# GET UP AND GO: FACTORS DETERMINING *GAME ON* GRANT RECIPIENTS' SUCCESS IN INCREASING STUDENTS' PHYSICAL ACTIVITY

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# 1 Introduction

## 1.1 Abstract

This culminating experience focuses on school-based interventions to fight childhood obesity, seeking to identify what characteristics are shared amongst successful interventions versus unsuccessful interventions. The incorporated research is conducted on data provided by Action for Healthy Kids (AFHK) about their *Game On* (GO) grants. AFHK is a national nonprofit organization that strives to improve the health of children across the country with school-based physical activity and nutrition initiatives. One of the organization's main programs is their GO grants, which they give to schools, so they can implement successful school health programs. The five steps of a GO program are to assemble a school health team, conduct a school health index, create and implement a wellness plan, select school specific activities, and engage families and communities (1). Some of the many suggestions for activities include before school programming, healthy food taste testing, salad bars, and walk/bike to school initiatives. The goal of this data analysis is to provide recommendations to both AFHK and to schools, so as to increase the success of future school-based childhood obesity initiatives. Using a statistical analysis and thematic coding, this paper highlights the most successful solutions for physical activity initiatives in schools are implementing before school activities, walk/bike programs, and gymnasium and play space refurbishment.

## 1.2 Literature Review

### 1.2.1 Childhood Obesity in America Today

The United States is currently facing an obesity epidemic, especially amongst children. Studies and data have revealed the extent of the childhood obesity epidemic. Every year, the

Trust for America's Health[22] publishes *The State of Obesity,* a comprehensive summary of their most up to date statistics on the American obesity epidemic; statistics come from the National Health and Nutrition Examination Survey (NHANES), the Behavioral Risk Factor Surveillance System, the National Survey on Children's Health, Youth Risk Behavior Survey, as well as other government health surveillance systems. The statistics they have compiled are startling: 18.5% of children (age 2-19) were obese according to 2015-2016 NHANES data (22). Additionally, 15.2% of children (age 10-17) are overweight, while 5.2% of children aged 6-11 and 7.2% of adolescents age 12-19 in the United States are severely obese (22). To put these numbers into perspective, obesity is classified as a body mass index score (BMI) of the 95$^{th}$ percentile and above, while an overweight BMI is between the 85$^{th}$ and 95$^{th}$ percentile (22). While the population with a BMI deemed overweight faces undeniable health risks, this population fails to be included in obesity statistics. Severely obese BMIs in children are anything 20% higher than the 95$^{th}$ percentile (6).

Existing scientific literature has already demonstrated the many life-long health complications caused by childhood obesity. Obesity puts a large strain on the body and increases risk of fatty liver disease, hypertension, Type 2 diabetes, and coronary artery disease (2). Being obese during childhood causes a person to develop these diseases at an earlier age (18). Obesity causes premature aging of the vascular system, leading to accelerated atherosclerosis progression (2). Other conditions that are associated with obesity include sleep apnea, polycystic ovary disease, and complications with bone growth (9). Not only does obesity lead to physical health problems, but it is also associated with socioemotional problems. There is a bidirectional relationship between obesity and depression and anxiety disorders (18). Depression can cause

obesity through emotional eating and loss of energy, while obesity can lead to depression due to a perceived lower self-worth.

Though it is important to fight childhood obesity to reduce the health risks described above, there are further complications that may arise in adulthood. Obese children are more likely to be overweight in adulthood (18). When obese children lose weight in childhood, their cardiovascular disease risks decrease (9). Lifelong habits are formed in childhood. This is a critical time to intervene, because positive influences can make kids form better habits. For example, food preferences change throughout childhood because of exposure to new foods and because of imitation learning and peer influence (16). Physical activity levels in childhood can serve as a predictor for adult health and well-being, which is one of the reasons why it is so important for children to engage in regular physical activity (13).

### 1.2.2 Ways to Reduce or Prevent Childhood Obesity

There are multiple ways to reduce and prevent childhood obesity; almost all of them revolve around physical activity and nutrition. These strategies include regular exercise, healthier diet, portion control, and education. Experts recommend that efforts be taken at family, community, school, and medical system levels (7).Those experts recommend that pediatricians counsel children about eating enough fruits and vegetables, avoiding sugary beverages, and limiting screen time. The American Academy of Pediatrics furthers those recommendations for health care providers to counsel parents about the importance of family meal time, limited dining at restaurants, paying attention to portion sizes, and eating breakfast (7). Having a doctor counsel a child and families about these issues give families and children guidelines about healthy living.

