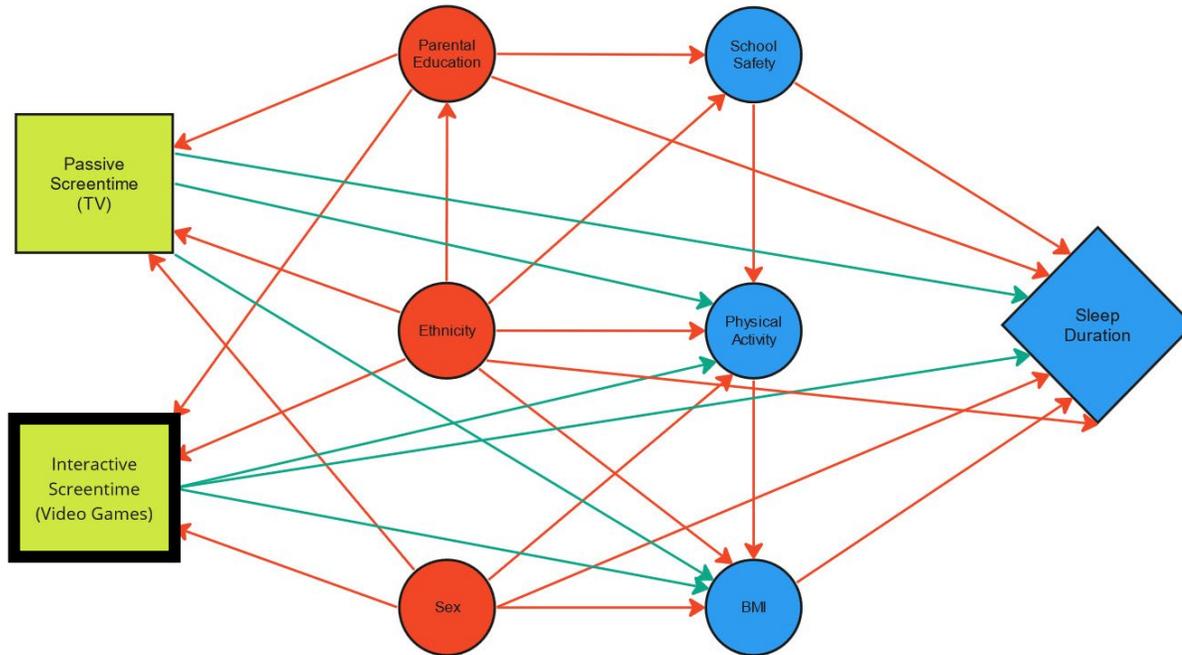


Playing video/computer games was associated with increased odds of short sleep duration among 8th grade adolescents



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Compared to playing no video games...

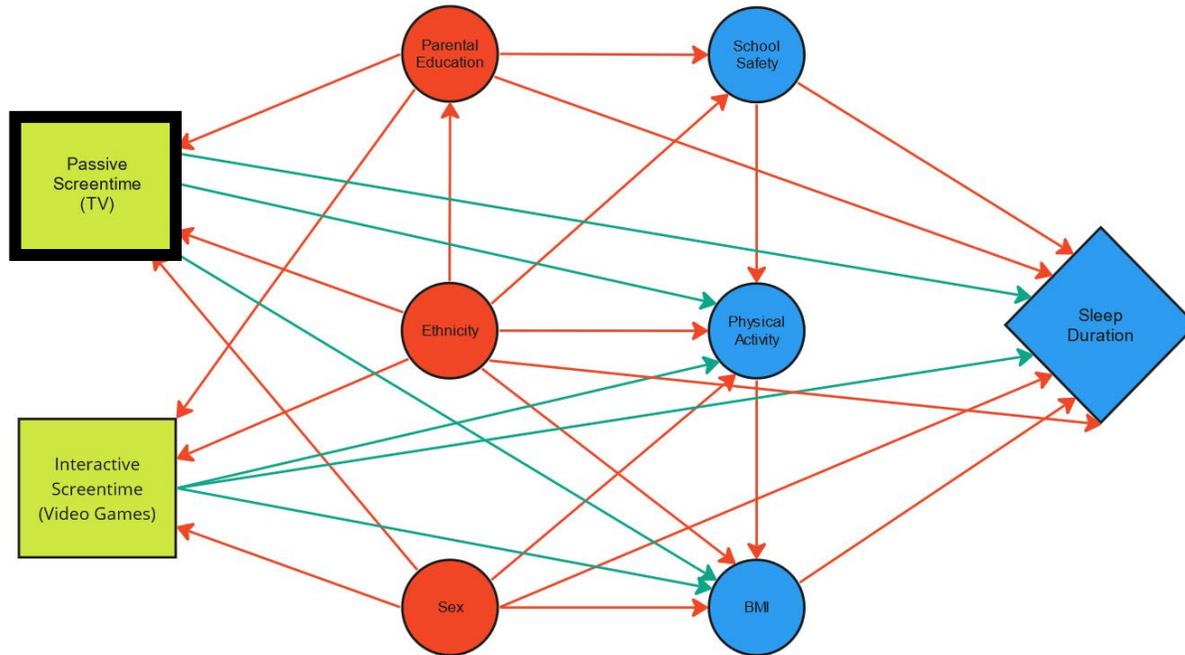
<2 hours associated with 2.8 x the odds of short sleep duration

2+ hours associated with 3.6 x the odds of short sleep duration



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Pfledderer, C.D., Ranjit, N., Saxton, D., Ingram, A., Pérez, A., Hoelscher, D., Archer, N.P.

**Only 8% reported
not watching any
amount of TV**



TV screentime had a protective
effect on sleep duration among
11th grade adolescents



Youth Movement Behaviors

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This is where even MORE contextual information would be helpful...

Only 8% reported not watching any amount of TV



Youth Movement Behaviors

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**Only 8% reported
not watching any
amount of TV**



**This is where even MORE contextual
information would be helpful...**

Do students who watch no TV have busier
schedules?

Are they staying up later to complete
homework or to attend extracurricular
events?

Are there other factors at play?

