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“Kids are 100% Behind”:

The Impact of the Covid-19 Pandemic on Elementary and Secondary School Students in
Massachusetts

By

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UNION COLLEGE

March 2022

Abstract

ROSENSWEIG, SYDNEY “Kids are 100% Behind”: The Impact of the Covid-19 Pandemic on Elementary and Secondary School Students in Massachusetts. Department of Sociology March 2022

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For two years now, the Covid-19 pandemic has continuously impacted all aspects of our society, including K-12 education. The impact of the Covid-19 pandemic is thought to be very harmful and have long-term consequences. Understanding this impact is very important, which is why this study focuses on how the Covid-19 pandemic has impacted K-12 education, specifically how it has impacted academics and behavior while attempting to understand which groups were most impacted. This problem was approached in three different ways. Z-score changes were used to determine the changes by subgroup in the percentage of students failing to meet expectations and exceeding expectations in Massachusetts Comprehensive Assessment System (MCAS) scores for all available test scores between 2019 and 2021; linear regressions were used to determine which factors led to MCAS score changes in the average test scores, the percentage of students failing expectations, and the percentage of students exceeding expectations between 2019 and 2021 for 3rd, 6th, and 10th grade English Language Arts and Mathematics; and 32 educators from a variety of school districts across Massachusetts were interviewed to further understand the academic impact in schools and to understand how students' behavior has been impacted as a result of the pandemic. The differences in MCAS scores by subgroup showed an increase in the number of students failing to meet expectations for all test scores and a decrease in the number of students exceeding expectations for almost all test scores between 2019 and 2021; these results also showed students of color and English Language Learner students being more impacted than White students. The linear regression results found that across different grades and subjects, different factors contributed to the change more than others, but Hispanic students were the most likely to lead to an adverse change while students from higher household incomes were the most likely to lead to a positive change. The linear regressions also showed that 6th-grade students were more impacted than 3rd and 10th-grade students and that there was more variance in Mathematics than English Language Arts test scores. Finally, the interviews showed noticeable class-based disparities in schools and a decline in students' behavior, mental health, and social skills. Overall, the results from this study show that the Covid-19 pandemic has impacted K-12 education and that the impact was disparate, which will most likely continue to be an issue as time goes on.

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Introduction

“On the second I arrived on the zoom meeting I’m connected to the audio. There were more buttons than there should have been, more to click than should ever be clicked. There’s far too much to take in here, more to find than can ever be found. But we all agreed as we joined the meeting that we hated zoom. The squares of zoom and they move around when the teacher shares their screen and we lose our hope until we can leave”

-A song written by nine-year-olds about their experience with remote learning

The Covid-19 pandemic, which began to impact everyone's lives in the United States in March of 2020, has now been prevalent for two years. It has continued to impact many aspects of people's everyday lives, including education. During the 2020-2021 school year, I took care of nine-year-old twins and a four-year-old, and I saw the pandemic's impact on their learning. The two nine-year-olds were in third grade and did virtual learning for half the day until April of 2021 when all public schools in Massachusetts became entirely in person again. They are enrolled in one of the best school districts in Massachusetts, their home has high-speed wifi, and they each have their own bedroom and study space; they have all the resources necessary to succeed in school, but the pandemic still impacted their learning. Both children were very unmotivated when doing school from home each afternoon; they did not want to log onto their zoom classes, they were very bored and unfocused and tried to talk to me when they were in their zoom classes. They even wrote a song about their difficulties with virtual learning. It was also a constant struggle to get them to do their homework; they were on their computers for so much of the day, leading them not to want to log back on to do school work. Their parents told me that the children were very motivated to learn in the past, and they believed that remote learning was causing them to be less interested in school. It is evident that even though these

children have the necessary means to succeed, the pandemic still negatively impacted their learning.