At the community level, doctors are considered an important source of information for fighting childhood obesity (9). Community level initiatives to fight childhood obesity include policy changes, as well as efforts taken on by local community organizations. Policies to fight obesity include the creation of new parks, adding sidewalks or bike paths, and policies to make a neighborhood safer for people to exercise in. Families are also powerful tools for decreasing rates of childhood obesity. Children are heavily influenced by their parents' attitudes and behaviors. Studies have observed that having active parents improves children's attitudes about exercise and makes them more likely to exercise (13). One study demonstrated that when parents have greater support levels for physical activity, preschoolers are 6.3 times more likely to be highly active, as compared to being inactive (23).

Because children spend substantial portions of their time at school, having school-based initiatives are an effective way to combat childhood obesity. Since most students eat at least one meal a day at school, providing healthier food choices will allow children to eat healthier. In order to encourage children to start making healthier choices, schools can implement nutrition education. Schools can also implement movement breaks throughout the day or give kids longer recess in order to promote exercise. By playing sports in physical education (PE) class, children can improve favorable attitudes about physical activity (10).

### 1.2.3 School-based Initiatives to Fight Obesity

School-based nutrition and physical activity initiatives have already proven to be successful in shaping healthy habits. These initiatives range from nutrition programs, rewarding healthy choices, walking to school, and enhanced PE programs. The success of these interventions show that schools are a powerful tool in reducing childhood obesity.

Enhanced PE programs have improved childhood fitness and increased the amount of time that children spend exercising. Not only do PE classes teach children about health and how to be active, but they also promote physical fitness and motor development (12). The definitions of "enhanced" PE classes and curriculums differ across studies, but it usually meant that the enhanced curriculum had longer class periods and more topics covered than nonenhanced PE classes. One study conducted on 324 children in Slovenian primary schools gave the intervention group enhanced PE classes, which offered more sports, while the control group had the original PE curriculum. After a year of enhanced PE classes, the intervention group had much better motor skills than the controls. Even though the differences decreased over time, in the years after the intervention, during follow up exams, the intervention group maintained better physical fitness than the control group (12). A similar study was conducted in Italy, where 497 children were examined, and the control group continued to use the standard PE curriculum, while the intervention group received an enhanced PE curriculum. After the intervention, the experimental group had lower rises in BMI levels than the control group. The intervention group also caused a 10% decrease in boys' and 12% decrease in girls' sedentary activities (17).

Walking to school is another way for children to be physically active. One form of a walking to school intervention is walking school busses. A walking school bus is when a group of children walk to school while under adult supervision. One study examined 324 students; the controls were passive commuters while the intervention group was given the chance to use a walking school bus. In the schools that had a walking school bus, 27% more students would frequently walk to school. Students in the schools with walking school busses also received more daily activity than children in the control schools. In the intervention schools, kids that walked to

school frequently gained 58% less body fat than the kids who passively commuted to school (11).

Some schools have been successful in rewarding their students' healthy choices. One study analyzed 40 schools in Utah, without a control group; these schools gave students a $0.25 token—that could be used at the school store, book fair, or carnival—if they ate at least one fruit or vegetable serving. When the incentive was offered, the percentage of students eating at least one fruit or vegetable at lunch nearly doubled (14). Another study in the United Kingdom rewarded students with a little prize at lunch, including stickers, if they chose a fruit or vegetable, rather than eating it. It promotes healthy choices over eating healthy foods. The incentives worked and increased fruit and vegetable choices, especially amongst children of a low socioeconomic background (3).

## 2 Methods

### 2.1 Data

Data was conducted by AFHK on their baseline and midterm surveys for schools that receive GO grants. The baseline survey looks at school demographics, while the midterm survey considers at mid-year success and trends. The midterm survey collects information on both main components of a GO grant: physical activity programs and nutrition education. Even though the nutrition data was available, this analysis focuses on physical activity, and only studied nutrition data when it presented in open-ended questions during thematic coding. Action for Healthy Kids gave permission for this data to be used in this analysis and paper.

## 2.2 Data Analysis

The data was analyzed in Microsoft Excel; simple calculations for aggregate data was typically done with either a calculator or through Excel. Excel was also used to narrow the open-ended responses that were then thematically coded by hand. For more information on the questionnaires that schools were given, see figures 1 and 2 for better insight.