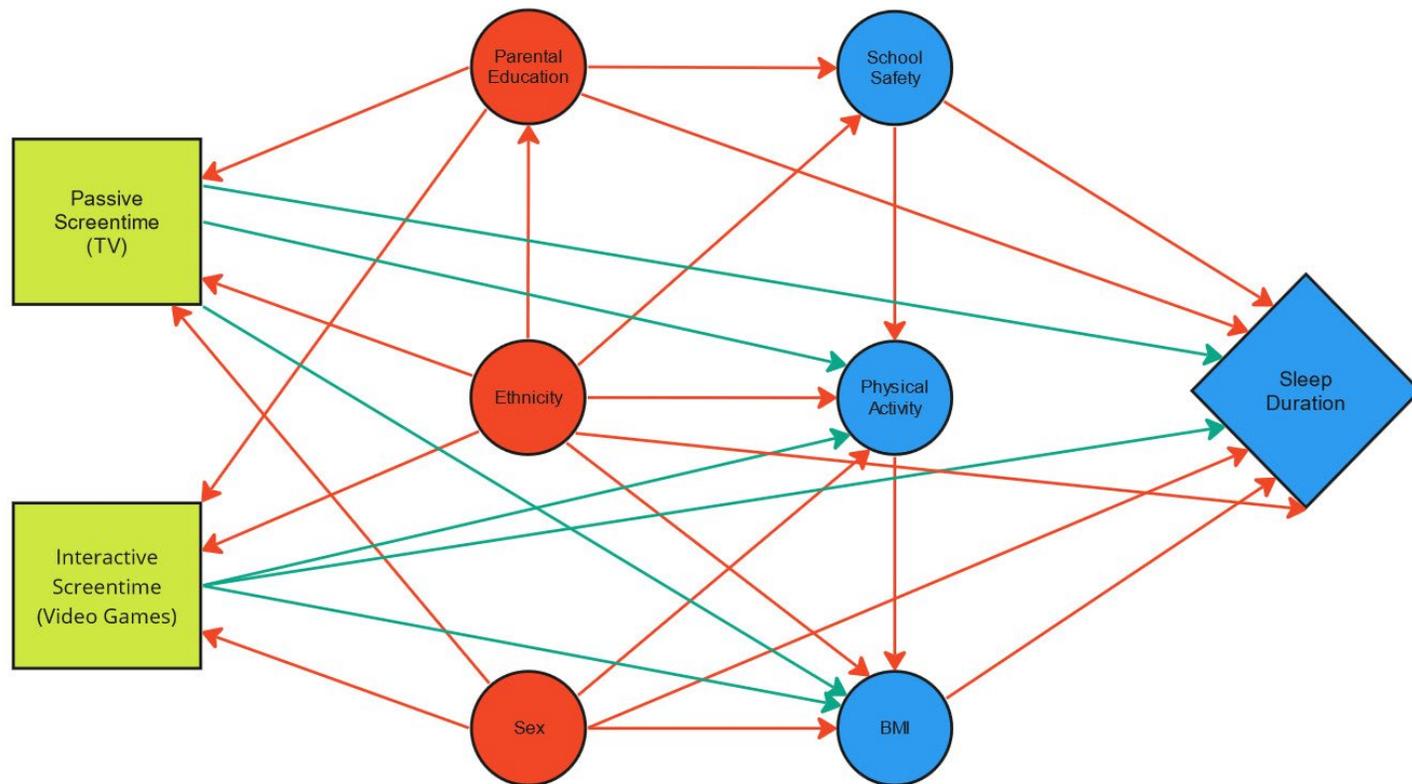


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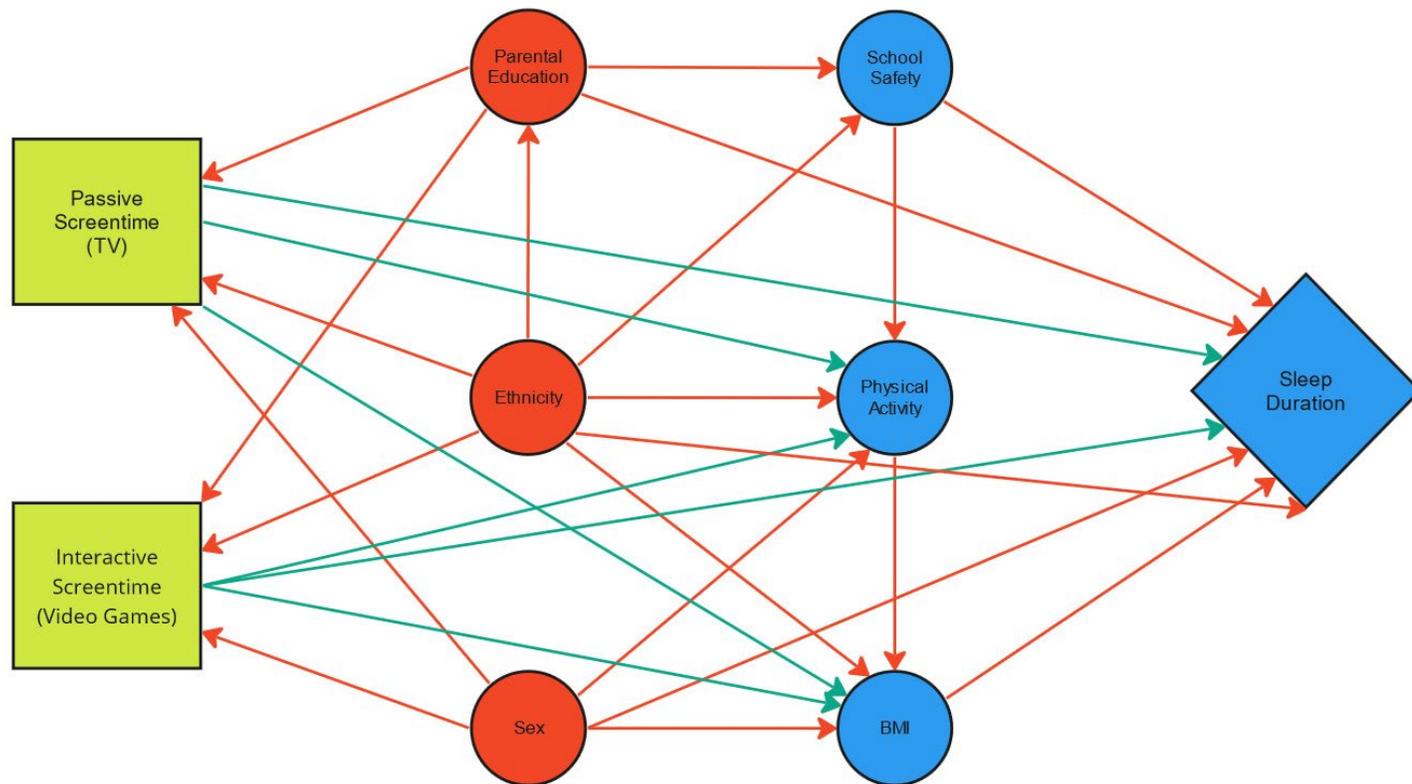
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Not all screentime is created equal