Similarly, this past summer, I worked with someone who has three high school teenagers, and I got to hear her perspective and her teenager's experiences with online learning. Her family had already been struggling financially, and the lockdown in the Spring of 2020 led her and her husband to be out of work which added more financial stress. Due to their financial situation, her kids did not have access to Wi-Fi or a computer to log onto their zoom classes which led them to fall very behind in school; she said that her kids went multiple weeks without the proper technology to do school. In addition, she said that once they did have the necessary technology, they were still struggling in school as they could not focus online, which led them to fail classes. Their school returned to in-person learning from September of 2020 to December of 2020, where they could succeed academically. However, in January of 2021, they went remote once again, leading her kids to be very stressed about being online again because they felt they could not learn properly or pay attention when they were remote. She said that her seventeen-year-old son was crying because of his fear of failing again due to virtual learning.

The experiences of the children I used to take care of and my co-worker's teenagers are just two examples of how the Covid-19 pandemic has impacted education. This is why the research question for this study is "How has the Covid-19 pandemic impacted student's academics and behavior in K-12 schools and how has it impacted people differently depending on their race and social class?". This question is vital to study and answer because one's future is often determined by their education and how well they do in school. The fact that there will be at least three academic years directly affected by the Covid-19 pandemic is very significant; the impact on education will be more severe the more prolonged it is impacted. Thus, there is a high

probability that the pandemic's impact on students' education will have a long-term impact, including determining students' future careers and whether or not they go to college.

While the Covid-19 pandemic has impacted students of all backgrounds, it is evident that there is a disparate impact. As seen in my co-worker's teenagers' experiences, not everyone has access to the necessary technology required to do school online. When children do not have access to the necessary materials to do school, it puts them at a severe disadvantage and could lead competent students to not succeed in school; this disadvantage will most likely continue to impact these students for many years to come. This disadvantage can also lead students to become less engaged in school. From my experiences working with children and being in school myself, I have noticed that when kids struggle academically, they start caring less about school. If kids stop caring about school, it could lead to high school dropouts, which were already very prevalent, especially for lower-income students. Before the pandemic, in 2009, the bottom 20% of all family incomes were five times more likely to drop out of school than students from the top 20% of all family income (Rumberger 2013). This demonstrates that there were already disparities in education, especially in terms of high school dropouts, but now the Covid-19 pandemic may have exacerbated these disparities.

Similar to social class disparities, the pandemic will most likely lead to more racial disparities in education. There were significant racial disparities in education even before the pandemic began. For example, students of color are often in school districts that care less about them and are less likely to finish high school than White students due to their schools lacking resources; schools that predominantly serve students of color have fewer resources than schools that predominantly serve White students (Sablich 2016). Additionally, if a White student and a student of color misbehave in the same way, the student of color is more likely to get in trouble

than the White student (Sablich 2016). There are also often stereotypes that students of color, especially Black students, are less capable of succeeding than White students, leading Black students to get less support in school (Sablich 2016). The fact that there were already racial disparities in education before the Covid-19 pandemic and that disparities in education have most likely increased even further due to the Covid-19 pandemic is very concerning.

It is evident that social class and racial disparities exist in education, and the Covid-19 pandemic most likely increased these disparities. This is why people need to be aware of these disparities, especially educators who work in K-12 schools. While the pandemic is occurring and after the pandemic ends, the disparate impact on education will be very significant. If educators are aware of these disparities, they may be able to support students who need extra support and help those students catch up in school or at least not fall further behind.

While the pandemic most likely had an academic impact, it also most likely impacted students' behavior and mental health. Even before the Covid-19 pandemic, there were concerns about young people's mental health, and mental health issues among youth have been increasing. According to the CDC (2021), in 2019, more than 1 in 3 high school students had a continuous feeling of sadness or hopelessness, which was a 40% increase from the number in 2009, and approximately 1 in 6 youth made a suicide plan in 2019 which is a 44% increase from 2009 (CDC, 2021). Mental health struggles in youth impact many parts of their lives, including academics, decision-making, and overall health (CDC 2021). Poor mental health is correlated with behavioral risks, including drug use and violence which often continue into their adult life (CDC 2021). Additionally, an article published in 2019 found that adolescents and young adults have been experiencing worsening mental health in the past ten years due to the increased use of social media, fewer face-to-face interactions, and more cyber-bullying (Rosenberg 2019). Since

mental health issues amongst youth were already increasing before the pandemic began, it can be assumed that the challenges that have arisen due to the Covid-19 pandemic have increased these issues. Moreover, since social media has already been contributing to worsening mental health, the fact that youth have been using technology so much more since the pandemic began will most likely contribute to worsening mental health.