In order to categorize the data, certain categories and groups were created at the author's discretion. The author based the success of physical activity initiatives on three questions in the survey: if the schools had seen an increase in the number of students participating in physical activity, minutes of physical activity, and amount of moderate to vigorous physical activity. For the student participation question, schools had four answer choices: "yes, we have increased the number of students participating;" "no, but we expect to see increases in participation before the end of the school year;" "we aren't sure we will be able to increase participation before the end of the year;" and "our project will not increase the number of students participating." For the minutes of physical activity, schools had the following answer choices: "Yes, we have increased daily physical activity minutes;" "no, but we expect to see increases in minutes before the end of the school year;" "we aren't sure we'll be able to increase minutes before the end of the year;" and "our project will not increase daily physical activity minutes." The moderate to vigorous physical activity question had similar answers: "yes, we have increased the amount of time students engage in moderate-to-vigorous physical activity;" "no, but we expect to see increases in moderate-to-vigorous physical activity before the end of the school year;" "we aren't sure we will be able to increase moderate-to-vigorous activity levels before the end of the year;" and "our project will not increase the amount of time students engage in moderate-to-vigorous physical activity." For this analysis, the most successful programs are defined by schools that answered

that they have seen increases in all three physical activity metrics. Least successful programs are schools that answered that they will not see an increase in those metrics, while the moderately successful group consists of schools that fall between the definitions, answering a mix of any of the four answer choices.

Another grouping for analysis is school size. The National Center for Education Statistics[15] reported in their 2018 Digest of Education Statistics, the average public school had 528 students in 2016. On the baseline GO survey, schools were supposed to input their enrollment numbers. For this analysis schools in the survey were then divided into three groups based on the national public school average of 528 students: above average enrolment (which would have included schools at the average, if there had been schools with exactly 528 students), below average enrollment, and null. Of the 379 schools, 377 of them gave AFHK the number of students they had enrolled, so the null group only consisted of the two schools that did not input their enrolment numbers. For the school size classification, 137 schools were above average size, while 240 were below average.

One last grouping created for the analysis was poverty level. Mostly, the schools that receive grants from AFHK are underserved, so it would be difficult to sort schools into groupings of wealthy versus poor. Instead, schools were grouped into high poverty, not high poverty, and null based on their free and reduced lunch rates. The National Center for Education Statistics considers schools with a free and reduced lunch rate of 75% or greater to be “high poverty” schools (20). Based on that figure, this analysis used a threshold of 75% free or reduced lunch to figure out which schools were high poverty. AFHK calculates a school’s free and reduced lunch rate by summing the number of students that get free and reduced lunch rates and dividing that by the school’s enrolment. This analysis used the free and reduced rates that AFHK

had on file, however, there was no free and reduced rate on file for 41 schools due to missing enrollment numbers or missing number of students eating free and reduced lunch. The 41 schools missing data was identified as the null group, while 142 schools were sorted into the high poverty group, and 196 schools were non-high poverty group.

Another form of analysis is reviewing some of the open-ended questions on the survey, where schools were able to type answers in freely. Instead of analyzing and thematically coding all free response questions for 379 schools, open-ended answers were coded only if the school was most successful and had not spent ant grant money yet (including schools that have not yet received their money). These 26 schools were chosen for thematic coding because they can provide insight into the use of free initiatives or strategies as a tool to improve physical activity success levels. There were themes and trends across schools of all success levels, however free and cheap initiatives are much easier to implement on a wide scale rather than expensive ones, so this analyzes the most successful schools that have not yet spent any money on their GO program.

Some of the open-ended questions and responses include remarks about various AFHK nutrition initiatives that are a part of the GO program. The themes surrounding the nutritional initiatives were disregarded for this analysis, as it is assessing the success of GO grants in physical activity. Two of the open-ended questions analyzed were about what physical activity strategies these schools are implementing besides outdoor recess, indoor recess, classroom movement breaks, walk/bike initiatives, purchasing PE equipment, refurbishing gyms, refurbishing play spaces, before-school programming, or after-school programming. One of the questions asked for challenges about grant implementation, and the final two survey responses

that were analyzed asked for quotes from grant stakeholders. The themes noted and coded are yoga, exercise clubs, family programming, community programming, and fundraising efforts.

One series of responses were categorized for the least successful category—the challenges that they face in grant implementation. Again, the nutrition related parts of responses were not coded. The themes noted were staffing changes, timing of funding, school districts, and weather. It is important to know what challenges are preventing these schools from being successful, so future schools can plan ahead of time, and AFHK can provide recommendations and resources for handling these challenges.

All responses about what types of physical activity initiatives have been implemented from were reviewed for all most successful schools. The author then took note of every type of activity mentioned.

# 3 Findings

## 3.1 Activities Implemented

The analysis revealed many important findings about the data. Using the aforementioned definitions of success, the most successful schools were compared with moderately successful schools and less successful schools. This made it possible to see what the different success groups had in common and what percentage of schools that partook in a strategy were at each level of success.

