AN EXAMNINATION OF AFTER-SCHOOL ATTENDANCE PATTERNS ON ACADEMIC OUTCOMES FOR HIGH SCHOOL STUDENTS

by

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(Under the Direction of Stacey Neuharth-Pritchett)

ABSTRACT

Many studies have evaluated the effectiveness of after-school programs to understand the possible positive effects they have on students. Funding for these programs as well as spaces available for students can be competitive. While many studies have evaluated attendance in relation to program outcomes, studies have not evaluated programs in terms of student attendance patterns. Many students attend frequently near the beginning but then slow their attendance or vice versa. This study aimed to evaluate whether student grades would differ between students who had different attendance patterns. The study found only one significant result which was between the science grades of students who consistently attended the program frequently and students who infrequently attended the program. The results and implications of future studies and practice are discussed.

INDEX WORDS: After School Program, Attendance, Dosage, Outcomes

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M.A., University of Georgia, 2018

A Dissertation Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

DOCTOR OF PHILOSOPHY

ATHENS, GEORGIA

2021

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August 2021

ACKNOWLEDGEMENTS

I would like to acknowledge my advisor and dissertation committee chair, Stacey Neuharth-Pritchett, for working with me on my dissertation. She provided valuable feedback and helped me to finish the long process. I would not have been able to attend this program without her. I also thank Amy Reschly and Ashley Harrison for being on my committee and providing feedback and support. I would also like to thank all of my professors, supervisors, and my cohort for the amazing years in the program.

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

CHAPTER 1

INTRODUCTION

Annually, the Nita M. Lowey 21st Century Community Learning Center's (CCLC) afterschool programs serve over two million pre-kindergarten through 12th grade students in over 10,000 centers across the United States (US Department of Education, 2020). According to the federal government's summary of annual performance of all programs across the United States in the most recent round of data from 2018-2019, programs were successful in improving academic performance in students' mathematics and English/Language Arts scores as well as behavior. Through data sources including classroom grades and teacher reports, almost 48% of 21st CCLC participants improved their mathematics and language arts grades, with 62% of teachers reporting improved behavior among participating students and almost 70% improving rates of homework completion and class participation. The government's most recent demographic summary of attendees in the program indicates that the program serves primarily students of low socio-economic status and underrepresented minority groups (Afterschool Alliance, 2019; US Department of Education, 2020). In 2018-2019, the program primarily enrolled and served students from the following groups: 39% Hispanic, 25% White, and 20.5% Black. With a large demand for these programs, 89% of adults agreed the programs are important to the community, although of the 21 million youth eligible to attend the program, only slightly over 2 million attend due to federal funding. In 2019, the program was allocated $1,205,773,682, but this large amount is still not enough to meet the growing demand of quality experiences for students out-of-school time (Afterschool Alliance, 2019).

Across numerous studies, outcomes of the 21st Century Afterschool program, and most afterschool programs, in general, present mixed results in terms of program success. Some studies report that afterschool programs do little to increase achievement or improve behavior outcomes (Dynarski et al., 2003; Dynarski et al., 2004; Huang et al., 2011). Other studies indicate that programs do have a positive impact, and in particular emphasize program quality (U.S. Department of Education, 2017; Vandell, Reisner, & Pierce, 2007; White, 2015). Afterschool programs have also been cited as promoting healthy development, protective factors, and growth in cognitive skills. These programs also provide mentorship opportunities and opportunities to connect and to heal from trauma (Georgia Statewide Afterschool Network, 2020; Kinder et al., 2019; Minney et al., 2019). Due to the demand for such programs to meet the out-of-school time needs of American families, it is important to assess the efficacy, or what contributes to the efficacy of programs to assure that the time of the students and the money devoted to such programs are invested wisely.

One factor that might be crucial to assessing the impact of afterschool programs is the attendance of the students. Recent evaluations suggest that programs stay open on average 13.8 hours a week over the course of 5 days for 32 weeks (Afterschool Alliance, 2019; GAO, 2017). On the 21st CCLC program, the Government Accounting Office noted that the US Department of Education "lacks useful data about whether the program is achieving its objectives to improve students' behavioral outcomes such as attendance and discipline." (GAO, 2017, p. 2). Despite the amount of time services are offered, some studies have found that student attendance in the program is sporadic (James-Burdumy, 2005,, 2007). Because regular school-day attendance is related to school achievement and outcomes (Gunn 1993; Parke & Kanyongo 2012; Rhoad-Drogalis & Justice 2018; Roby 2015), attendance in the 21st CCLC program itself might be the

key to understanding why there are such mixed outcomes in after-school programming studies. Few studies evaluate the relationship between attendance and outcomes. Of those that have, results are mixed. When evaluating the relationship between attendance and outcomes, most studies use number of days attended or a related variable as a metric. Using these summary data instead of examining the raw data for attendance patterns presents a clouded picture of how such patterns might influence academic and behavioral outcomes. Most studies have focused on merely examining the total number of days of attendance within the 21st CCLC program and as such do not explore patterns for students who attend intensively for a short period or who engage on a more sporadic basis. By examining such patterns, the current study is designed to provide insight into the relationship of attendance patterns to student outcomes. This type of examination of student attendance is a gap in the afterschool programming literature and will add to the field's understanding of how attendance can mediate outcomes.