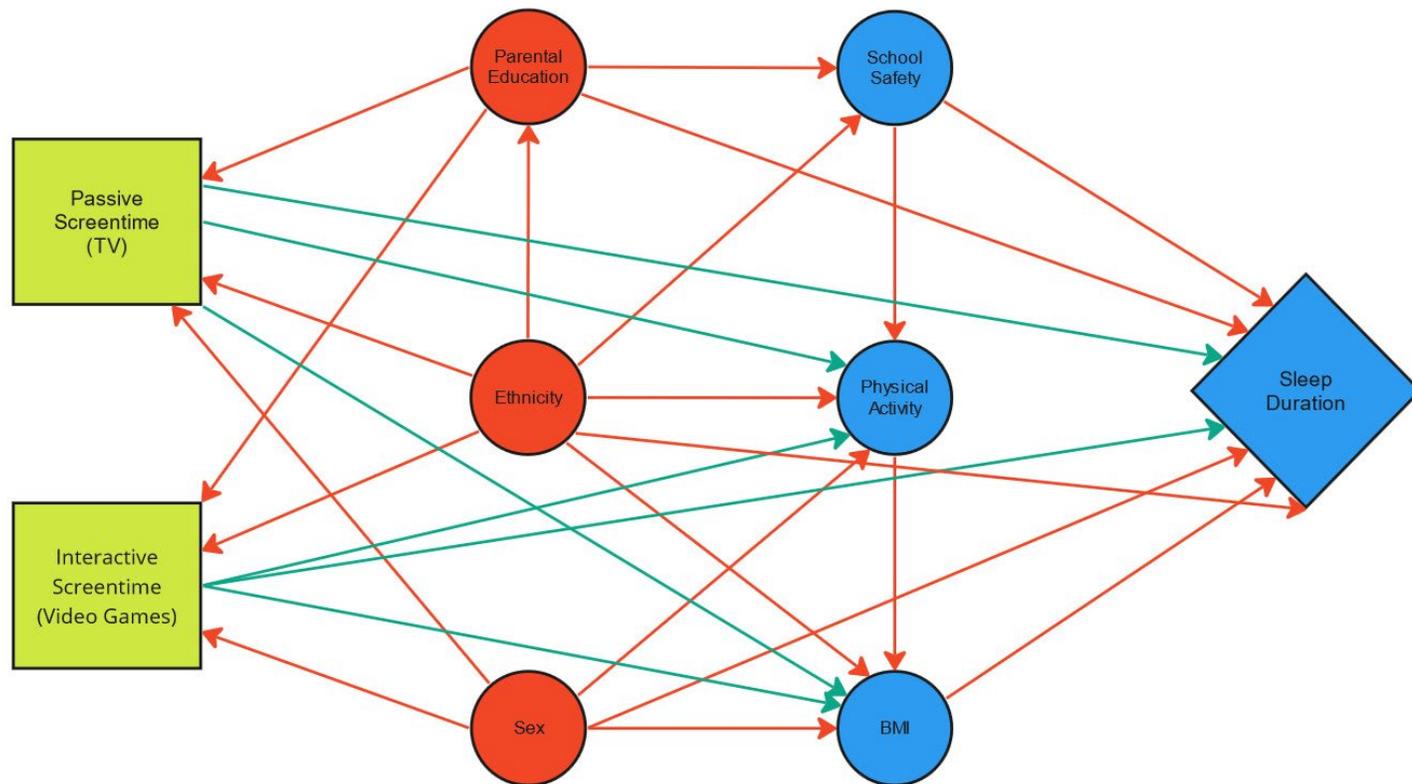


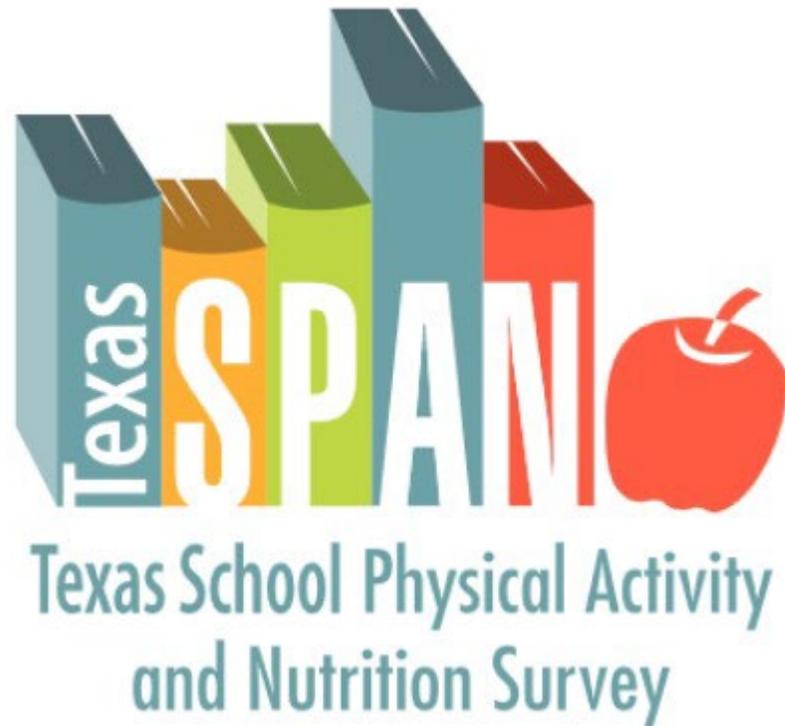
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Not all screentime is created equal

Most studies (and current 24-hr movement recommendations) **treat screentime as a single variable**





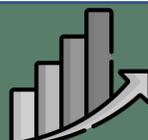
Examining associations between physical activity context and children meeting daily physical activity guidelines: The role of outdoor play, sports, and other organized activities

Pfledderer, C.D., Brown, D.M.Y., Ranjit, N., Springer, A.E., Malkani, R.I., Salvo, D., & Hoelscher, D.M.

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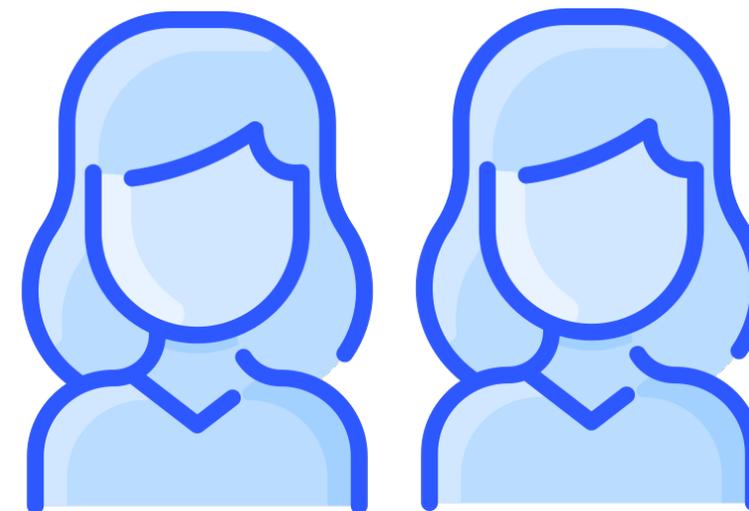
Funded by the Texas Department of State Health Services with funds from the Title V Maternal and Child Health Block Grant to Texas, Centers for Disease Control and Prevention Health and Human Services Block Grant, and the Michael & Susan Dell Foundation through the Michael & Susan Dell Center for Healthy Living.