Mental health issues impact students in schools and their behavior in different ways. Elementary and middle school students with mental health challenges are less likely to be happy in school and are more likely to be absent, suspended, or expelled. They also often have aggressive behavior and struggle to concentrate and interact with their peers (youth.gov n.d). Amongst high school students, students who struggle with their mental health are more likely to fail or drop out of school and engage in high-risk behaviors (youth.gov n.d). Overall, there is a clear correlation between worsening mental health and behavioral issues amongst youth; since the pandemic most likely caused a decline in mental health, youth will most likely have worsened behavior.

The question of how the pandemic impacts education and behavior and how it is impacting certain groups more than others relates to sociology in many ways. Education and school are significant parts of young people's social lives; many people view their school as a substantial part of their lives, and it teaches them how to interact with others. Teachers, especially those who teach in a diverse school, need to understand that not everyone comes from the same background and has the same resources and that their classrooms may have many different cultures and backgrounds. Additionally, people's lives and backgrounds are directly impacting the education they are receiving; throughout the pandemic and before the pandemic, White students from higher social classes have had access to the most resources to succeed in

school, while lower-income students of color often have had the least resources. Furthermore, educators must understand the mental health impact the Covid-19 pandemic has had on students and that their students may be behaving the way they are because of their mental health; if educators understand this, students' mental health and behavior can be addressed more effectively, and students will feel safer in school which can have a positive impact on their development and academic success going forward.

This research addresses the question of "How has the Covid-19 pandemic impacted student's academics and behavior in K-12 schools and how has it impacted people differently depending on their race and social class?" by looking at the changes between 2019 and 2021 in the percentage of students exceeding and failing expectations in all available Massachusetts Comprehensive Assessment System (MCAS) scores; by looking at what factors contributed to changes in students' MCAS scores between 2019 and 2021 in Mathematics and English Language Arts for grades 3, 6, and 10; and through data gathered from interviews related to disparities and behavioral issues that have arisen as a result of the Covid-19 pandemic.

Chapter 1: Literature Review

The Covid-19 pandemic has interrupted the education of all students across the United States, especially when the initial shutdown occurred in March of 2020. In the spring of 2020, all K-12 schools were remote, and students learned either synchronously, asynchronously, or a combination of both (Hilliard, Jones, and Mangum 2020). When schools first went online, many schools just focused on reviewing the material. However, by early April of 2020, it became clear that schools would be remote for the rest of the school year leading many districts to reexamine their remote learning plans and teachers to begin teaching new material (Hilliard et al. 2020).

While all students across the United States were remote in the spring of 2020, not all students had the same experiences, and there were many disparities within remote learning. One reason for these disparities was a technology access gap. Students from lower-income schools were less likely to have had access to the necessary technology and high-speed internet (Herold 2020). Additionally, EdWeek Research Center found that in the first week of teaching remotely, the number of teachers engaging with students in the most low-income schools in the United States was 22% lower than the number of teachers engaging with students in the highest-income schools (Herold 2020). Furthermore, when schools first went remote, 74% of all teachers said they were teaching, but there was a difference based on the school's income; 89% of public school teachers where less than 25% of all students were from low-income families reported engaging with students while only 67% of teachers working in schools where more than 75% of students were from low-income families reported engaging with students. By early April, the gap narrowed to 10% (Herold 2020). In the spring of 2020, teachers working in high-poverty school districts reported that almost a third of their students were not logging into school, which was approximately three times higher than what teachers from low-poverty schools reported (Herold

2020). Students in high poverty schools were also less likely to have had live classes in the spring of 2020; school districts serving high-income students were more than twice as likely to have live instruction than school districts serving low-income students (Herold 2020). There was also a difference in how teachers communicated with students depending on whether the school district was high-income or low-income; students from high-income school districts were more likely to have communicated with their teachers over email, while students from low-income school districts were more likely to have communicated with teachers through text messages, phone calls, and social media (Herold 2020).