CHAPTER 2

LITERATURE REVIEW

A number of factors influence the academic success of American youth. Poverty is a well-established and influential variable affecting educational outcomes for youth. For example, a recent report by the U.S. Government Accountability Office (2018) revealed public high schools with higher percentages of students who live in poverty offered fewer advanced courses preparing students for college. Yet, completion of a four-year college degree is linked to not only individual economic success and mobility but also family and community success (Barro & John-Wha, 2015). Engagement in educational opportunities and success within those opportunities are crucial factors for young people to escape the cycle of poverty.

In 1965, president Lyndon B. Johnson signed the Elementary and Secondary Education Act (ESEA) as a part of his "War on Poverty." The first section of this act (Title I) increased educational funding, particularly to schools with a substantial population of low-income students. The law has been modified in subsequent reauthorizations, with the scope of the program increased with accompanying regulations to better govern funding. In 2018, $15,759,802,000 was allocated for Title I services across the country with 52 new schools receiving awards (Funding Status, 2018). Title I funds are commonly used for professional development, classroom materials, and employment of additional staff to reduce class size, provide tutoring, or offer afterschool and summer programs (US Government Accountability Office, 2011).

Research findings on outcomes for Title I schools are inconsistent. Some research indicates services provided in Title I schools can reduce the learning opportunity or achievement gap (Borman & D'Agostino, 1996; Kainz, 2019). However, other research findings reveal little to no impact and even negative effects for students in Title I learning environments (Klaauw, 2008). Researchers note there are many other factors affecting achievement than just the schools receipt of Title I funding (Kainz, 2019). Allocation of resources, for example, can be a significant influence on Title I outcomes. Title I school spending has been linked positively to increases in graduation, future earnings, and negatively related to grade retention and conduct problems (Rucker, 2015). However, some schools do not use Title funds directly on students (e.g., buying materials, smaller class sizes, technology, tutoring) but rather use resources for teacher professional learning (Weinstein et al., 2009). The level of spending associated with teacher professional learning might also affect performance. Government records indicate teacher training is where most of the money is spent compared to other potential areas of support for Title I funds (US Government Accountability Office, 2011).

In 1994, Congress reauthorized ESEA with major revisions as the Improving America's Schools Act (IASA). Coupled with revision of the regulations regarding Title I schools, the law established the 21st Century Community Learning Centers (CCLC) program. The act purposed 20 million dollars to fund the program. The purpose of the centers was to foster places that benefit the education, health, social-service, cultural, and recreational needs of a rural or inner-city community (Improving America's Schools Act of 1994). CCLC was established in low-income areas with a focus on opportunities for students to take classes after school hours. However, today CCLC focuses on providing afterschool enrichment and achievement services to elementary, middle, and high-school students.

In its infancy, the CCLC budget increased from 200 to 450 million dollars (James-Burdumy et al., 2005). In 2001, the No Child Left Behind Act (NCLB) reauthorized IASA and the budget for the 21st Century programs was increased to 1 billion dollars. The act also switched funding to state distribution based on the proportion of Title 1 funds in a given state. States then competitively allocated money to the local school systems, usually based on the percentage of children under the poverty line who attended the schools in a manner like Title I. Programs were also required to be independently evaluated and must include achievement and enrichment opportunities to receive funding. CCLC programs operate on average for 13.8 hours a week over the course of five days and typically operate for 32 weeks a year across a typical fall and spring school semester. True to their mission to serve children in economic need, 73% of participating students qualify for free- or reduced-price lunch. Funding has not, however, increased significantly since NCLB although demand for the program has increased by 20%. It is estimated the cost per student is $1,543 a year while the cost per center is $122,000.

The CCLC today is the only program funded by the government with an objective to solely provide afterschool programming. In 2014, approximately 10.2 million students attended afterschool programs (Afterschool Alliance, 2014). In 2017, over 11 million children were left at home alone between the hours of 3:00 and 6:00 pm (Afterschool Alliance, 2017) while 21st CCLC provide services to more than a million children and youth (Afterschool Alliance, 2017). However, the same report estimated an additional 19.4 million students would enroll in an afterschool program if offered, suggesting an increasing need for programs. Title I schools may allocate resources to afterschool programs, but as mentioned above, tend to allocate resources to teacher training and other areas. Afterschool programs, are one specific way that schools could offer more in support to children in economically disadvantaged schools.

Benefits of After-School Programs

After-school programs or out-of-school time programs support opportunities for youth to develop educational, social-emotional, physical, and personal skills (Hanlon et al., 2009). In addition, these programs also support opportunities for youth to engage in culturally relevant and positive development opportunities for youth who might be more at-risk for negative outcomes outside of normal school hours (Durlak, Weissberg, & Pachan, 2010; Merttinen et. al, 2019). For example, research indicates that low-income African American children who attended after-school programs benefitted from such programs and had significant increases in academic achievement and behavior when compared to students from a control school without such opportunities (Hanlon et al., 2009). Another study indicated that 21st CCLC programs have more than 40% of their enrolled students increasing their reading and mathematics scores through participation (Naftzger et al., 2007). Many programs designed with integrated positive youth development frameworks into their programming are designed to facilitate successful outcomes including violence reduction among at-risk youth (D'Agostino et al., 2019; Holt et al, 2017; Lerner et al, 2016). The national evaluation of the 21st Century Community Learning Center program, for example, found that 50% of students dropped out of the program and students attended an average of 32.5 days during the school year (Dynarski et al., 2003).