Out of the 379 schools, 253 of them, or 67%, used their GO grant funds to purchase PE equipment that they needed. Of the most successful schools, 137 of them, or 77%, reported purchasing PE equipment. For moderately successful schools this number is less, where 66% of them reported buying new PE equipment. This percentage further decreases for the least

successful schools, at 48%. By dividing the number of most successful schools that bought PE equipment by the total number of schools that bought PE equipment, the calculation reveals that if a school bought PE equipment with their grant money, they have a 54.2% chance of being successful.

Another way that schools can spend their grant is on refurbishing play spaces. One hundred twenty schools, or 32%, refurbished their play spaces. Forty percent of the most successful schools spent their grant money or other resources on refurbishing play areas. Only 26% of the moderately successful schools refurbished their play spaces, while even fewer of least successful schools did so, at 22%. If a school decided to refurbish their play space, 59% of them were in the most successful category. This .59 ratio is the highest ratio of all of the physical activity strategies that a school could implement. Quotes on the survey indicate that refurbishing play spaces also has benefits besides reducing childhood obesity; one school bought more play equipment for recess and it "helps cuts [sic] down on discipline problems."

Some schools, 22% of them, decided to refurbish their gymnasiums. Forty-nine of the 177 most successful schools refurbished their gyms, while 22 of the 108 moderately successful schools did the same. The number is much lower for the least successful schools, only 13 of them, or 14%, spent funds to refurbish their gymnasiums. Fifty-eight percent of the schools that refurbished their gymnasiums were the most successful.

Many schools—246 to be exact—had outdoor recess either before or after they got their grant; this means that 65% of schools had outdoor recess during the school year. One hundred twenty nine of the 177 most successful schools had outdoor recess. Across levels of success, 73% of most successful, 62% of moderately successful schools, and 53% of least successful schools had outdoor recess. The ratio of most successful schools that had outdoor recess to the

total number of schools that had outdoor recess indicates that schools that chose to have outdoor recess had a 52% chance of having the highest level of success. One school responded on the survey that "students are being more active outside with the extended recess," which indicates that long outdoor recesses can improve activity levels, which can lead to success.

Another form of recess is indoor recess. 225 schools, or 59% of them, report having indoor recesses. Of the most successful schools, 67% of them implement indoor recess. Moderately successful schools implement indoor recess at a 61% rate, while the least successful schools implement at a 44% rate. By dividing the number of most successful schools with indoor recess by the number of schools across all levels of success with indoor recess, the data shows that if a school implements indoor recess, they have a 52% chance of being most successful.

Brain breaks are classroom movement and play breaks. Of surveyed schools, 72% of them implement brain breaks. Further data analysis revealed that 75% of the most successful schools implemented brain breaks, with moderately successful schools were not far behind at 73% of them implementing brain breaks. The least successful schools trailed with only 63% of them implementing brain breaks. Calculations reveal that if a school implements brain breaks, they have a 49% chance of being in the most successful category.

Two hundred fifty nine schools collect fitness assessment data. Although the fitness assessment data is unavailable for study, one can see that 71% of the most successful schools conduct fitness assessments. Moderately successful schools are not far behind, with 61% of them conducting fitness tests. The number drops for the least successful school category, with only 63% collecting fitness assessment data. Here, the ratio of most successful schools with fitness testing to all schools with fitness testing is 0.48, indicating that any school that implements fitness assessments has a nearly 50% chance of being in the most successful category.

The second least implemented strategy is before-school programing, with only 28% of schools having before-school programs. 32% of the most successful schools have some form of before-school programming. This is the only category where least successful schools implement this more than moderately successful schools, with rates of 23% and 24% respectively. This is not particularly odd because the numbers are not that different; 2 more moderately successful schools implement before-school programming than least successful schools, however the denominator for least successful schools is smaller at 94 when compared to the moderately successful group's denominator of 108. Further calculations reveal that 54.3% of schools that implement before-school programming are in the most successful category.

After-school programming is just over two times more popular than before-school programming. Fifty-seven percent of schools implement after-school programming. Across all levels of success, implementation rates are 66% for most, 50% for moderately, and 48% for least successful. Here, the ratio of most successful schools with after-school programming to all schools implementing after-school programming is 0.540, revealing that 54% of schools that implement after-school programming are in the most successful category.

Only 28% of surveyed schools hold walk or bike to school initiatives. 58 of the most successful schools, or 33%, implement these initiatives. The number is lower for moderately successful schools, where only 27 schools, 25%, implement walk or bike to school initiatives. Trailing by 3%, only 21 of the 94 least successful schools implement walk or bike to school programs. If a school implements a walk or bike to school initiative, it has a 55% chance of being most successful.

