

ADDRESSING DISPARITIES IN PEDIATRIC OBESITY: SUMMER IS ONE OF THE MOST INEQUITABLE TIMES OF YEAR

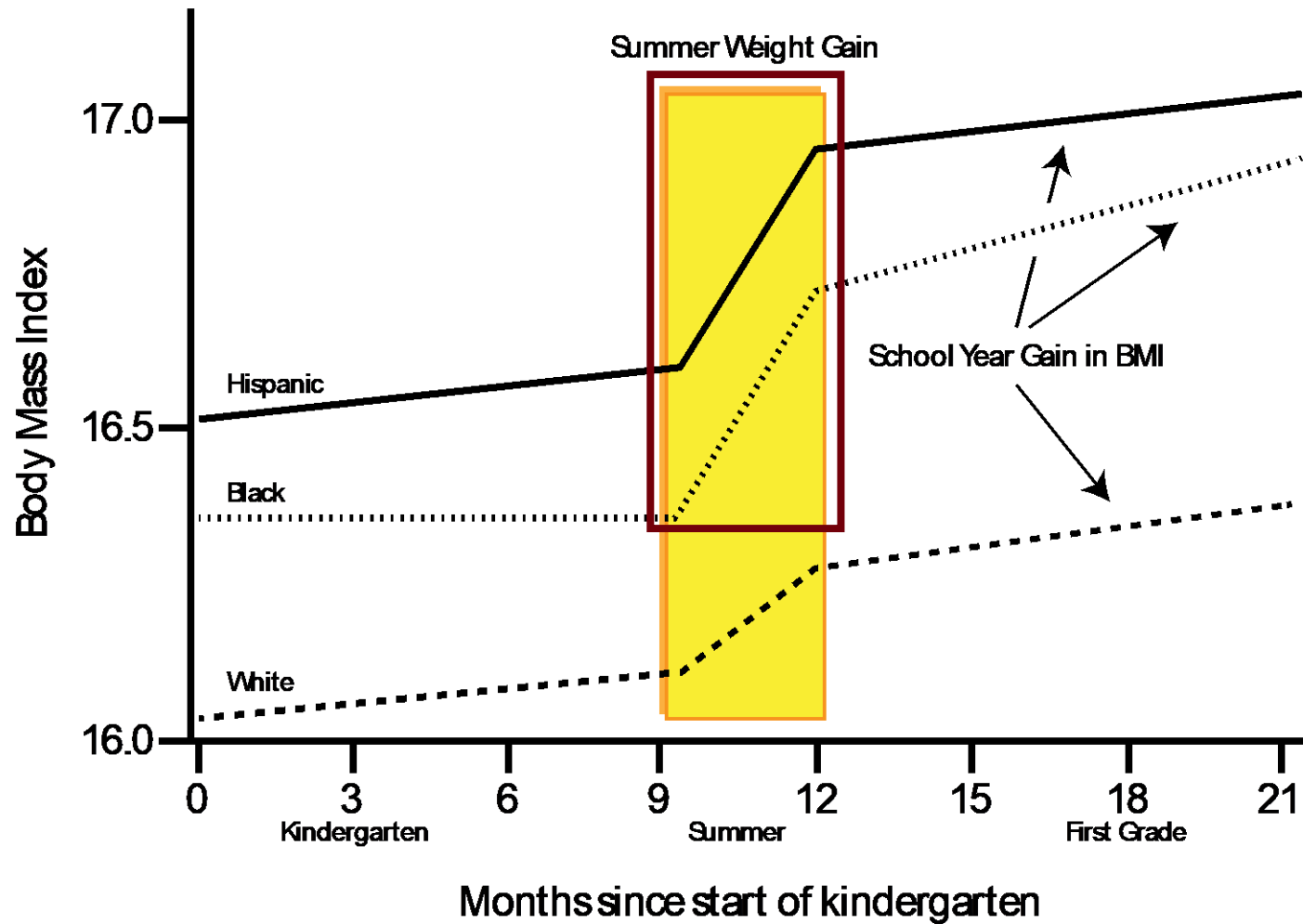
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RESEARCH AND PRACTICE

The Effect of School on Overweight in Childhood: Gain in Body Mass Index During the School Year and During Summer Vacation