Early research on the 21st CCLC, conducted by the US Department of Education, produced mixed findings. For most grade levels, teacher ratings regarding student performance and student grades did not differ significantly when comparing program attendees versus regular students. Elementary school participant grades and teacher ratings of homework completion, self-care, and behavior did not differ significantly from that of non-participants. Minor positive effects were found in middle school where Black and Hispanic students received slightly higher

grades in mathematics or social studies (Dynarski et al., 2003; Dynarski et al., 2004). Frequency of attendance was not found to be a major factor. However, researchers noted that in the early years of the program, staff turnover was high and student attendance was sporadic and/or low, especially in middle school (James-Burdumy, 2005,2007). Such factors could be the reason for such results.

Results from other independent studies were also mixed. One study using the Iowa Test of Basic Skills found that elementary school students who attended the program improved significantly in language arts, social studies, and reading (Jenner & Jenner, 2007). On the other hand, a 2011 study in California did not find academic gains (Huang et al., 2011). Likewise, a study in Georgia found no differences in state test scores in mathematics between program participants and non-participants (Little, 2009).

More recent in-depth evaluations examined the program in West Virginia. Data from 2015 to 2016 found teachers rated 60% of program participants as having more improved behavior and better homework completion and class participation although the result was not compared to non-program attendees. Academic grades were not significantly different between program attendees and non-attendees except for fourth graders in language arts (Hammer & Whisman, 2017). Improvements in performance were attributed to greater community and volunteer collaboration by program directors while professional development and staffing were considered the biggest challenges.

Other recent government reports indicate growth in grades and state assessment scores, but do not compare the program population to general-day students (U.S. Department of Education, 2017). Another study that did compare participants to non-participants, found that second to fourth graders improved more academically in mathematics and reading when assessed

by the Star 360 assessment system (Pearcy, 2019). In general, academic results seemed to be mixed, but more recent results are promising. For example, the West Virginia studies found that every year, program directors indicate improvement in program structure and community collaboration (Hammer & Whisman, 2017). It is possible that earlier studies found few results due to a lack of resources and experience that is now present in the program.

While academic effects seem to be minimal, there is more positive research on behavioral outcomes. Teachers rated students who attend the program as improving in positive academic behaviors such as completing work to the teacher's satisfaction, turning in homework, and volunteering in class (U.S. Department of Education, 2017; White, 2015). Another longitudinal study found positive outcomes for social skills and work habits while misconduct, drug use, and absences were all lower for students attending the program (Vandell, Reisner, & Pierce, 2007). Students who attended the program also had higher school attendance (have fewer than 10 unexcused absences or out of school suspensions) in Philadelphia schools (Gao, Hallar, & Hartmann, 2014). Attendance effects were also present in high schools where program members demonstrated improvements in positive behaviors such as attendance, socialization, and work completion (Dodd & Bowen, 2011).

Additional social benefits were found in a meta-analysis indicating students who attended the program had greater improvements in feelings, attitudes, and behavioral adjustment (Durlak, Weissberg, & Pachan, 2010). A focus on social outcomes can be beneficial, as youth development in this area is positively correlated with positive outcomes (Paluta et al., 2016). It should be noted that program quality is tied to positive outcomes. A study evaluating students in a program compared students with frequent supervision and those with low supervision.

Outcomes, academically and behaviorally, were positive for those with high supervision compared to those with low supervision (Vandell, Reisner, & Pierce, 2007).

However, some studies indicate that the 21st CCLCs might increase negative behaviors. Evaluations in 2008 suggested participants in the elementary afterschool program were more likely to have disciplinary issues. Middle-school students in the same evaluation were more likely to accept illegal drugs and break objects on purpose (James-Burdumy, Dynarski, & Deke, 2008). While there is more positive consensus when it comes to the behavioral and social benefits of after-school programs, research is somewhat mixed.

Attendance effects on academic achievement

Attendance is known to correlate with student achievement. Multiple studies have found regular school attendance is related to higher grades (Gunn 1993; Parke & Kanyongo, 2012; Rhoad-Drogalis & Justice, 2018; Rosby, 2015). While attendance effects on regular school are well established, the effects of attendance on afterschool programs are less clear. Early evaluations following NCLB by the US government suggested there might be no significant connection between levels of attendance and positive outcomes (Dynarski et al., 2003). Many program directors anecdotally tend to note increased student attendance as being a factor in positive outcomes (White, 2015).

Some studies note positive effects. One study noted a correlation but did not use statistical analysis to evaluate the relationship (Gao, Hallar, & Hartman, 2014). Another study found a small effect for regular attendees (Huang et al., 2011). A similar result was found where students who attended programs over 90 days had increased growth on standardized test scores in reading (Little et al., 2007). One study evaluating achievement testing did find a higher increase in attendance levels when comparing students in and out of the program (Jenner & Jenner, 2007).