In September of 2020, not all students had the same learning experience, and the experience they had typically depended on where they lived. There was a rural-urban divide in school reopenings; approximately 20% of urban school districts had in-person learning, while 66% of suburban school districts had in-person learning, and 87% of rural school districts had in-person learning in the fall of 2020 (Camera 2020). There were also social class differences. School districts with the highest poverty rates were more likely than low-poverty schools to have been remote in the fall of 2020; 41% of the highest poverty school districts started the 2020-2021 school year remotely, while 25% of the lowest poverty school districts began remotely (Klein 2020). There were also racial differences in reopening. White students were more likely to have in-person instruction than students of color; 75% of all White students had access to in-person learning, 63% of all Black students had access to in-person learning, and 59% of all Latinx students had access to in-person learning in the fall of 2020 (Klein 2020).

General Findings on the Impact on Education

As the Covid-19 pandemic persists in the United States, many aspects of everyday life continue to be impacted, including education. Public education in the United States lacks the resources to deal with school closures and remote learning. This caused children to have weaker academic progress and developmental skills; many students who struggled to learn under normal circumstances struggled even more with remote learning (Garcia and Weiss 2020). The pandemic has also caused school bonding to decrease. Around 15% of students said their academic well-being had declined because of lower school engagement and increased burnout (Branje and Morris 2021). Students' academic motivation was also lower when learning virtually, which is thought to be due to the pandemic restrictions (Branje and Morris 2021).

Students' Well-Being

The pandemic has impacted students' well-being because they have been distanced from their friends and unable to engage in typical childhood activities (Darmody, Smyth, and Russell 2021). Around 35% of parents are concerned about their children's mental health. This negative impact on children's mental health may limit their opportunities later in life, including lowering their chances of going to college and having a high-paying job (Dorn *et al.* 2021). It has been estimated that 17% of high school seniors who had planned on attending college are no longer going to due to the need to instantly enter the workforce and college tuition being too expensive (Dorn *et al.* 2021). Additionally, one in four high school seniors' plans have changed since the pandemic began, and the students whom the pandemic has most impacted are more likely to change post-graduation plans (Youth Truth 2021). The impact on student's mental health and well-being influences their choices; some have dropped out of school, chronic absenteeism for

eighth through twelfth grade has increased by 12%, and around 42% of students who became absent during the pandemic are no longer in school (Dorn et al. 2021).

Falling Behind

The 2020-2021 school year was one of the most challenging academic years in the United States history, and the Covid-19 pandemic has led students in K-12 schools to be five months behind in Mathematics and four months behind in Reading (Dorn et al. 2021). Many students failed classes in the fall of 2020; for example, in Maryland, almost six times as many students were failing Mathematics and English in Montgomery County compared to previous years, and some districts reported that nearly half of their middle school and high school students were failing at least one class in the Houston metropolitan area (Strauss 2020). Additionally, on average, students who took the i-Ready in school assessment were about ten points behind in Mathematics and nine points behind in Reading by the end of the 2020-2021 school year, and most students who took it in the spring of 2021 were about six months behind in Mathematics and the same in Reading (Dorn et al. 2021). There is also a possibility that students who have been unengaged in school during the Covid-19 pandemic may have lost previous knowledge, but the majority of students just learned less; students who started a new grade during the 2021-2022 school year started the year missing necessary knowledge and students who are repeating a school year because of the Covid-19 pandemic are less likely to graduate from high school or attend college (Dorn et al. 2021).