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Over the past 2 decades, the prevalence of overweight among young US schoolchildren has tripled, from 5% to 15% among the 6- to 11-year-old population.¹⁻³ Overweight is especially common among young Black and Hispanic schoolchildren, approximately 20% of whom are now overweight.² (Following conventional usage, we apply the label "overweight" to children whose body mass index [BMI] exceeds the 95th percentile on the Centers for Disease Control and Prevention's [CDC's] BMI-for-age charts⁴; these charts give the age-specific BMI distribution that prevailed before recent increases in BMI. Some researchers use the label "obese" for certain overweight children, but the word "obese" is not as clearly defined for children as it is for adults.⁵)

In seeking explanations for childhood overweight, some observers have pointed to schools, which 1 critic has called "obesity zones."^{6,7} Schools have been faulted for serving fattening lunches,⁸ for scheduling inadequate time for exercise,⁹ and for allowing packaged-food and soft drink companies to install vending machines.^{7,10} Other observers, by contrast, have pointed to influences outside the school walls, suggesting that childhood overweight results from children overconsuming fast food and energy-dense convenience foods,^{12,13} from a lack of sidewalks or recreational areas in many housing developments,¹⁴ from excessive television viewing,⁵ and from reductions in parental supervision as more mothers enter the workforce.¹⁶

Although each of these specific factors may have some effect, it is unclear in general whether childhood overweight arises primarily from school or nonschool influences. This issue is fundamental because it can help to focus future efforts. For example, if the major sources of overweight reside inside school walls, then interventions should focus on improving the school environment. By contrast,

Objectives. To determine whether school or nonschool environments contribute more to childhood overweight, we compared children's gains in body mass index (BMI) when school is in session (during the kindergarten and first-grade school years) with their gains in BMI when school is out (during summer vacation).

Methods. The BMIs of 5380 children in 310 schools were measured as part of the Early Childhood Longitudinal Study, Kindergarten Cohort. We used these measurements to estimate BMI gain rates during kindergarten, summer, and first grade.

Results. Growth in BMI was typically faster and more variable during summer vacation than during the kindergarten and first-grade school years. The difference between school and summer gain rates was especially large for 3 at-risk subgroups: Black children, Hispanic children, and children who were already overweight at the beginning of kindergarten.

Conclusions. Although a school's diet and exercise policies may be less than ideal, it appears that early school environments contribute less to overweight than do nonschool environments. (*Am J Public Health*. 2007;97:696-702. doi:10.2105/AJPH.2005.080754)

if the major sources of overweight are found outside of schools, then interventions that improve or compensate for the nonschool environment may be more promising.

Disentangling the effects of school and nonschool environments poses a methodological challenge. It is difficult to measure—or even to identify—all of the school and nonschool influences on body mass index (BMI). And it is both impractical and unethical to run a clinical trial in which the school "treatment" is offered to some children but withheld from others.

Fortunately, the structure of the school calendar allows us to observe children under both school and nonschool conditions. During the school year, children are exposed to a mix of school and nonschool influences, but during summer vacation they are exposed to nonschool influences alone.^{17,18} If overweight arises primarily from school influences, we would expect accelerated BMI gains during the school year. By contrast, if overweight arises primarily from nonschool influences, we would expect accelerated BMI gains during summer vacation.

Our main objective, then, was to compare school and nonschool influences on children's BMI by estimating children's rates of gain

when they are in school (during the academic year) and when they are out of school (during summer vacation). Our study design was roughly analogous to a crossover trial, in which every participant is exposed to a period of school treatment and a period of nonschool treatment. The natural experiment afforded by the school calendar, though, differs from an ideal crossover trial in 2 important ways.

First, in a crossover trial, different groups would be rotated through the school treatment at different times; however, in US schools, nearly all children are exposed to the school treatment at about the same time, so the school treatment is confounded with the season of the year. Second, some children attend school during summer and thus cannot be observed outside the school environment. We excluded such children from our primary analyses, although later we discuss secondary analyses in which they were compared with other children.

METHODS

Data

To estimate school-year and summer changes in BMI, we used data from a survey

WHY?