On the other hand, a 2008 study evaluating attendance effects found no differences in achievement on state evaluations when comparing program participants to non-participants and when evaluating the effect of attendance levels on achievement (Ogden, 2008). A literature review suggested greater participation was not related to any academic, behavioral, or socio-emotional outcomes, only relating to higher school attendance (Roth, Malone, & Brooks-Gunn, 2010). Similar to the effects of afterschool programs, quality seems to be a primary factor. Regular participation in high-quality programs is associated with positive outcomes, and inconsistent participation in low-quality programs could in fact lead to negative outcomes (Vandell, Reisner & Pierce, 2007). Lack of supervision and structure was particularly noted as a factor in negative outcomes.

Attendance effects in other contexts is similar. Other programs outside of schools exhibit positive effects from regular attendance (Bailet et al., 2009; Maher et al., 2011, Yokley-Busby, 2013). Programs evaluated included private afterschool programs in urban areas, prekindergarten programs, and infant caregiver programs in relation to child outcomes. Some studies mention no connection beyond more frequent school attendance (Roth, Malone, & Brooks-Gunn, 2010), but once again program quality was linked to outcomes (Hirsch, Mekinda, & Stawicki 2010; Wasik et al., 2013).

Attendance in After-School Programs

Some recent work has focused on enhancing attendance within after-school programs, and particularly within the 21st CCLC program (Zhang, Fleming, & Bartol, 2004). Grogan and colleagues (2014) noted that students benefit socially and academically with regular attendance while Faust and Kuperminc (2020) noted students had a sense of enjoyment and challenge with such attendance. Some advocates posit that high-quality and engaging opportunities will draw

students to experience success in general day classes and have consistent attendance in out-of-school time programs. However, a recent study by Crimarco and colleagues (2018) found that few psychological constructs were connected with attendance for participants in their study. In a study focused on provision of physical activity opportunities, neither physical activity enjoyment nor athletic competence predicted attendance. The authors also found that motivation was negatively associated with attendance of boys in fifth grade, while non-self-determined extrinsic motivation was positively associated with attendance of girls during the same grade. Similarly, a family-school based out-of-school time literacy intervention was found to have a small but statistically significant positive impact on student reading achievement, but to have no impact on regular school day attendance (Jones, 2018).

Other factors might also influence attendance patterns. For example, the Crimarco et al. (2018) study also found that motivation was linked to attendance and that such motivation was positively linked to attendance for girls. Their study also found that age and race were also related to attendance patterns with attendance improving as children moved through the grades and with non-White youth having lower attendance as the grade level increased. That finding on race is also supported in other literature that suggests that students from low-income families face barriers that frequently result in their absence from extracurricular and out-of-school programs (Peters & Gentry, 2012). Further, students' internal motivation to engage in after-school programs versus being mandated to participate by parents or teachers can influence the student's performance and overall attendance (Hodges, McIntosh, & Gentry, 2017; Kuperminc, Smith, & Henrich, 2013). Another factor that predicts attendance is externalizing behaviors such as attendance and discipline referrals (Kremer at al., 2015). Program quality is also linked to attendance patterns with older students, for example in middle school, attending with less

purposeful engagement (Hirsh, Mekinda, & Stawicki, 2010). Program quality, however, does not seem to be a key determinant for younger students (Leos-Urbel, 2013). In one study that measured indicators for dropping out of afterschool programs, students with higher risk characteristics such as poorer general day attendance and more peer drug models were less likely to stay enrolled in out-of-school time programs (Weisman & Gottfredson, 2001).

Dosage of attendance has been linked to afterschool program outcome success. For example, Frankel and Daley (2007) found an association between after-school attendance and scores in math and language arts. They also found after-school attendance to be positively related to general school-day attendance but noted that after-school attendance needed to reach a relatively high level to produce a significant effect. In another study examining dosage of attendance and program outcomes, the Los Angeles' Better Educated Students for Tomorrow (LA's BEST) after-school program found that effects were present but required a significant number of days of engagement. After controlling for demographic characteristcis of the sample, Huang and colleagues (2008) noted a significant effect on mathematics achievement for students who attended the program for more than 100 days (Huang et al. 2008).

Operationalizing Attendance

Review of the literature on afterschool program attendance suggests that simple categorization of attendance might not actively capture youth participation and their engagement (Hirsch, Mekinda, & Stawicki, 2010). Further, engagement in afterschool programs also has not demonstrated significant effects on general-day school attendance (Durlak et al. 2010; Zief et al. 2006). In a review of after-school evaluations, the Harvard Family Research Project found nearly 70% of after-school evaluations counted any attendance as full participation in the program (Chaput, Little, & Weiss 2004). Operationalizing attendance in such a manner diminished the

influence of a more discrete measure of attendance such as hours attended, days attended, etc. Maynard and colleagues (2015) noted that afterschool programming does enjoy positive public support and there are local, state, and national resources directed at the efforts. The authors noted concerns about the lack rigorous studies assessing effects of afterschool programs and the lack of significant effects of such programs on attendance and externalizing behaviors (Maynard et al., 2015).

In a comprehensive review of afterschool programs, Leos-Urbal (2013) noted "There is little prior research examining how much students enrolled in after-school programs actually attend, and existing evidence suggests that there is considerable variation in attendance between programs" (p. 687). This outcome was further supported in a review of the literature by Roth, Malone, and Brooks-Gunn (2010) where the authors found that there was little support for higher levels of attendance being related to academic, behavioral, or social-emotional outcomes. They noted that participation should encompass five aspects that include intensity (frequency of attendance during one program year), duration (years of attendance), total exposure (frequency of attendance over multiple years), breadth (involvement in different types of program activities), and engagement (effort and interest in program activities). Although attendance should include thoughtful measurement of all five elements of these participatory structures, advocates have also noted that engagement in program services is one of the critical factors in associating attendance with program outcomes (Fredericks, Bohnert, & Burdette, 2014).