When analyzing the earlier initiatives, one can see that the four least popular initiatives—gymnasium refurbishing, play space refurbishing, walking/biking initiatives, and before-school

programming—have the highest proportion of most successful schools amongst all schools that engaged in each initiative. Only 22% of schools refurbished their gymnasiums, but 58% of them were in the most successful category. Similarly, only 28% of schools engaged in before-school programming or walking/biking initiatives, but 54.3% and 55% of them, respectively, fell into the most successful category. Play space refurbishing is the most effective strategy, with 59% of schools that implemented it being in the most successful category; only 32% of schools decided to refurbish their play spaces.

### 3.2 School Setting

On their surveys, schools classified their location as a "rural/non-metro," "suburban," "town," or "urban" area. All but twelve schools answered this question, so the analysis on whether location impacts success was conducted on the 367 schools that gave their location code. Only 15% of schools were rural, and rural schools made up 16% of most successful schools, 11% for moderately successful schools, and 17% for least successful schools. These numbers hardly differ from the 15% expected in each category. 30% of schools surveyed were suburban. Suburban schools make up 33% of most successful schools, 30% of moderately successful schools, and 24% of least successful schools. Since these numbers are not far from the expect value of 30%, suburban location appears to play very little role in GO grant success. There were the fewest number of schools in towns, at only 7%, which does not differ much from schools in towns making up 9% of most successful, 5% of moderately successful, and 8% of least successful schools. At first glance, adding an index seemingly reveals that town schools are much more successful. However, because there are so few town schools, it is likely that this index is irrelevant, suggesting these differences could be due to random variation. There were

more schools in urban settings, 48%, than any other location. Urban schools made up 42% of the most successful schools, 54% of moderately successful schools, and 52% of least successful schools. The index reveals that urban schools are the least likely group to be most successful; the index is relevant for urban, rural, and suburban schools, because their sample sizes are greater than that of towns.

### 3.3 Poverty

As mentioned earlier, this analysis grouped schools into two categories—high poverty and not high poverty—based on their free and reduced lunch rates. There were 142 high poverty schools and 196 not high poverty schools; the level of high poverty is expected because AFHK tends to issue grants to underserved schools. Forty-six percent of high poverty schools were most successful, as compared to 47% of not high poverty schools. In other words, high poverty and not high poverty schools have almost an equal rate of being most successful. For high poverty schools, 32% were moderately successful, while only 27% of non-high poverty schools were at the same success level. Likewise, 21% of high poverty schools fell into the least successful category, while 27% of non-high poverty schools fell into that category. When adding the moderately and most successful categories together, one can see that 78% of high poverty schools experience at least some degree of success, while only 74% of the non-high poverty schools experience some degree of success. From this data, one can conclude that high poverty schools experience more success than non-high poverty schools in their GO grants.

### 3.4 Type of School

There are 7 different types of schools in this survey: adult, combined, elementary, junior high, middle, senior high, or special needs. There was not an adequate sample size for many of these categories to be considered relevant, however a relatively big sample size of 24 makes the data for combined schools relevant for the purpose of this study. 46% of combined schools fell in the most successful category, while 33% were moderately successful and 21% were least successful. Elementary schools had the biggest sample size at 267, 49% of which were in the most successful category. 29% of elementary schools were moderately successful while 22% fell into the least successful category. There were 39 middle schools, 44% were most; 23% were moderately, and 33% were least successful. Senior high schools are the last group with a large enough sample size to analyze. Out of 32 senior high schools, 38% were most, 22% were moderately, and 41% were least successful. This analysis revealed that senior high schools were much more likely to be least successful than any other type of school with a big enough sample size considered in this study.

### 3.5 School Size

Analysis revealed that school size plays a role in a successful GO program. As mentioned earlier, schools were divided into two groups based on their enrolments—above average size and below average size. There were 137 above average sized schools and 240 below average size, the remaining two schools did not report their enrolment numbers. 51% of the bigger schools fell into the most successful category, 24% in moderate success, and 25% in least successful. For the smaller schools, 44% fell into the most, 31% in the moderate, and 25% in the least successful category. While an equal number of smaller schools and larger schools fell into the category of

least successful, there were more moderately successful smaller schools than larger schools, at 51% and 31%, respectively. Thus, the main takeaway from this portion of the analysis is that the larger schools were more likely to be successful than smaller schools.