Failing grades are leading experts to worry that if schools do not take essential steps to help struggling students, the increase in failing grades will lead to higher drop-out rates and fewer students attending college (Taylor and Nierenberg 2021). The academic impact of the

pandemic may also cause students to earn \$49,999 to \$61,000 less over their lifetime than they would have if the pandemic had not occurred (Dorn et al. 2021). The lower earnings, as well as lower education levels and innovation, will lead to lower economic productivity; it is estimated that by 2040, there will be an annual Gross Domestic Product loss of \$138 billion to \$188 billion because of the unfinished learning caused by the pandemic (Dorn et al. 2021). Furthermore, impacted education leads students to finish school without the necessary skills, behaviors, and mindsets to succeed in the future (Dorn et al. 2021).

A study done by McKinsey and Company before January of 2021 measured quality based on how effective remote learning is and predicted that students who remained in school, if schools reopened in January of 2021, could lose 3-4 months of learning if the remote instruction they received was average, around 7-11 months of learning if their remote learning was low quality, and around 12-14 months of learning if they did not receive any instruction while learning remotely (EmpowerK12 2020). Additionally, in the fall of 2020, students who took much longer than average to grow showed growth rates that were 41% higher than students who took the typical amount of time to grow (EmpowerK12 2020). Furthermore, students who were in grades 3-8 in the fall of 2020 lost on average four months of Mathematics and one month of English and Reading learning, which led them, on average, to drop 3 to 5 percentage points in Mathematics and stay at the same place in Reading (EmpowerK12 2020). A different study, which compared students in the fall of 2019 to the fall of 2020, found that students performed similarly in Reading between 2019 and 2020, but students' Mathematics achievement dropped by around 5 to 10 percentile points (Kuhfeld *et al.* 2020). Additionally, the percentage of students failing at least one class in 2020 tripled in Houston schools compared to previous years (Potter, Baumgartner, and Turley 2021). Moreover, while students' academics were negatively

impacted by being remote across the United States, students may have made more progress academically in the winter of 2020. However, students were still further behind than they should have been (United States Department of Education 2021). Renaissance Star Assessment found that students were still very behind in both Reading and Mathematics, but more behind in Mathematics; students in late elementary and early middle school grades were about 8-11 weeks behind in Mathematics and 6-10 weeks behind in Reading in the winter of 2021 (United States Department of Education 2021).

In Ohio, like many other states, students were negatively impacted by the pandemic. For example, an average achievement on the Ohio Third Grade English Language Arts assessment dropped by around 0.23 standard deviations between the fall of 2019 and fall of 2020, which is equal to approximately a third of a year's worth of learning; the number of students being proficient fell by 9%; and the number of students who scored sufficiently on the test decreased by 8% (Kogan and Lavertu 2021). Additionally, the number of students reaching minimum test scores decreased by 8.9% for students in the district's bottom achievement quartile and decreased by 6.5% for students who were in the school district's higher achievement quartile, meaning that test scores declined for all students but declined more for students who were already struggling (Kogan and Lavertu 2021).

Students' Perspectives

From students' perspectives in a retrospective analysis, without looking directly at their test scores, around 39% of students said they learned a lot every day in the spring of 2020 compared to before the pandemic, 61% of students said they learned a lot every day in the fall of 2020, and 59% of students said they learned a lot every day before the pandemic (Youth Truth

2021). Additionally, in the fall of 2020, about 65% of students who were learning in person said they learned almost every day, 61% of students learning remotely said they learned a lot every day, and 59% of students learning in a hybrid format said they learned a lot every day (Youth Truth 2021). The grades students received also impacted how they viewed their learning. Around 66% of students who got mostly A's in school said they learned a lot every day, 57% of students who got B's said they learned a lot every day, 48% of students who got C's said they learned a lot almost every day, and 39% of students who got D's said they learned a lot every day (Youth Truth 2021).