Therefore, to begin to address the role of attendance on student outcomes, the current study focused on dosage intensity across a program service year. The intent of the study was to begin to reconsider operationalization of the attendance variable to examine how specific patterns of attendance were related to student outcomes.

CHAPTER 3

METHOD

Context

Data were collected from two high-school afterschool programs located in a southeastern state. Participants were members of the 21st Century Community Learning Centers program. Data about students were collected from participants who were enrolled in the 2017-2018 program year. The students attended the program Monday through Thursday after school from 3:45 to 5:00. Consistent with 21st Century program requirements, both high-school programs offered a combination of academic and enrichment opportunities. Academic opportunities included subject matter classes in science and mathematics, English Language Learner programs, and credit recovery opportunities for students who needed to earn graduation credit. Enrichment classes included mixed martial arts, drama, Junior ROTC, youth girl empowerment groups, and other athletic activities.

Participants

Across both programs, data from 738 high school students were included in analyses. The sample size was 51.8% female and 48.2% male. The grade distribution was 35.8% 9^{th} graders, 22.9% 10^{th} graders, 24.4% 11^{th} graders, and 16.9% 12^{th} graders. The racial/ethnic composition of the group was 2.03% Asian, 55.01% Black, 27.91% Hispanic, 10.71% White, and 4.34% multiracial. Among the students, 8.7% of the population were students who were identified as gifted and enrolled in such programming during the general school day. The sample also was

comprised of 6.5% of students who were identified as limited English proficient and 14.6% who received Special Education services.

Groups

The independent variable employed in this study was attendance category. Attendance category was defined as the change in attendance to the afterschool program between quarter 1 of the fall semester and quarter 2 of the fall semester. Attendance level was defined as low, medium, or high for each quarter by using the total number of days the student attended divided by the total possible days attended. For the first quarter, the total number of possible days was 12 days, and for quarter 2, the total number of days was 39 days. A low attendance level was defined as attending less than a third of the total possible days. A low attendance in quarter 1 was attending less than 4 days and a low attendance in quarter 2 was attending less than 13 days. A medium attendance level was defined as attending between a third and two thirds of the days possible. In quarter 1, a medium attendance level was attending between 4 and 8 days, and in quarter 2 attending between 13 and 26 days. A high attendance level was defined as attending over two thirds of the possible days. In quarter 1, a high attendance was attending more than 8 days, and in quarter 2 attending more than 26 days.

Based on this operationalization of the variables, there were ten total attendance categories after calculating the attendance levels. Students were placed into groups based how their attendance level category changed from quarter 1 to quarter 2. For example, group 1 consisted of students who attended the program a high amount in quarter 1 (more than 8 days) and a high amount in quarter 2 (more than 26 days). Data for the number of participants in each grouping are displayed in Table 1 below.

Table 1

Operational Definitions of Attendance Groups

Group	Sample Size	Quarter 1 Attendance	Quarter 2 Attendance	Mean Attendance Days
Group 1	26	High	High	39.8
Group 2	54	High	Medium	28.8
Group 3	23	High	Low	18.6
Group 4	10	Medium	High	35.2
Group 5	30	Medium	Medium	24.8
Group 6	40	Medium	Low	12.1
Group 7	10	Low	High	29.6
Group 8	66	Low	Medium	20.0
Group 9	51	Low	Low	11.2
Group 10	428	Infrequent	Infrequent	2.9

Group 10 consisted of students who were deemed to not attend the program in either quarter frequently enough to warrant inclusion into a group, and so were used as a control. The criteria for this infrequent group was that the student attended the program on average less than once a week in both quarters. Therefore, the student must have attended 12 or less days total combined through both quarters. To put it into perspective, of the 428 students in group 10, 56.5% of them attended the program for two days or less between both quarters and 30.6% did not attend the program at all. The federal 21st CCLC operationalization of a student who is considered regularly-participating is a student who attended a minimum of 30 days or more across the entire program year (Georgia Department of Education, 2021). The analyses in this study only uses data from the fall term of the program year. Therefore, dosage as conceptualized by the federal government would suggest a minimum of 15 days in the fall term. The use of a total of 12 days or less to classify students as infrequent is based on that threshold.

Classroom report card numeric grades used were for the student's reading, mathematics, and science classes. If students were enrolled in multiple classes of the same area, lower-level classes were prioritized (e.g.,, Biology over Chemistry). In addition, classes related to the core curriculum were prioritized over other classes of the same area (i.e., chemistry over

entomology). Standard classes primarily included as reading grades were ninth, tenth, eleventh, and twelfth grade literature/comprehension classes for reading. For mathematics, common classes were algebra, geometry, coordinate algebra, and precalculus. For science, standard classes were biology, chemistry, and physics. Various levels of classes (i.e., 9th grade literature and advanced 9th grade literature), Advanced Placement classes, and other supplementary classes (journalism, human anatomy, zoology, foundations of algebra, etc) were used when no other alternatives were present. Classroom summary grades were used from the end of quarter 1 and the end of quarter 2. Students were also categorized by whether they were passing the class at the end of Quarter 1. The failing group was composed of students receiving a grade of less than 70 in the reading, mathematics, or science class.