### 3.6 Budget

On their surveys, the schools also reported what portion of their budget they had used. The answer choices to this question were "100% of our funds have been spent," ">50% of our funds have been spent," "<50% of our funds have been spent," "0% of our funds have been spent," and "we have not received our funds." Schools that have already spent all of their funds have a most successful rate of 48%, while schools that have spent between 50-100% of their funds have a most successful rate of 61%. Schools that have not yet received their funds have a 33% most successful rate, while schools that have received their funds but have not yet spent any of it have a 27% most successful rate. Schools that have spent some of their money but less than 50% have a 45% most successful rate. It is important to note that every sample size was above 15, so it is unlikely that these numbers were caused by random variation. This data revealed that schools that have spent between 50-100% of their funds have the highest most successful rate, even higher than schools that have already put all of the resources towards the initiatives. The differences could be because the schools that have spent all of their money spent too much too quickly to have a lasting impact. The most shocking finding was that schools that have not received their funds have a higher of being most successful than schools that have not spent any of their money. That result could be because the schools that have not yet spent any money are planning to host a large event, requiring most of that money in the second half of the year; if they were to expect that event to be successful, then they are probably taking fewer of the free

initiatives—brain breaks, fitness testing, walking initiatives, etc—than the schools who are still waiting on their grant money.

### 3.7 Open Ended Questions

A few of the questions on the survey are open ended, allowing schools to type their answers freely. Instead of analyzing all free response questions for 379 schools. Open ended answers were reviewed if the school fell into the following categories: most successful and have not spent any grant money yet (including schools that have not yet received their money). These 26 schools were chosen because they can provide insight into the use of free initiatives or strategies for improving physical activity success levels.

#### 3.7.1 Most Successful Schools

A common theme amongst the selected group of 26 schools (and amongst successful schools in general) was yoga. One of the 26 selected schools offers yoga classes after school. That school found an empty space and created their own yoga studio, or as it is named, a "zen den." A student from that school claims that yoga has made them "feel so happy! It's help me open up physically and made me feel better." Another school offers yoga options in PE classes. One of the selected schools uses yoga as an individual activity for their students in grades K3-8, providing students with self-guided yoga instructional cards and mats. Not only does yoga improve activity levels amongst children, but it has also been seen to lower cortisol levels in second graders (4). Cortisol is a stress hormone, and it has been associated with abdominal obesity (8). By adding inexpensive yoga initiatives, schools can reduce childhood obesity by both getting kids active and by reducing cortisol levels.

Another trend amongst these 26 successful schools that had not yet spent any of their grant money was implementing exercise clubs. Exercise clubs are a form of the before-school or after-school programming that AFHK recommends schools implement. One school created a mileage club after school, while another school's mileage club meets before school every day. These mileage clubs track how many miles a student has run or walk. Another school implemented a running and walking program at the end of class each day. Walking clubs, where students go for walks together, can be a successful way to raise activity levels; one school claims that their walking club has helped students "increase activity prior to the start of school," and that it has additional benefits of helping "students build relationships with each other." Similar to exercise clubs, one of the selected schools wrote about creating a sports team that gives students an opportunity for physical activity but also a chance to focus on "socioemotional well-being, teamwork, and good sportsmanship."

Another noted trend is involving families and communities in physical activity initiatives. One school that deems itself to be in an unsafe neighborhood says that they want to implement a walking/biking initiative, but faces difficulties due to gang and trafficking activity nearby. They are working with both parents and the community to create "safer passages" to school. Another school has started a Family Fitness Saturdays program; they allow families to use their gyms and weight room equipment, allowing families to work out during the winter. Walk to School Wednesdays—where they encourage parents to walk their children to school with a reward of a free healthy breakfast—has contributed to another school's success. Community is also involved in the creation of the aforementioned sports team at one school; that team partnered with community organizations, including a soccer complex, so students can play soccer. That same school also offers a free weekly fitness day to the community. Involving family in exercise

programs can be beneficial because kids with physically active parents are much more likely to engage in moderate to vigorous physical activity (13).

Multiple of the selected schools have ongoing fundraisers for improving physical activity. One school says the grant is "beneficial in adding to fundraising efforts to provide handicapped accessible equipment" so that handicapped students can participate with their able-bodied peers in physical activity. Another school is looking to fundraise to supplement their grant in order to buy a gym divider with the intention of offering more in and outside of school programming for their students. And finally, a school in a low income area planned on buying a refillable water station with their grant, but they were not able to raise enough additional funds in their low income neighborhood to be able to afford it, so they plan on finding new uses for their grant.

The analysis also revealed some more creative solutions that different schools are implementing. One school had great success with a student versus staff basketball game. Another school hosts fitness challenges, growing their students' "enthusiastic and voluntary engagement" in physical activity. One school has made scheduling adjustments and is now allowing elementary students to use the gym for PE if it is too cold outside. Free solutions like these, although not particularly common, could serve as great suggestions to schools that are trying to increase physical activity.