Next steps in movement behavior research and harnessing the power of context

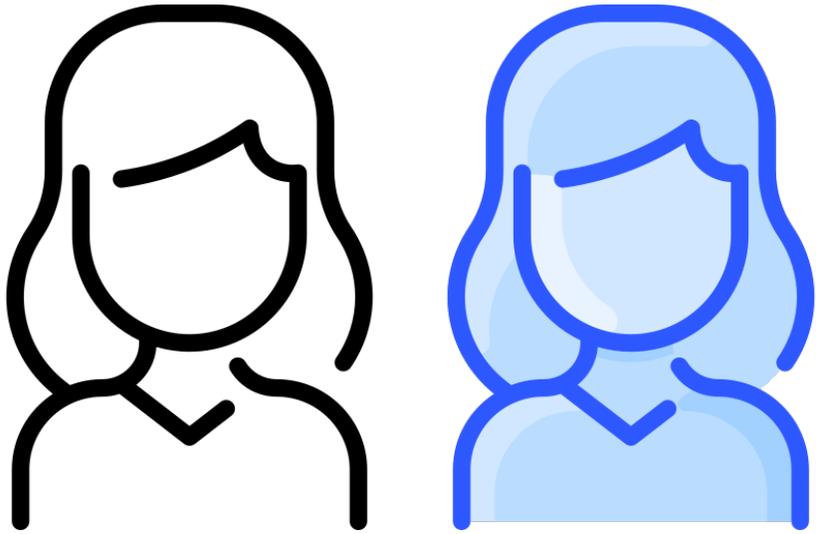


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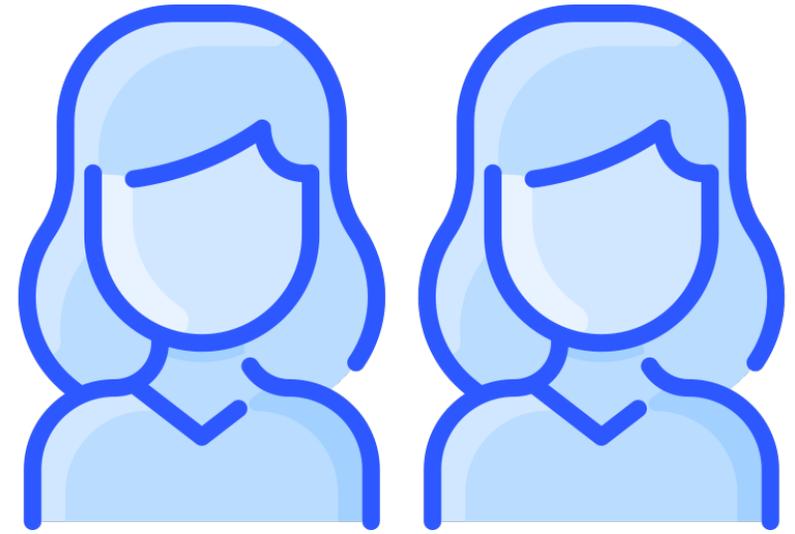


**Within-Person
Research Designs**



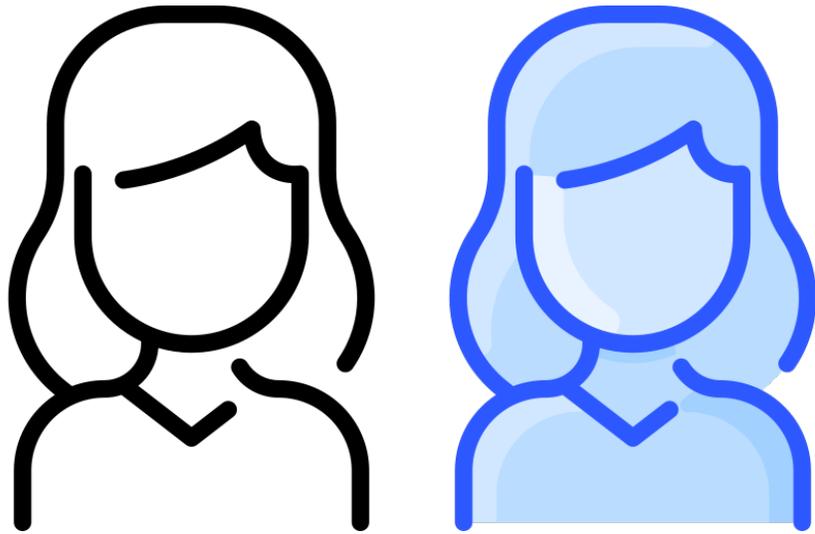


Between-Person



Within-Person



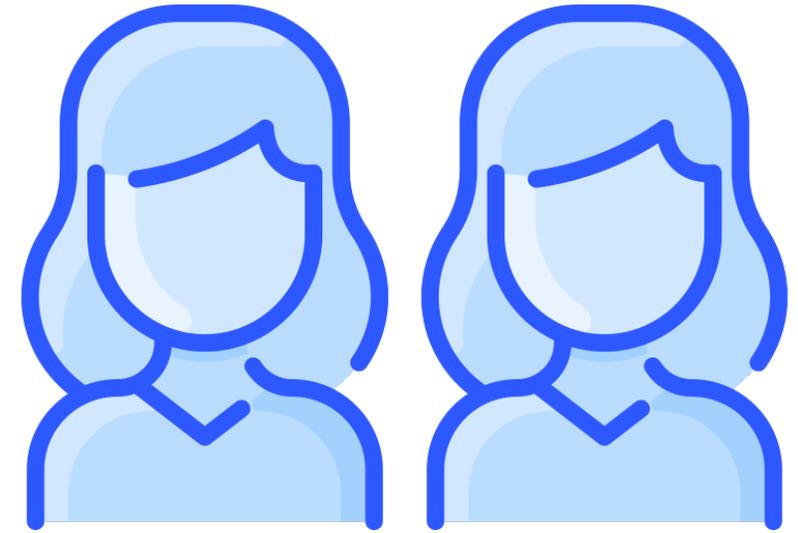


Between-Person

Allows us to answer the question:
“Does a participant in [insert context]
have more/less [insert behavior] than
a participant in [insert context]?”



Allows us to answer the question:
“Does a change in [insert context]
correspond to a change in [insert
behavior] for a given participant?”