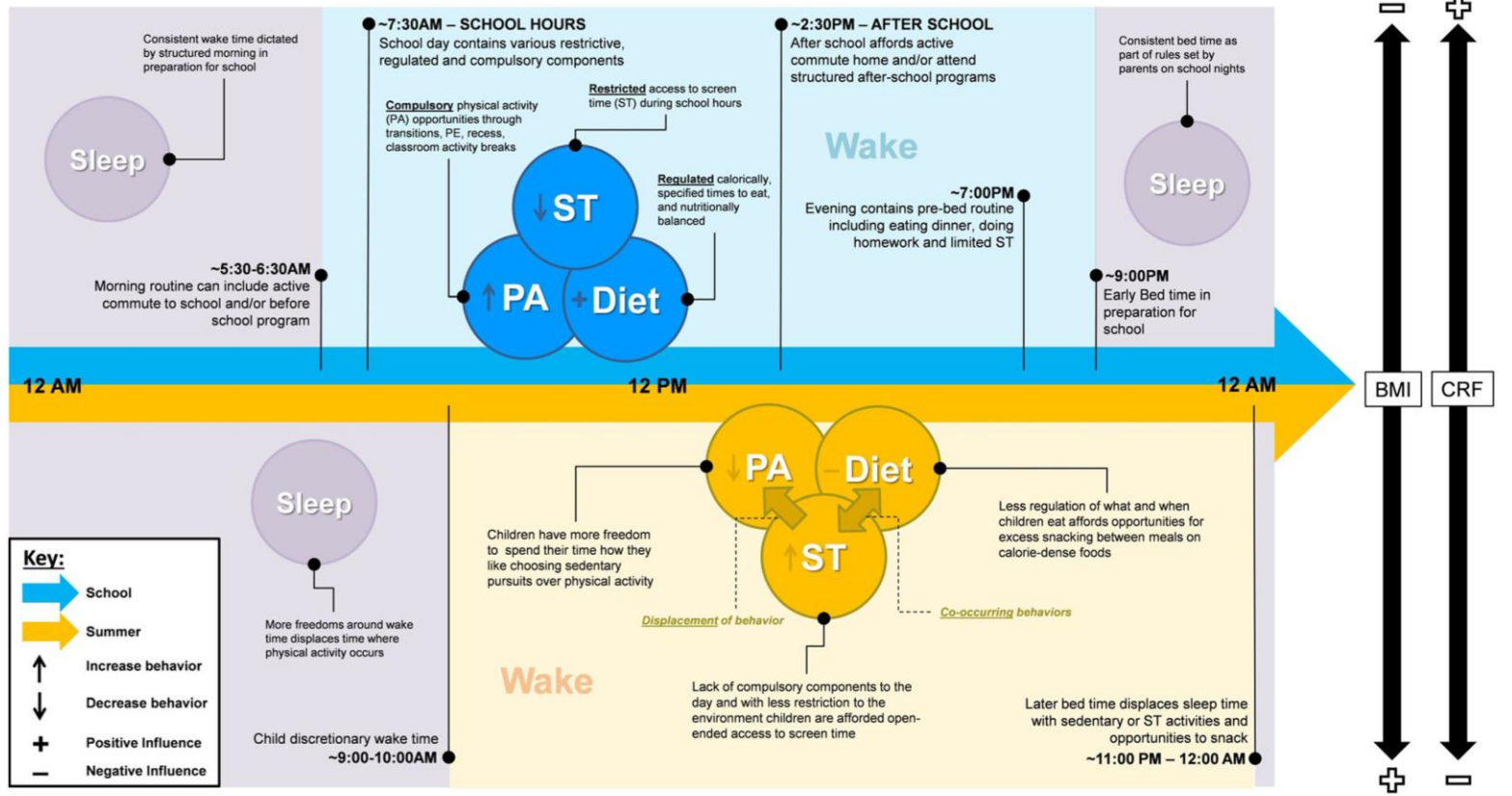


Fig. 1 Structured day hypothesis conceptual model

DEBATE

Open Access



Understanding differences between summer vs. school obesogenic behaviors of children: the structured days hypothesis

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Abstract

Background: Although the scientific community has acknowledged modest improvements can be made to weight status and obesogenic behaviors (i.e., physical activity, sedentary/screen time, diet, and sleep) during the school year, studies suggests improvements are erased as elementary-age children are released to summer vacation. Emerging evidence shows children return to school after summer vacation displaying accelerated weight gain compared to the weight gained occurring during the school year. Understanding how summer days differ from when children are in school is, therefore, essential.