In this retrospective analysis, students also discussed their experiences with distance learning. Around 48% of students said they could take breaks when needed, 41% said learning online is interesting, and 35% said someone usually notices when they are not paying attention (Youth Truth 2021). When online with their teacher, 9% of students said there was not enough interaction, 62% said there is just enough interaction, and 29% said there is too much interaction (Youth Truth 2021). Regarding peer interactions, 41% of students said there was not enough interaction, 48% said there is just enough, and 11% said there is somewhat too much (Youth Truth 2021). Finally, concerning interacting with their friends while distance learning, 49% of students said there are not enough interactions, 41% said there are the right amount of interactions, and 10% said there is too much interaction (Youth Truth 2021).

Students also discussed their sense of belonging in this retrospective analysis. For example, when schools went to distance learning in the spring of 2020, only 30% of students said they felt like they belonged to the school's community, while 43% of students felt like they belonged in the schools' community the previous fall (Youth Truth 2021). Additionally, students felt like teachers put in more effort to support them and their lives outside of school in the spring

of 2020; in the spring of 2020, 43% of students felt like their teachers made an effort to understand their lives outside of school compared to 30% in the fall of 2019 and fall of 2020 (Youth Truth 2021). Furthermore, the pandemic negatively impacted students' well-being, and only 49% of students felt like there was an adult at their school they could go to for emotional support compared to 64% before the pandemic, with students remote in the fall feeling less supported than those learning in-person (Youth Truth 2021).

Parental Action

The pandemic led many parents to take their children out of the public school system. Some chose to send their kids to private school, while others enrolled their children in pandemic pods or homeschooling (Dorn et al. 2021). In terms of homeschooling, 5.4% more students across the United States were being homeschooled in September of 2020 compared to March of 2020, with the most considerable increase being among Black students; in the spring of 2020, 3.3% of Black students were being homeschooled while 16.1% were being homeschooled in the fall of 2020 (Associate Press 2021). As a result of parents taking their children out of school, kindergarten enrollment was 16% lower in the 2020-2021 school year than in previous years. While kindergarten is not mandatory in most states, it often positively influences students' academic performance in the future and their overall life outcomes (Dorn et al. 2021).

Many parents who kept their children in school during the pandemic have been concerned that their children are not learning enough, and most have said that they or someone else in their home is providing additional teaching to their children (Horowitz and Igielnik 2020). However, the academic support children get in their homes varied by income. Parents from the highest incomes are the most likely to have hired tutors or other forms of support to help their

children keep up with school; 19% of upper-income parents said they hired someone to help their children, 7% of middle-class parents said that they had hired someone to help their children, and 8% of low-income parents said that they had hired someone to help their children keep up with school (Horowitz and Igielnik 2020).

Teacher Troubles

Many teachers struggled with teaching remotely, and many had never intended to teach remotely, which led them to have to adjust very quickly, leading even the best teachers to struggle to teach remotely (Garcia and Weiss 2020). It is also more difficult for teachers to keep track of students' attendance online, which leads teachers to be unaware of what their students are doing during class time and struggle to keep up the emotional bonds that are so important for students and teachers to have (Garcia and Weiss 2020). For example, in Avon, Indiana, a high school teacher said he had issues getting in touch with almost 25% of his students and said 75% felt they were falling behind in school (Meckler and Natanson 2020).

In the Spring of 2020, only 32.5% of eighth-graders had teachers who considered themselves proficient users of online platforms, and only 19.3% of eighth-graders had teachers who felt confident effectively teaching online. While some teachers who were less confident teaching online had done trainings, about one in eight eighth-grade teachers were not proficient and not trained in online platforms (Garcia and Weiss 2020). Additionally, only one in three school districts expected teachers to teach, track student engagement, or monitor students' academic progress while their schools were remote, and only 50% of districts across the United States expected teachers to keep track of their student's engagement (Gross and Opalka 2020). Moreover, only 42% of teachers across the country were expected to grade students' work, and

only about 58% of school districts expected teachers to monitor students' progress. This means that about two in five school districts did not expect students to complete assignments, which left their families entirely in charge of their children's learning (Gross and Opalka 2020).