Within-Person



Article

Impact of Virtual vs. In-Person School on Children Meeting the 24-h Movement Guidelines during the COVID-19 Pandemic

Christopher D. Pfledderer ^{*}, Michael W. Beets, Sarah Burkart , Elizabeth L. Adams, Robert Glenn Weaver ,
Xuanxuan Zhu and Bridget Armstrong 

Arnold School of Public Health, University of South Carolina, Columbia, SC 29208, USA
^{*} Correspondence: chris.pfledderer@usc.edu

Abstract: The pandemic mitigation strategy of closing schools, while necessary, may have unintentionally impacted children's moderate-to-vigorous physical activity (MVPA), sleep, and time spent watching screens. In some locations, schools used hybrid attendance models, with some days during the week requiring in-person and others virtual attendance. This scenario offers an opportunity to evaluate the impact of attending in-person school on meeting the 24-h movement guidelines. Children ($N = 690$, 50% girls, K–5th) wore wrist-placed accelerometers for 14 days during October/November 2020. Parents completed daily reports on child time spent on screens and time spent on screens for school. The schools' schedule was learning for 2 days/week in-person and 3 days/week virtually. Using only weekdays (M–F), the 24-h movement behaviors were classified, and the probability of meeting all three was compared between in-person vs. virtual learning and across grades. Data for 4956 weekdays (avg. 7 d/child) were collected. In-person school was associated with a greater proportion (OR = 1.70, 95% CI: 1.33–2.18) of days that children were meeting the 24-h movement guidelines compared to virtual school across all grades. Students were more likely to meet the screen time (OR = 9.14, 95% CI: 7.05–11.83) and MVPA (OR = 1.50, 95% CI: 1.25–1.80) guidelines and less likely to meet the sleep (OR = 0.73, 95% CI: 0.62–0.86) guidelines on the in-person compared to the virtual school days. Structured environments, such as school, have a protective effect on children's movement behaviors, especially physical activity and screen time.

Keywords: school-based physical activity; youth physical activity promotion; children; youth



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1. Background

The 24-h movement guidelines for youth outline an optimal composition of movement behaviors for the 24-h day. For youth aged 5–13 years, the guidelines recommend 60 min per day of moderate to vigorous physical activity (MVPA), 9–11 h of sleep per night, and no more than 2 h per day of recreational screen time [1]. The guidelines have been adopted by several countries and agencies for multiple age groups [2–5], and many researchers have integrated the guidelines in their research designs for both observational and intervention-based research [6]. Meeting the youth 24-h movement guidelines is associated with lower adiposity [7], higher fitness [8], better dietary patterns [9], mental health [10], and health-related quality of life [11]. While the 24-h movement guidelines are important for children to achieve daily, the pandemic mitigation strategy of closing schools to slow the spread of the novel SARS-2 COVID virus may have had an unintended impact on children's MVPA, sleep, and time spent watching screens.

At the height of the pandemic, multiple mitigation strategies were adopted by K–12 schools. These included the following: (1) schools completely shut down, with all students receiving online instructions, (2) alternating school days (hybrid), in which half of the students receive in-person instructions some days of the week and virtual on others, and (3) families opting to have their children receive in-person or online instructions [12].



Article

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Fall 2020

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Youth Movement Behaviors

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Fall 2020 Hybrid Attendance

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Youth Movement Behaviors

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Fall 2020 Hybrid Attendance Daily Diaries

1. Background

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Article

Impact of Virtual vs. In-Person School on Children Meeting the 24-h Movement Guidelines during the COVID-19 Pandemic

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Fall 2020 Hybrid Attendance Daily Diaries Accelerometry

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Fall 2020 Hybrid Attendance Daily Diaries Accelerometry 14 days 690 children



Youth Movement Behaviors

Article

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Hybrid Attendance Daily Diaries Accelerometry

Objective measures



Youth Movement Behaviors

Article

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Objective measures

Context



Youth Movement Behaviors

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Within-person analysis

Hybrid Attendance Daily Diaries Accelerometry

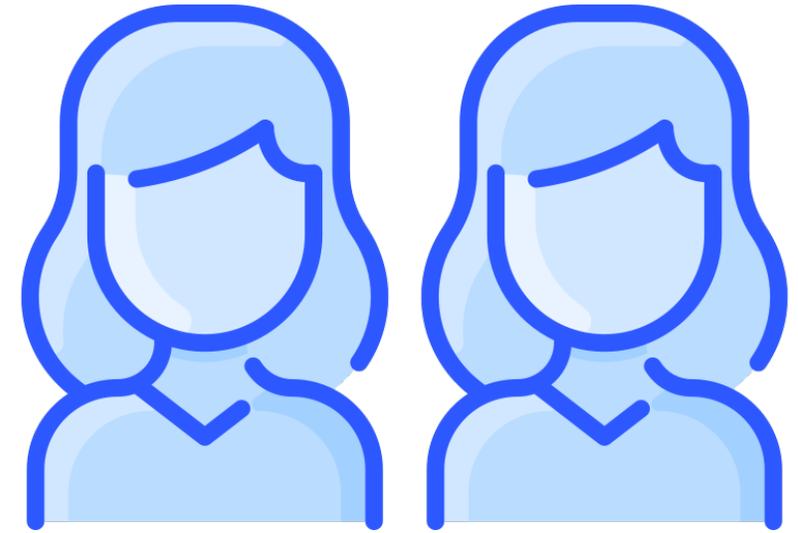
Objective measures

Context



Youth Movement Behaviors

Allows us to answer the question:
“Does a change in [insert context]
correspond to a change in [insert
behavior] for a given participant?”



Within-Person



Article

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Does a change in school setting correspond to a change in movement behaviors for a given participant?

1. Background

The 24-h movement guidelines for youth outline an optimal composition of movement behaviors for the 24-h day. For youth aged 5–13 years, the guidelines recommend 60 min per day of moderate to vigorous physical activity (MVPA), 9–11 h of sleep per night, and no more than 2 h per day of recreational screen time [1]. The guidelines have been adopted by several countries and agencies for multiple age groups [2–5], and many researchers have integrated the guidelines in their research designs for both observational and intervention-based research [6]. Meeting the youth 24-h movement guidelines is associated with lower adiposity [7], higher fitness [8], better dietary patterns [9], mental health [10], and health-related quality of life [11]. While the 24-h movement guidelines are important for children to achieve daily, the pandemic mitigation strategy of closing schools to slow the spread of the novel SARS-2 COVID virus may have had an unintended impact on children's MVPA, sleep, and time spent watching screens.

At the height of the pandemic, multiple mitigation strategies were adopted by K–12 schools. These included the following: (1) schools completely shut down, with all students receiving online instructions, (2) alternating school days (hybrid), in which half of the students receive in-person instructions some days of the week and virtual on others, and (3) families opting to have their children receive in-person or online instructions [12].