Chi-square analyses were performed on demographic variables to assess for differences within the sample. No statistically significant differences were found on gender ($\chi^2(9) = 9.581$, $p = 0.385$), ethnicity ($\chi^2(36) = 44.089$, $p = .167$), special education status ($\chi^2(9) = 2.441$, $p = .982$), gifted status ($\chi^2(9) = 8.682$, $p = .467$), grade ($\chi^2(27) = 34.278$, $p = .158$) or English proficiency ($\chi^2(18) = 23.709$, $p = .165$).

Hypotheses

Hypotheses were created according to attendance groups and are as follows: 1) Individuals who attend the program at a low, medium, or high level will have greater improvement in grades compared to those who have operationally defined infrequent attendance across time (all groups compared to group 10), 2) For individuals who attend the program at consistent levels (groups 1, 5, and 9) or those who attend the program more frequently will have greater improvement in grades compared to those who attend the program less frequently, 3) Individuals who move from low attendance to high attendance (group 7) will have better

improvement in grades compared to those who have low attendance in both quarters (group 9), 4) Individuals who move from medium attendance to high attendance (group 4) will have better improvement in grades than those who go from medium to low (group 6), 5) Individuals who attend at a high rate both semesters (group 1) will see better improvement in grades over those who go from high attendance to low attendance (group 3), and 6) students who improve their attendance to the program (groups 4, 7, 8) will see better improvements in grades over those whose attendance to the program goes down (groups 2, 3, 6).

Measures

Attendance data were collected daily by each 21st CCLC program and coded into a database that is maintained by the program. Students were required to sign into each class and individual student data was extracted from the database and downloaded into a spreadsheet for analysis. Grades were collected at the end of quarter 1 (September 28th, 2017) and at the end of the semester (December 19th, 2017). Quarter grades consisted of grades sent home on progress reports by the schools. They included all classroom activities and assessments before the reports were sent home.

CHAPTER 4

RESULTS

The current study compared the change in classroom end-of-quarter grades of different attendance groups across five hypotheses. The change in grades between groups was evaluated using an independent samples t-test with attendance group serving as the independent variable. Welch's t-tests were utilized when unequal variances among attendance groups occurred. Results testing each of the hypotheses is provided below.

Hypothesis 1

Hypothesis 1 predicted a significant difference in change in grades for reading, mathematics, and science would be found when comparing those who had operationally defined infrequent attendance to those who attended the program at high, medium, or low levels. All students were sorted into two groups, "Attended the Program" or "Infrequently Attended Program." No significant differences were found between the two groups in reading ($t(534) = -1.13$, $p = 0.26$) and mathematics ($t(557) = 1.60$, $p = 0.11$), but an effect was found in science ($t(558) = 1.78$, $p = 0.02$) (see Table 2). For those who attended the program, the mean change in science grades from quarter 1 to quarter 2 was 0.96 ($Sd = 11.03$) while the change for those in the infrequent group was -1.14 ($Sd = 11.19$) indicating that those who attended the program had increases in their science achievement from quarter 1 to quarter 2 while those who had infrequent attendance had scores that fell between quarters.

Table 2

Differences between program attendees and infrequent attendees

Subject	Frequent			Infrequent					
	n	*M*	*Sd*	*n*	*M*	*Sd*	*T*	df	Sig. (2-tailed)
Reading Change	273	-3.98	11.56	367	-2.99	9.98	-1.13	534	.26
Mathematics Change	273	1.64	12.23	373	0.14	11.28	1.60	557	0.11
Science Change	258	0.96	11.03	356	-1.14	11.19	1.78	558	0.02

Hypothesis 2

Hypothesis 2 predicted a significant difference between the change in grades between Group 1 (High to High Attendance) and Group 9 (Low to Low Attendance). Participants' classroom grades were compared across reading, mathematics, and science grades. No significant difference was found between the two groups in reading ($t(29) = -.05$, $p = .95$), math ($t(43) = .10$, $p = .91$), or science ($t(43) = 1.38$, $p = .17$). Results from these analyses are displayed in Table 3.

Table 3

Differences between Group 1 and Group 9

Subject	Group 1			Group 9					
	n	*M*	*Sd*	*n*	*M*	*Sd*	*T*	df	Sig. (2-tailed)
Reading Change	21	-4.36	15.94	43	-4.15	10.75	-.05	29	.95
Math Change	20	1.45	9.94	43	1.15	11.60	.10	42	.91
Science Change	218	3.25	8.20	43	-.21	10.37	1.38	40	.17

Hypothesis 3

Hypothesis 3 predicted a significant difference between the change in grades between Group 7 (Low to High Attendance) and Group 9 (Low to Low Attendance). Classroom grades across the participants in reading, mathematics, and science were compared. No significant

differences were found between the two groups for any of the subjects. Mean score change and standard deviation along with the test statistics are displayed in Table 4.