Furthermore, teachers struggled to keep up with the standardization of teaching; when teaching in-person, teachers know how to teach and have clear expectations for students, but this was more challenging online, leading students and teachers not to have a standardization to follow (Middleton 2020).

While many teachers struggled to teach remotely, the pandemic also increased burnout and worsened mental health among teachers. A survey from January of 2021 found that nearly 25% of teachers were planning on leaving their jobs at the end of the school year, which is much higher than the average from previous years (Zamarro *et al.* 2021). Many teachers are considering leaving the profession due to the stress that teaching during the pandemic has caused. Teachers have said that they are at a breaking point due to the uncertainty, the long hours, and having to manage personal and work responsibilities (Cardoza 2021). Prior to the pandemic, teaching was already considered one of the most stressful professions in the United States, and the pandemic is increasing stress levels among teachers, which is also impacting students. When teachers are struggling mentally, it often leads students to also struggle mentally; for students to be successful in school, teachers need to feel safe and supported (Cardoza 2021).

Disparities in Education Before the Covid-19 Pandemic

Even before the Covid-19 pandemic began, there were many race and class-based disparities in education, with many students having an advantage over others. This has ranged from students' academic achievement in elementary school to college graduation rates, and

ethnic and racial disparities are linked to limited access to educational resources, educators treating minorities differently, and different responses to education (Ali 2021). Latinx, African American, and Native American communities have always had fewer resources than White communities, impacting their education (Ali 2021). As seen in the National Assessment of Education Progress, Black and Latinx students continue to have lower test scores than White students; on the eighth-grade math assessment, Black students are 32 points behind White students on a 500 point scale, and Latinx students are 24 points behind White students, and in the fourth-grade reading assessment, Black students are 26 points behind White students and Latinx students are 21 points behind White students (United States Department of Education 2021).

The summer learning gap and other achievement gaps occurred long before the Covid-19 pandemic began. The book *Children, Schools, and Inequality* (Entwisle, Alexander, and Olson 1997) discusses how schools in Baltimore and similar cities have divided elementary schools. Rather than bringing different students together, urban elementary schools are becoming increasingly isolated, more racially segregated, and increasingly economically polarized. This causes students struggling financially to only be with other students struggling financially (Entwisle et al. 1997). As Baltimore lost more money, people had less faith in the public school systems, and many people who could afford to do so left the public school system altogether. This has caused Baltimore public schools to become increasingly disadvantaged; in the 1990-1991 school year, there was increasing racial and economic segregation in these schools (Entwisle et al. 1997). A social climate in a small elementary school where the majority are advantaged is very different from a social climate in a school where most students are disadvantaged (Entwisle et al. 1997).

Preschool Advantage

Children who go to preschool have an advantage over those who do not because preschool increases children's IQ by 8 points and increases students' Mathematics achievements through elementary school. Preschool students also often have more pride in their academic accomplishments (Entwisle et al. 1997). When looking at children who attended a Head Start preschool, their parents were more satisfied with their academic performance than parents whose children did not; when Head Start students reached seventh grade, only 14.6% of them were in special education programs compared to 34.9% of the children who did not attend a Head Start preschool; only 19.9% of these students had been retained compared to 34.9% of students who did not attend a Head Start preschool; and by twelfth grade, 18.9% more students who attended Head Start preschools were not in special education programs compared to students who did not attend a Head Start preschool (Entwisle et al. 1997). Additionally, students who attended preschool had been more accessible for first-grade teachers, were more likely to make their parents proud of their achievements, and had greater confidence in their abilities (Entwisle et al. 1997). Furthermore, students who went to preschool were more likely to graduate from high school, retain employment, and better adapt to mainstream society (Entwisle et al. 1997). In general, preschools have very positive long-term impacts on students; children who attended the early Head Start programs were almost always disadvantaged and African American but were still more likely to graduate from High School than those who did not attend early Head Start programs (Entwisle et al. 1997).