### 3.7.2 Least Successful Schools

Schools with the least successful physical activity initiatives face a lot of challenges. By analyzing these challenges, some information can be provided to schools or AFHK about how to prevent, combat, or prepare for these issues in the future. Some of the common themes across these challenges were staffing changes, timing of funds, issues with the school district, and

weather. Of the 94 least successful schools, only 54 filled out a response for the challenges question. Of those 54 schools, five gave an answer that was some variation of "none" or "N/A," and three more claimed that they were not having any challenges but added an additional comment. Of the 46 schools that actually described their challenges, three only wrote about nutrition initiatives; this leaves 43 responses to analyze.

Eight of these schools, or 17% of the valid answers, wrote that they had experienced a loss in or a change of staff, and that this was hindering grant implementation. Three of these schools have lost staff that had not yet been, or might not be, replaced. One school lost the teacher "who was going to order and implement the [fitness] trackers" for their initiative. Another school lost their financial secretary, so they have not been able to make many of their necessary purchases yet. One school experienced both staff loss and staff turnover; they received a new principal and they lost their Community School Coordinator. Four other schools experienced a change in staff, including changes in PE teachers and for the position in charge of grant implementation, that is interfering with implementing their program.

Issues with funding were the most common barrier, as they were the subject of eleven responses. These funding issues can be broken down into four subcategories: have not received money, received money shortly before the midterm survey, known delays with the money, and waiting for all grant installments. Three schools had just received their funding, so they have not yet been able to implement their initiatives. Two schools on this survey have not yet received a check from AFHK. Four schools experienced delays in funding: one school is waiting for their district to give them their money; another school needs a new financial secretary to be able to make purchases; one school's check got lost in the mail, delaying their response; and another school experienced a delay in the release of funds, so they ordered their materials late and are

waiting for them to arrive. Two schools are waiting until they receive all instalments of their grant so they can make their purchases of either snowshoes or PE equipment.

Three schools state that they are experiencing difficulties with their school districts. One school awaits district approval for their plan, struggling to convince all involved of the benefits of their plan. One school could was not granted access to filling out their midterm report in the AFHK portal, and they had to rely on their district to fill it out, which required additional time. Another school is had some issues with their district's finance department, but did not elaborate any further.

Another common trend mentioned was relying on the weather for initiative implementation. One school is waiting for enough snow to be able to go snowshoeing. Another school that is implementing snowshoeing has not received their full grant yet, so they will not be able to buy enough snowshoes in time to use them. Poor weather in the fall limited another school's ability to conduct activities outside. Even though only three schools discussed weather as a problem, weather-specific activities are a large enough barrier to prevent a school from using their grant money over the school year that they planned for.

### 3.7.3 Cost

All most successful school responses, no matter how much money they had spent, for the question asking about what kinds of physical activity programs they have implemented were reviewed, without thematic coding, with the purpose of finding other possible free strategies for schools to use. As indicated earlier, many schools have implemented yoga programs. Schools can create free clubs in activities that do not require purchasing extra supplies, such as running, walking, hiking, or dance clubs. Some schools lead their students in physical activities during the

morning announcements. A few schools assign workout or exercise homework; one school requires a parental signature as proof of completion. Other opportunities include holding open gyms before school, creating quarterly field days, or having teachers set an example for their students and walking or playing sports during recess. One school has used supplies from their art department and have painted activities on the cement for children to play during recess.

Most successful schools had a number of successful activities that required funding. Some schools have set up after school programs through independent contractors, while a number of schools have installed ga-ga, or an Israeli form of dodgeball, pits for their students to play in during recess. One school has used money to buy Nintendo Wiis, a videogame console that can be used for activity, for their students to use during recess, playing games that require activities. Another school has used their grant to buy under-desk bikes for students to pedal on while working in class. One school even has a jump rope team, and not only do students get exercise through jump roping, but they also encourage students to attend sporting events, when they perform at halftime.

## 4 Recommendations

The analysis revealed adequate trends in the data to be able to issue recommendations for both schools and AFHK. If some schools implement a few of these recommendations, they could have a more successful physical activity program. The main recommendation for AFHK is to communicate to schools about what programs are the most successful in increasing physical activity levels.

Both the statistical analysis and thematic coding revealed the success of before-school and after-school programming. Statistically before-school programming has a bigger impact, but

open-ended questions repeatedly discussed the success of after-school programs as well. Many schools find it a challenge to find staff or resources to conduct before- or after-school programming. The analysis of the most successful schools that have not yet spent money revealed that a low cost option is a running, walking, or mileage club. If schools have the resources, they should also implement sports teams when available.