Table 4

Differences between Group 7 and Group 9

Subject	Group 7			Group 9					
	n	*M*	*Sd*	*n*	*M*	*Sd*	*T*	df	Sig. (2-tailed)
Reading Change	9	-4.42	12.72	43	-4.15	10.75	-.05	10	.95
Math Change	10	1.25	15.41	43	1.15	11.60	.10	11	.98
Science Change	10	2.40	8.40	43	-.21	10.37	1.38	16	.41

Hypothesis 4

Hypothesis 4 predicted a significant difference between the change in grades between Group 4 (Medium to High Attendance) and Group 6 (Medium to Low Attendance). Participant scores in reading, mathematics, and science were compared. The hypothesis was not supported as no significant differences were found for any of the content areas assessed. Mean score change and standard deviation along with the test statistics are displayed in Table 5.

Table 5

Differences between Group 4 and Group 6

Subject	Group 7			Group 9					
	n	*M*	*Sd*	*n*	*M*	*Sd*	*T*	df	Sig. (2-tailed)
Reading Change	10	-9.77	9.61	36	-2.43	9.93	-2.11	14	.05
Math Change	9	2.33	27.17	36	2.50	11.14	-.01	8	.95
Science Change	10	-5.79	18.18	33	.55	11.74	-1.04	11	.32

Hypothesis 5

Hypothesis 5 predicted a significant difference between the change in grades between Group 1 (High to High Attendance) and Group 3 (High to Low Attendance). Participant classroom grades were compared across reading, mathematics, and science content areas. For each of the content areas, no significant differences were found between participants for any other the content areas. Mean score change and standard deviation along with the test statistics are displayed in Table 6.

Table 6

Differences between Group 1 and Group 3

Subject	Group1			Group 3					
	n	*M*	*Sd*	*n*	*M*	*Sd*	*T*	df	Sig. (2-tailed)
Reading Change	21	-4.36	15.94	21	-5.13	9.72	.18	33	.85
Math Change	20	1.45	9.94	20	2.77	10.40	-.41	37	.68
Science Change	218	3.25	8.20	19	1.87	12.22	.40	31	.68

Hypothesis 6

Hypothesis 6 predicted a significant difference between students who improve their attendance to the program (groups 4, 7, 8) and those whose attendance to the program goes down (groups 2, 3, 6). Participant classroom grades were compared across reading, mathematics, and science content areas. For each of the content areas, no significant differences were found between participants. Mean score change and standard deviation along with the test statistics are displayed in Table 7.

Table 7

Differences between Attendance Up and Attendance Down

Subject	Attendance Up			Attendance Down					
	n	*M*	*Sd*	*n*	*M*	*Sd*	*T*	df	Sig. (2-tailed)
Reading Change	77	-4.45	9.30	106	-3.14	12.64	-.77	181	.44
Math Change	79	-.62	14.70	106	3.01	11.08	.1.92	183	.06
Science Change	75	-.85	11.76	98	1.97	10.62	-1.54	171	.10

Overall, there were no significant differences from the results following hypothesis 2, 3, 4, 5, and 6. On hypothesis 1, a significant difference was found in the change in science grades between the two groups ($t(558) = 1.78$, $p = 0.02$). There were no significant differences between groups on hypothesis 1 regarding the change in reading or math scores.

CHAPTER 5

DISCUSSION

After analysis, the results from the study align more closely with prior research that found few or no significant effects of after-school program attendance on academics. Hypothesis 1 only found an effect between frequent and infrequent program attendees when comparing the change in their science grades. There were no significant differences between the reading and mathematics scores. Hypothesis 2, which predicted a difference between consistently high-attendance students and consistently low attendance students, was not supported as the study did not find any significant differences when evaluating students with constantly high attendance and those with constantly low attendance. Hypothesis 3 was also not supported as the results did not reveal any significant differences in the scores between attendees who improved their attendance from low to high, and students with consistently low attendance. Hypothesis 5 was not supported as there was no significant difference between a group of students who had consistently high attendance and a group whose attendance was high but declined. Finally, Hypothesis 6 was not supported as there was no significant difference between the group of students whose attendance approved and the group of students whose attendance decreased. The results suggest that students changing how frequently they attended the program over time has little effect on their reading, mathematics, or science grades.

While this study does not invalidate the results of the small number of studies that did find significant results based on attendance (U.S. Department of Education, 2017; Vandell, Reisner, & Pierce, 2007; White, 2015), it is difficult to argue that the study helps to elucidate the

impact of attendance in after-school programs. It might be necessary to carefully examine the nature of after-school program evaluations and use attendance information to better design conclusive studies. The purpose of this study and the limitations acknowledged while composing the explanation of the results might help to guide future studies on after-school programs. This study attempted to analyze the program attendees as if they were receiving an intervention and create comparison groups based on their exposure to the intervention. Logically, and through numerous studies, the implementation and cessation of an effective intervention can be charted based on its effects (Odom & Strain 2002). Many studies are designed by starting an intervention, stopping it, then starting it again to compare its effects on a single person or group over time. In a sense, one could view this study as similar to a single-subject design study except the withdrawal or implementation of interventions is based on student factors rather than the design of the study itself. Groups were therefore formed based on those attendance patterns. While the analysis of attendance patterns might be a step in the right direction for future studies, there may be other factors to consider from questions raised during the study.