Youth Movement Behaviors

Article

Impact of Virtual vs. In-Person School on Children Meeting the 24-h Movement Guidelines during the COVID-19 Pandemic

Christopher D. Pfledderer ^{*}, Michael W. Beets, Sarah Burkart, Elizabeth L. Adams, Robert Glenn Weaver, Xuanxuan Zhu and Bridget Armstrong

Arnold School of Public Health, University of South Carolina, Columbia, SC 29208, USA
* Correspondence: chris.pfledderer@usc.edu

Abstract: The pandemic mitigation strategy of closing schools, while necessary, may have unintentionally impacted children's moderate-to-vigorous physical activity (MVPA), sleep, and time spent watching screens. In some locations, schools used hybrid attendance models, with some days during the week requiring in-person and others virtual attendance. This scenario offers an opportunity to evaluate the impact of attending in-person school on meeting the 24-h movement guidelines. Children (N = 690, 50% girls, K–5th) wore wrist-placed accelerometers for 14 days during October/November 2020. Parents completed daily reports on child time spent on screens and time spent on screens for school. The schools' schedule was learning for 2 days/week in-person and 3 days/week virtually. Using only weekdays (M–F), the 24-h movement behaviors were classified, and the probability of meeting all three was compared between in-person vs. virtual learning and across grades. Data for 4956 weekdays (avg. 7 d/child) were collected. In-person school was associated with a greater proportion (OR = 1.70, 95% CI: 1.33–2.18) of days that children were meeting the 24-h movement guidelines compared to virtual school across all grades. Students were more likely to meet the screen time (OR = 0.14, 95% CI: 7.05–11.83) and MVPA (OR = 1.50, 95% CI: 1.25–1.80) guidelines and less likely to meet the sleep (OR = 0.73, 95% CI: 0.62–0.86) guidelines on the in-person compared to the virtual school days. Structured environments, such as school, have a protective effect on children's movement behaviors, especially physical activity and screen time.

Keywords: school-based physical activity; youth physical activity promotion; children; youth