Discussion: There is limited evidence on the etiology of accelerated weight gain during summer, with few studies comparing obesogenic behaviors on the same children during school and summer. For many children, summer days may be analogous to weekend days throughout the school year. Weekend days are often limited in consistent and formal structure, and thus differ from school days where segmented, pre-planned, restrictive, and compulsory components exist that shape obesogenic behaviors. The authors hypothesize that obesogenic behaviors are beneficially regulated when children are exposed to a structured day (i.e., school weekday) compared to what commonly occurs during summer. This is referred to as the 'Structured Days Hypothesis' (SDH). To illustrate how the SDH operates, this study examines empirical data that compares weekend day (less-structured) versus weekday (structured) obesogenic behaviors in U.S. elementary school-aged children. From 190 studies, 155 (~80%) demonstrate elementary-aged children's obesogenic behaviors are more unfavorable during weekend days compared to weekdays.

Conclusion: In light of the SDH, consistent evidence demonstrates the structured environment of weekdays may help to protect children by regulating obesogenic behaviors, most likely through compulsory physical activity opportunities, restricting caloric intake, reducing screen time occasions, and regulating sleep schedules. Summer is emerging as the critical period where childhood obesity prevention efforts need to be focused. The SDH can help researchers understand the drivers of obesogenic behaviors during summer and lead to innovative intervention development.

Keywords: Children, Obesity, School, Summer

Filled time perspective

Time filled with
positive behaviors
cannot be filled with
negative behaviors.