One possible reason for the inconsistent results of many different studies of the efficacy of after-school programs may be the differences between attendees in the classes they attend at each program. As mentioned in the methodology, each program offers a variety of enrichment and academic opportunities. Specifically, enrichment opportunities include vendors from the community that teach specific classes (arts, jewelry, mindfulness, dance, etc.), and specific clubs that are sponsored through the program (JROTC, robotics, etc.) Academic opportunities ranged from classes to supplement specific subjects, credit recovery courses, or homework assistance classes.

While a variety of opportunities are offered, often a student only attended one or two each of the enrichment and academic classes. As an example, a student might only attend mathematics classes and jewelry classes throughout the week and not attend any reading classes. There were also cases where students only attended the program for credit recovery or as a part of a club affiliated with the program. For example, a student might have attended the program briefly to make up for a failed class from the prior year than and then leave after they received credit. . Likewise, students might be attending the program five days a week, but only attend the JROTC program. Interestingly enough, the largest group was in fact students who registered for the program but only attended on average less than once a week despite high demand for the program Within the program's offerings, there were also other courses or opportunities that offered academic help only in the form of homework assistance or review of specific subjects. For example, the mathematics classes offered might only cover algebra and no other mathematics topics. Each student who attended after-school programs structured as the one included in this study will likely have vastly different experiences depending on the aspects in which they choose to engage. In addition, because the 21st Century Community Center programs are locally designed (After School Alliance 2017), each school might offer very different courses depending on teacher and community liaison availability and student interest. Some schools might use funding to assist with official school clubs while others might focus more on community vendors to teach specialized skills. The organization of the program and therefore the quality is dependent on the program directors and the teachers that are available to work after-school.

As a result, it may be more beneficial to not only conceptualize an after-school program as a singular intervention, but as an entity similar to a college that offers a variety of

opportunities from which students can choose. It would be illogical to measure whether a student improved in reading or not while attending the program if they attend no classes related to reading. As such, future studies should take into consideration the structure, components, and requirements of an after-school program before attempting to measure attendance and the program's effect on a student's academics and behaviors. It will undoubtedly be a much more complex design but understanding the attendance patterns not only in terms of dosage but where the students choose to allocate their time might allow for a more accurate measure of a program's efficacy or reveal which aspects of a program are most efficacious.

In addition, the allotment of an attendee's time might help to determine what exactly should be measured and what and how analyses should be conducted. While this study primarily examined academics, the effects of classes such as mindfulness, jewelry making, and JROTC might not be captured through measures of academic grades alone. Rather than choose several factors to study, analysis and observation of the individual classes in the program might better help form a hypothesis on factors that are affected. Behavioral data from the school such as referrals, suspensions, detentions, and absences might be more affected by certain classes. For example, students who are interested in jewelry making, might refrain from behaviors during the general school day that would jeopardize their ability to be present in the after-school enrichment class. Qualitative ratings from the schools that measure a student's in-class behavior (i.e., homework completion, attentiveness, participation, quality of work, etc.) might also be directly related to classes that focus on homework time or act as supplements to regular school hour classes and not account for engagement in the non-academic enrichment components of the program.

The quality of each class or enrichment opportunity within the after-school program's offerings might also influence the progress of students. Two schools might decide to teach similar materials, but in different formats, class sizes, and with different lesson quality. For example, the credit recovery course at one school might have students complete work and lessons virtually with only a teacher supervisor who watches the students to make sure they are on task. Meanwhile, another school has students sit in a classroom and review material from the classes the students are taking with direct teacher support to respond to questions. Due to these differences, one must be careful when combining data from different programs at different schools or carefully assess what the nature of the classes are before combining the data. Related to this factor, regular school classes might also have an effect on how students are performing. If the school has a strong biology program and a weak chemistry program, and likewise offers only biology help in the after-school program, one may not see any growth in the science grades of those who are in chemistry when compared to biology students.

If we combine the discussion points above that students change their attendance to the programs over time, only take certain classes at the programs, and that each class might influence different factors of engagement, it is apparent that studying the effects of after-school programs is a complicated task that must be carefully planned. Rather than study an entire program or groups of programs, it might be prudent to begin by analyzing individual components or classes of each program rather than look at the overall program. Rather than generalizing, reducing and specifying the groups might lead to more accurate explanations of student engagement and success. As an example of this approach, the federal government is already asking programs to begin to track student attendance in hours rather than days (Georgia Department of Education 2021).

If one examines an afterschool program as an assortment of customized interventions, then it is prudent to design studies that can allow for direct examination of specific benefits by attendance patterns, courses, and experiences. Such approaches would contribute to removing as much possible error when evaluating the efficacy of individual components of the program. Evaluating large programs with such diversity as the 21st Century Community Learning Center by grouping all students and measuring general academic outcomes will likely not capture the strengths and weaknesses of each individual student's attendance and success. This approach might also help programs nationwide realize which practices seem to have the largest effects and which classes have minimal effect. Taking these factors into account when crafting studies could help research to become more consistent across the national program. Although the current aggregated data for the overall program might be easier to consolidate information across sites around the county, evaluating each program similarly to a single-subject design approach and then aggregating the results might prove to be a more thoughtful and beneficial endeavor when making summary statements about the program. With such a large federal investment of resources, it is important to accurately measure the effects so the funding can be optimized. Although the hypothesis assessed within this study were largely not supported, the implications from their meaning can better inform future studies on after-school programming and raise empirical design considerations among researchers in the field.

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