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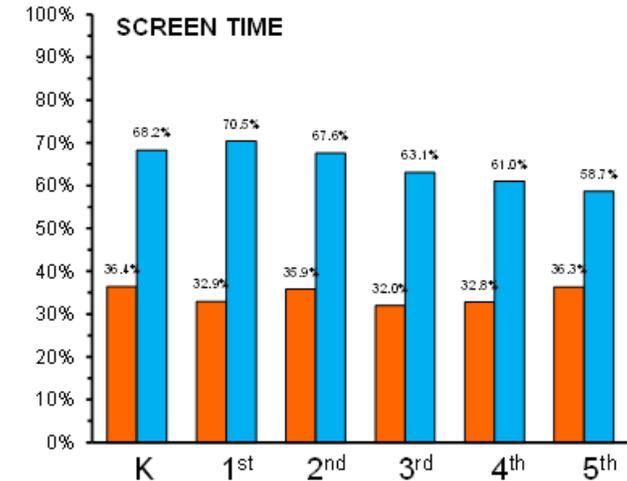
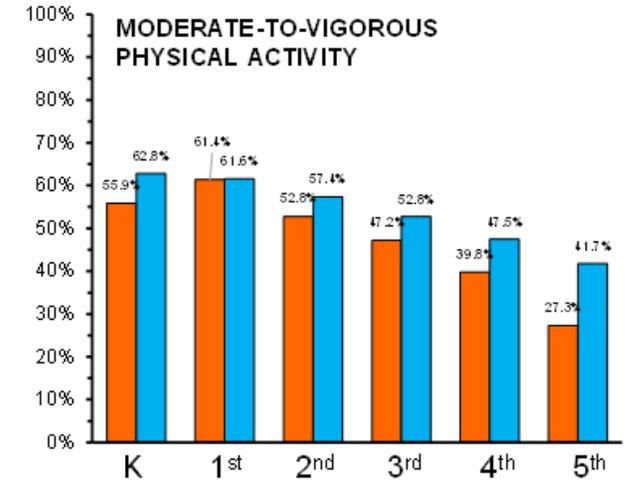
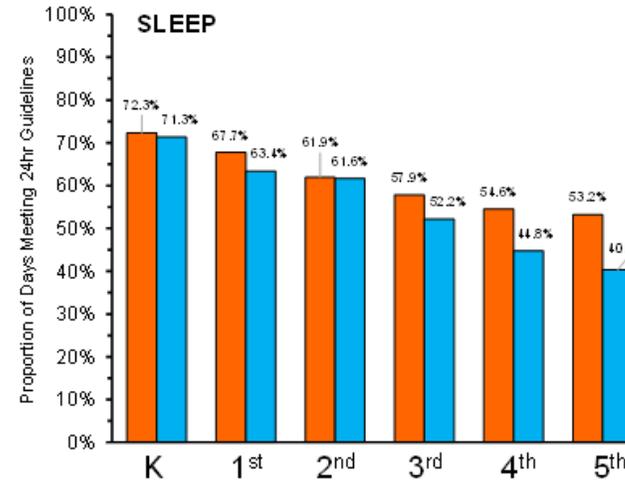
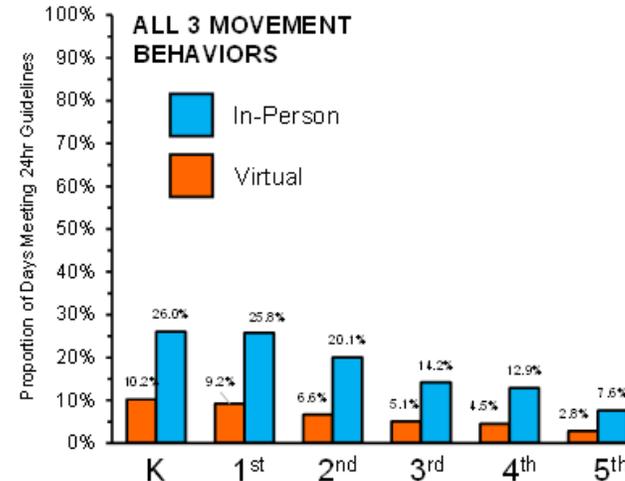
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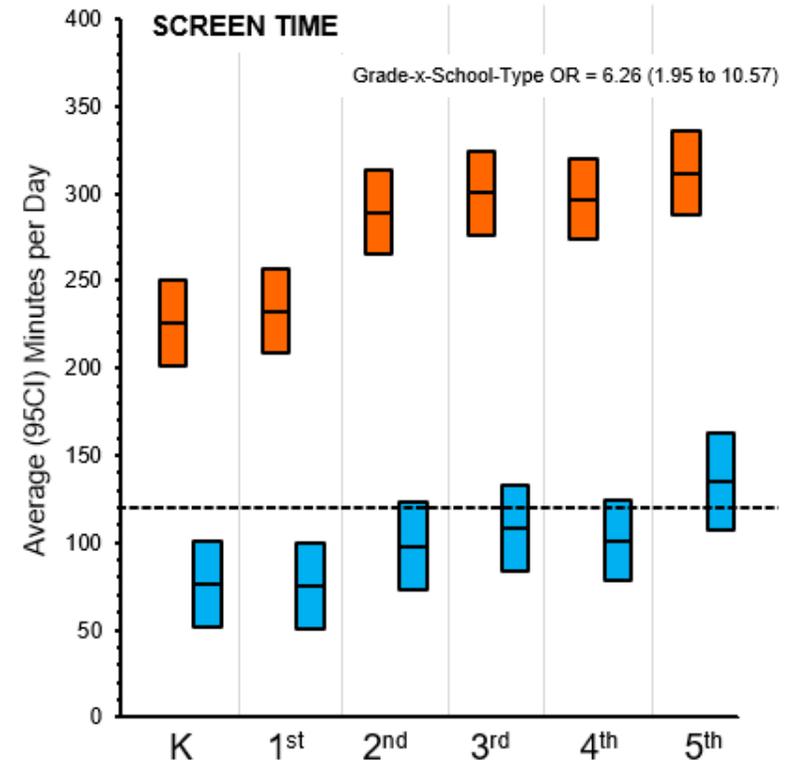
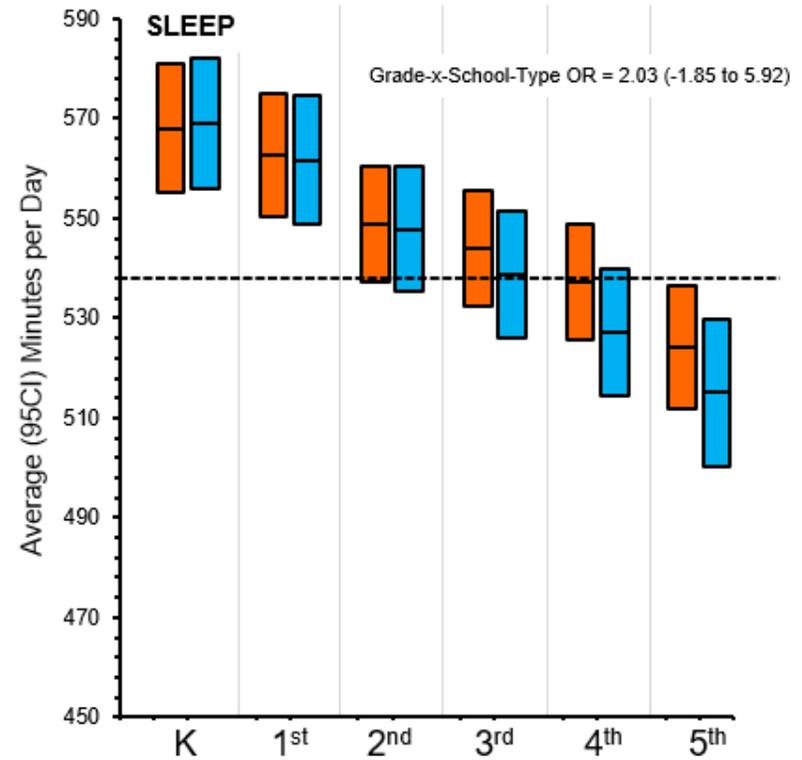
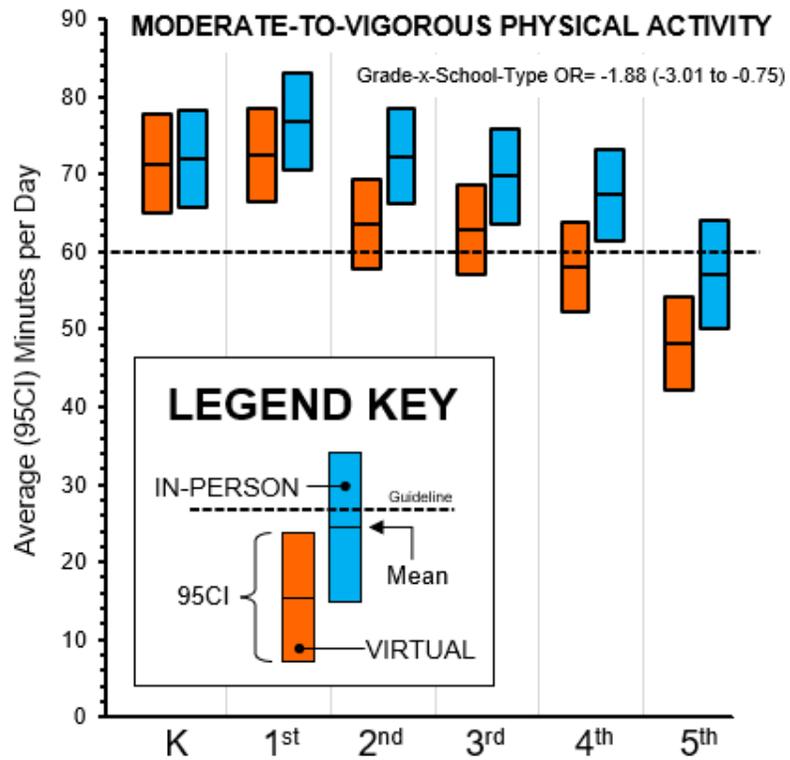
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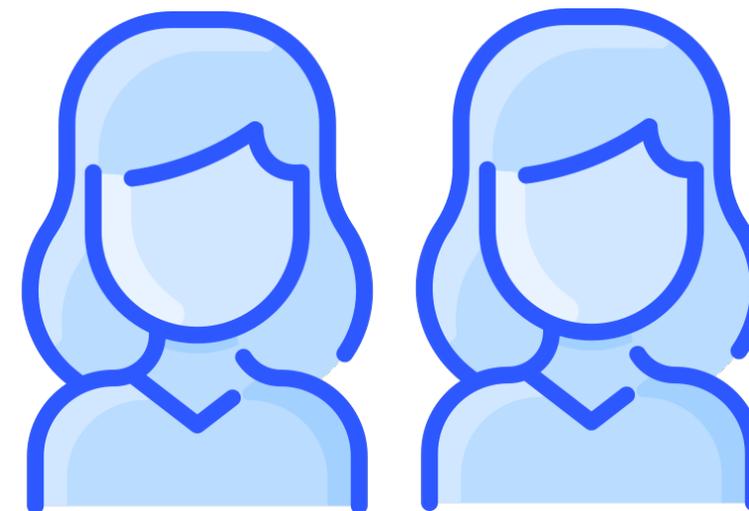


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Next steps in movement behavior research and harnessing the power of context