Leisure as a Context for Youth Development and Delinquency Prevention

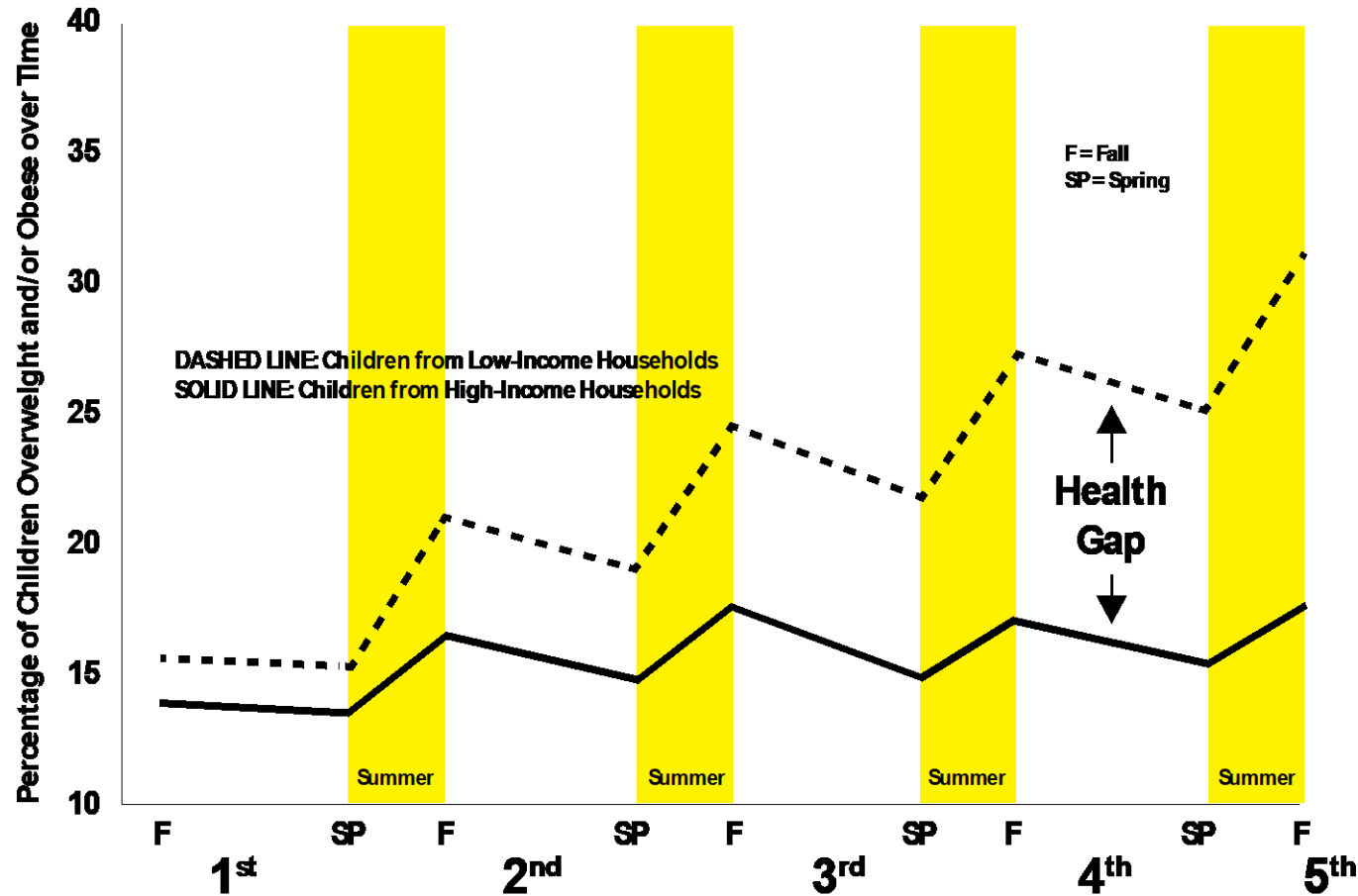
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This article highlights the importance of leisure as a context for human development as well as for prevention of risky behaviour, including crime and delinquency. We offer a brief review and synthesis of current criminology literature that examines leisure activity and then describe leisure research that may provide additional insight into why leisure may be an important context for understanding and preventing delinquent behaviour. We end with a brief description of an intervention that teaches youth to make healthy decisions in their leisure and describe a set of post hoc analyses from a data set from 628 rural youth in the United States used to evaluate the leisure based intervention. Although the data we report were not collected to examine delinquent behaviour, we tentatively conclude leisure-related variables can serve as risk and protective factors to property damage and by extension other delinquent behaviours. We suggest that helping youth become more intrinsically motivated by having goal-oriented leisure pursuits and decreasing levels of amotivation, learning to overcome peer pressure, and becoming more aware of leisure opportunities may reduce the risk of damaging property. Additionally, having parents who are aware of leisure interests, activities and friends is also a protective factor. We also found evidence to suggest that some form of leisure education intervention may be effective in preventing delinquent acts.

This article will highlight the importance of leisure as a context for human development as well as for prevention of risky behaviour, including crime and delinquency. We will first offer a brief review of current literature that examines adolescent delinquent behaviour and leisure activity and then describe leisure research that may provide additional insight into how leisure may be an important context for understanding and preventing delinquent behaviour. We will end with a brief description of an intervention that teaches youth to make healthy decisions in their leisure and describe a set of post hoc analysis from a data set used to evaluate the leisure-based intervention.

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Health Gap Hypothesis



Check for updates

THE MED REVIEW

R. Glenn Weaver, PhD, Michael W. Beets, PhD, Keith Brazendale, PhD, and Timothy A. Brusseau, PhD

Summer Weight Gain and Fitness Loss: Causes and Potential Solutions

Abstract: Over the past 3 decades, public health professionals have worked to stem the rising childhood obesity epidemic. Despite the field's best efforts, no progress has been made in reducing child obesity. One reason for this failure may be that obesity prevention and treatment efforts have predominately been delivered during the 9-month school year. However, recent evidence suggests that the summer, not the school year, is when unhealthy changes in body composition (ie, accelerated increases in percent body fat) and fitness losses occur. This unhealthy change in body composition and fitness loss during the summer could be explained by the "Structured Days Hypothesis," which posits that children engage in a greater number of unhealthy obesogenic behaviors on unstructured days when compared with structured days. Furthermore, the summer may be contributing to a widening "health gap" between children from low-income and middle- to upper-income families. During summer, fewer opportunities exist for children from low-income households to access healthy structured programs that do not require fees for participation. Moving forward, public health professionals should prioritize efforts to mitigate unhealthy changes in body composition and fitness loss during the summer by identifying ways to provide access to structured programming during this timeframe for children from low-income households.