Statistically, gym and play space refurbishing were successful strategies. However, they require money. The thematic coding revealed a set of free activities that schools can implement, instead of using their grant money on less successful initiatives. That grant money could instead be put towards gym or play space refurbishing. Schools that refurbish their play spaces had a 59% chance of being in the most successful category; this is a sign that play space refurbishing helps increase activity. However, middle and high schools tend to not have play spaces, as the students have outgrown them, so they should instead refurbish gymnasiums.

Schools that have implemented walk/bike initiatives have also seen higher success. Having Walk to School Wednesdays is a free way to get kids more active. 55% of schools that implement walk/bike initiatives are in the most successful category. As long as the school is deemed to be in a safe neighborhood and sidewalks are present, schools should encourage their students to walk to school. One way to encourage students to walk to school is to have specified light homework load nights, so a heavy backpack does not discourage them from walking to and from school on those days. The final recommendation for schools is to implement some of the other free initiatives mentioned in the thematic coding section, as well as devising new creative solutions to get their students more active.

## 5 Limitations

This study faces a few limitations that are important to note. First of all, the end of year data has not been collected yet, so it is unclear if the qualifications that make schools successful will remain true all year. It is also important to note that when the end of year data for this set of schools is collect, they will be exceptional cases, due to the COVID-19 pandemic. Secondly, there were are few errors in the data collection for the nutrition data. After analysis, there did not appear to be any errors in the physical activity data, but the data collection methods may have been flawed.

## 6 Future Research

This paper only analyzed physical activity data, while GO grants also involve a nutrition education program. There are a wealth of nutrition questions on the survey and good potential markers to define the success of a nutrition program—increased food and beverage knowledge, increased consumption of healthy foods, improved attitudes around healthy foods, and improved school nutrition environment. Those questions and their four answer choices can be used to form a definition of success similar to the one used here, and a similar analysis can be conducted on which strategies these schools implement.

Another opportunity for future research on AFHK's GO grant is looking at this same data once the end-of-year surveys have come in, however due to the COVID-19 pandemic, schools will likely have to implement different initiatives than they planned to. Future analysis can be conducted on prior years of GO grant data, that have baseline, midterm, and final data. Looking at previous years can help establish trends and possibly be used to predict the success rates of future GO grants.

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## 8 Figures

Figure 1: Relevant Questions from Questionnaire

**Section 1: Project Details**

**Physical Activity Initiatives**

| **Since the beginning of the school year, did your school:** | **YES** | **NO** |
|---|---|---|
| 1. Implement an *outdoor* recess strategy(s)? | | |
| 2. Implement an *indoor* recess strategy(s)? | | |
| 3. Refurbish your schools' general physical activity play space(s)? | | |
| 4. Refurbish your gymnasium/play space? | | |
| 5. Purchase physical education equipment? | | |
| 6. Implement a brain-break and/or classroom physical activity strategy(s)? | | |
| 7. Implement a *before*-school physical activity program(s)? | | |
| 8. Implement an *after*-school physical activity program(s)? | | |
| 9. Complete a physical fitness assessment(s) and/or testing? | | |
| 10. Implement a walk and/or bike to school initiative(s)? | | |

11. Since the beginning of the school year, did you employ any *other* physical activity initiatives to get students more active before, during or after the school day?

- Yes
- No
- If yes, please specify:

Figure 2: Relevant Questions from Questionnaire Continued

12. **Optional** – Provide any additional detail to describe *how* you implemented the physical activity initiative(s) listed above. (500 characters)

13. Has the physical activity component of your grant project increased *average daily physical activity minutes* for students?

- Yes, we have increased average daily physical activity minutes.
- No, but we expect to see increases in minutes before the end of the school year.
- We aren't sure we'll be able to increase minutes before the end of the year.
- Our project will not increase average daily physical activity minutes.

14. Has the physical activity component of your grant project increased the *number of students participating* in physical activity initiatives?

- Yes, we have increased the number of students participating.
- No, but we expect to see increases in participation before the end of the school year.
- We aren't sure we'll be able to increase participation before the end of the year.
- Our project will not increase the number of students participating.

15. Has the physical activity component of your grant project increased the *amount of time students engage* in moderate-to-vigorous physical activity? Note: In the simplest terms, moderate-to-vigorous activity is activity that makes your heart beat fast, such as brisk walking, jumping, jogging, biking, etc.

- Yes, we have increased the amount of time students engage.
- No, but we expect to see increases in moderate-to-vigorous activity before the end of the year.
- We aren't sure we'll be able to increase moderate-to-vigorous activity levels before the end of the year.
- Our project will not increase the amount of time students engage in moderate-to-vigorous physical activity.