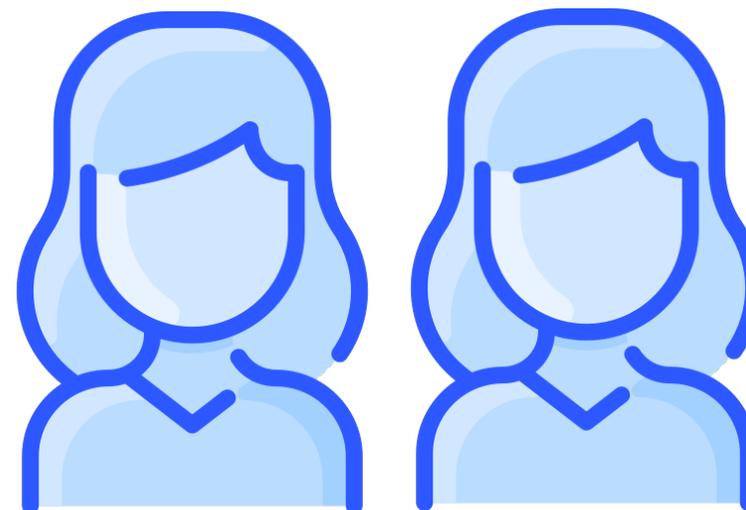
**Within-Person
Research Designs**



Challenging to conduct

Carry-over effects need to be accounted for

Difficult to scale at a population level

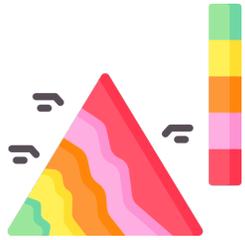


**Within-Person
Research Designs**



Next steps in movement behavior research and harnessing the power of context





Advances in 24-hr movement
behavior analyses
(CoDA, isotemporal substitution,
longitudinal methodology)



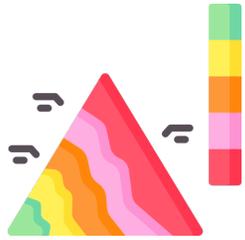


Advances in 24-hr movement
behavior analyses
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Methodological heterogeneity
needs to be addressed

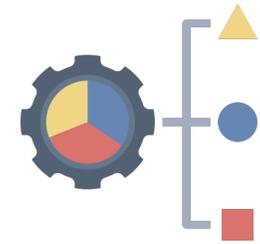




Advances in 24-hr movement behavior analyses
(CoDA, isothermal substitution, longitudinal methodology)

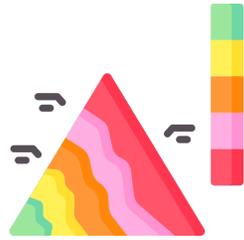


Methodological heterogeneity needs to be addressed



Identifying optimal compositions of 24-hr movement behaviors for a host of health outcomes

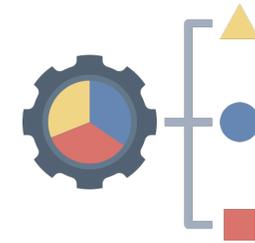




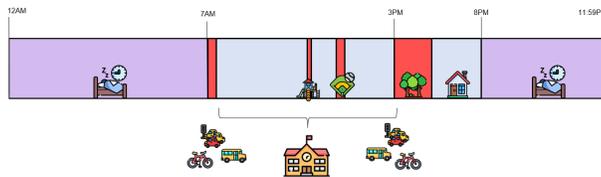
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Methodological heterogeneity needs to be addressed

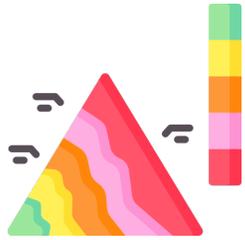


Identifying optimal compositions of 24-hr movement behaviors for a host of health outcomes



Advances in methods to contextualize 24-hr movement behaviors

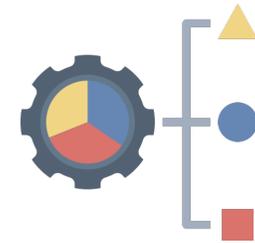




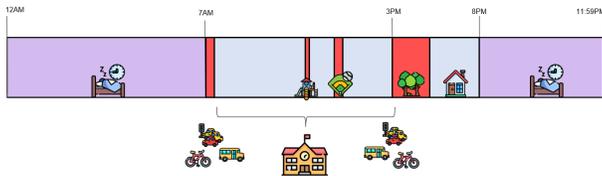
Advances in 24-hr movement behavior analyses (CoDA, isotemporal substitution, longitudinal methodology)



Methodological heterogeneity needs to be addressed



Identifying optimal compositions of 24-hr movement behaviors for a host of health outcomes

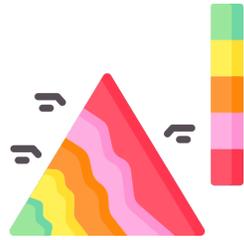


Advances in methods to contextualize 24-hr movement behaviors



Context-specific research paves the way for context-specific intervention strategies

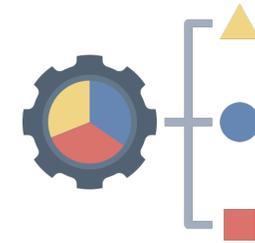




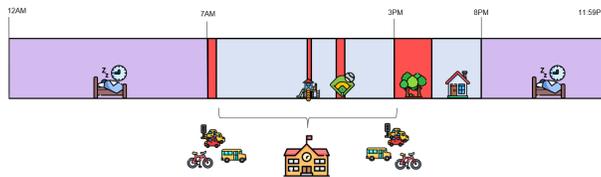
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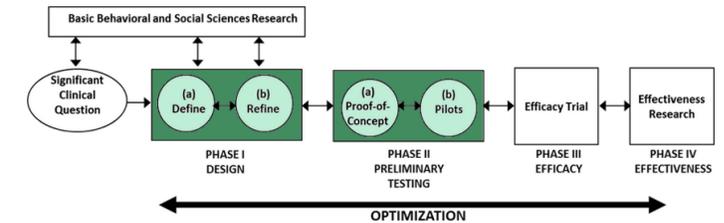
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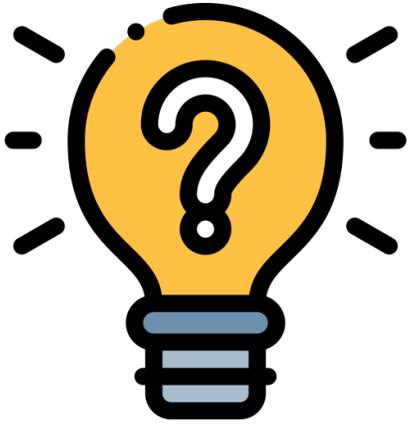


Context-specific research paves the way for context-specific intervention strategies



Intervention scalability issues still remain





Thank You!

Questions?

Contact

Christopher D. Pfladderer, PhD

Assistant Professor

University of Texas Health Science Center Houston

School of Public Health in Austin

Michael & Susan Dell Center for Healthy Living

Email

christopher.d.pfladderer@uth.tmc.edu



Youth Movement Behaviors

Thank you!

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