Keywords: obesity, overweight, children; youth; intervention

remain high and obesity negatively affects a large portion of children. Furthermore, there has been a decline in children's performance on fitness tests at a rate of approximately 5% per decade since the 1970s.² Decreased fitness has been related to negative immediate and long-term health outcomes for youth in terms of bone mineral density.

Recently, summer has been identified as a period of excess weight gain and reduced physical fitness.

Overweight and obesity during childhood has been linked to multiple noncommunicable diseases including high blood pressure, abnormal fasting glucose, insulin resistance, type 2 diabetes, sleep apnea, asthma, and joint problems.¹⁻⁴ Over the last 3 decades, obesity rates in children and adolescents (2-19 years) have nearly doubled, and in 2014, one in 5 children were classified as obese.⁵ While increases in the prevalence of childhood obesity may have slowed in recent years,⁶ rates of overweight and obesity, metabolic syndrome, and blood pressure.⁷

Disparities in Overweight and Obesity by Income Level

Unfortunately, like many other negative health outcomes, the burden of overweight and obesity is borne disproportionately by children and adults from low-income families.^{8,10} Furthermore, children from low-income

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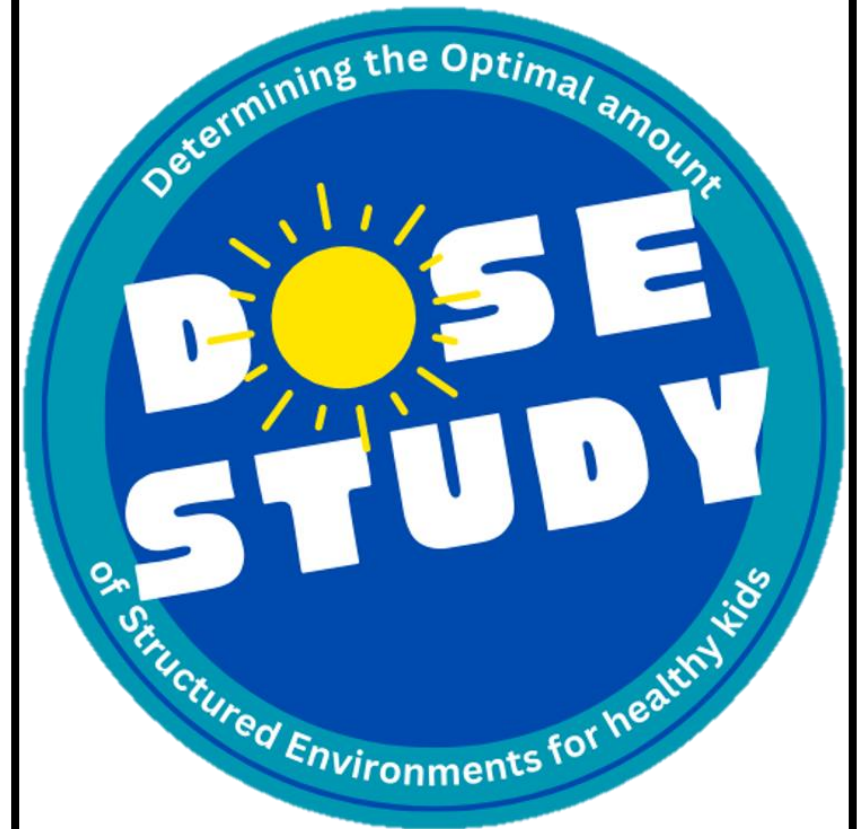
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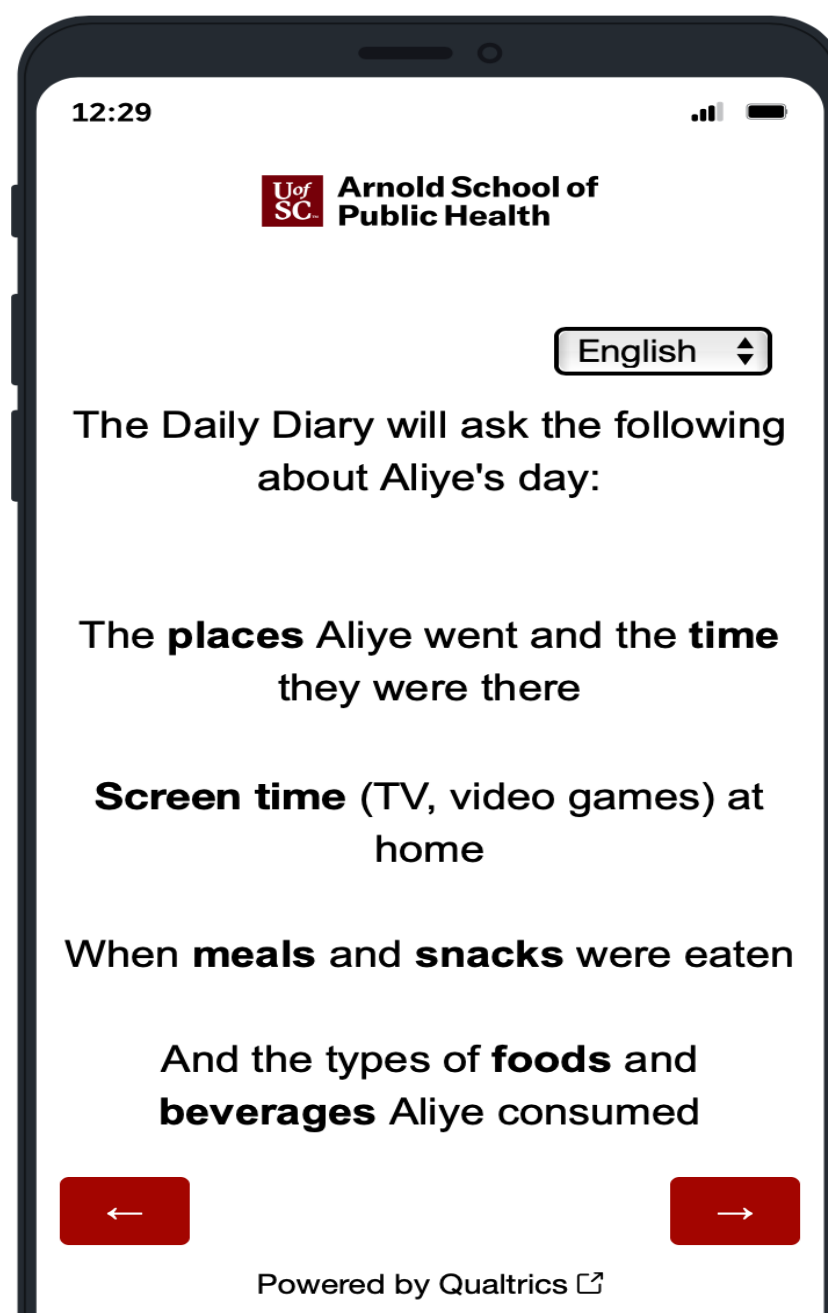
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EVIDENCE

NEXT STEP?

Identify the **dose-response relationship** between the amount of summer programming and accelerated summer BMI gain.





SAMPLE

Demographics of participating schools

School	Students (K-4 th Grade)	% Female	% non- Hispanic White	% non- Hispanic Black	% Other Race	% Families in Poverty
School 1	612	44.8	23.7	56.3	20.1	100
School 2	419	52.9	19.3	48.7	31.9	100
School 3	310	51.9	21.6	62.9	15.5	99.0
School 4	447	49.2	19.2	60.5	20.3	93.0

SETTING

(YMCA Summer Camp)

- Indoor and Outdoor Physical Activity
- Enrichment and Academics
- **Breakfast, Lunch, and Snacks:**
 - Summer Food Service Program
 - Fruits, Vegetables, Whole Grain
 - No Sugar-Sweetened Milk/Beverages



Conclusions

- **Children's BMI gain accelerates during summer vacation**
 - **Unhealthy changes in obesogenic behaviors during breaks from school**
 - **Racial/Ethnic minority and low-income at high-risk**
- **Provide children with access to structured programming**
- **More work is needed**
 - **Limited experimental data, determine optimal dose of structure during summer**

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THANK YOU!
&
QUESTIONS?