Seasonal Learning Gaps

Seasonal learning increases achievement gaps. Going to school reduces the achievement gap, and the gains students make during the school year are more significant than the gains students make in the summer. However, unlike school year gains, summer gains are entirely related to student's economic status; lower-income children gain the same amount as higher-income children in the winter but gain less than them in the summer, and in the summer, almost all African American students fall behind in school (Entwisle et al. 1997). Economically Disadvantaged students especially fall behind in Reading and Mathematics over the summer (Entwisle et al. 1997). Children who can learn at home are usually those from higher social classes, and it is those students who gain a lot of academic skills over the summer, while those from lower-income backgrounds do not have that advantage (Entwisle et al. 1997).

In Baltimore, students' achievement varied by social class only when schools were closed, emphasizing that school closures increase inequality gaps (Entwisle et al. 1997). Students from lower social classes began to fall behind during the summer between first and second grade, which is the summer when students from higher social classes got ahead; the gains and losses grew smaller each year, but these seasonal patterns continued for five years (Entwisle et al. 1997). Students in the top ten schools gained around 7 points in Reading and 3 points in Mathematics over the summer, while students in the lower ten schools lost 1.7 points in Reading and 1.5 points in Mathematics each summer, but all students made the same gains in the winter (Entwisle et al. 1997).

Another study found that the achievement levels of students impacted by the summer learning gap drop by one months' worth of school with more significant declines in Mathematics than Reading (Quinn and Polikoff 2017). A study of over half a million students in grades two

through nine found the impact of the summer learning loss to be more significant at higher grade levels and that the income-based reading gaps increased over the summer. This same study found that the students who were impacted by the summer learning gap lost between 25-30% of their academic year learning during the summer, and Black and Latino students typically gained less over the school year and lost more over the summer than White students (Quinn and Polikoff 2017). Similarly, an additional study found that 52% of students lost around 39% of their school year gains during the summer (DeLaRosa 2020). Without summer reading, students only retain around 70% of their progress, and some lose up to 50% of their math retention over the summer (DeLaRosa 2020).

The summer learning gap comes with many lasting consequences. Students from low-income families are less likely to get into college-prep high schools because their test scores are often too low when school placements are being made; since they have low test scores, they are more likely to not graduate and are less likely to attend a four-year college (Alexander and Entwisle 2007). The summer learning gap also leads low-income students to be nearly three grades behind high-income students in Reading by the end of fifth grade (TSDF 2021). When children start school, summer learning differences influence the grade nine achievement differences between students from high and low incomes (Alexander and Entwisle 2007). Once students are behind in school, it is challenging for them to catch up, and to do so, they have to make above-average gains. It is also improbable that school resources can fully compensate for the learning gap's impact on students (Alexander and Entwisle 2007).

Risk Factors Based on Social Class

Students from low-income families suffer from multiple risk factors. The two major overlapping ones are family socioeconomic status and parents' education level; these factors overlap because people who finish high school often have higher living standards than those who do not (Entwisle et al. 1997). Children who come from lower-income families are more likely to have lower test scores and behavioral issues in school; a child from a high-income family is 8% more likely to be in the upper half of their class than a child from a low-income family, and in 1992, students whose families were in the lower-income quintile had a dropout rate of around 25% while students in the highest income quintile had a dropout rate of only 2% (Entwisle et al. 1997). The correlation between a student's economic background and school outcome begins very early in schooling because children from higher economic backgrounds enter first grade with more advanced verbal and mathematics skills than low-income students (Entwisle et al. 1997). Additionally, higher-income children have more continuous growth because their families can provide resources for them to continue to grow when they are not in school while lower-income children do not have that privilege; poverty limits cognitive growth because children in poverty do not have the resources to grow when school is not in session (Entwisle et al. 1997).

The overall socioeconomic status of children in a specific school impacts how the school teaches. Variation in socioeconomic status between elementary schools is greater than the variation in secondary schools, which is because small areas within towns differentiate more by socioeconomic status; as a consequence, variation in Reading scores is around 60% greater at third grade than twelfth grade, and the variation in Mathematics is over 100% greater at third grade than twelfth grade (Entwisle et al. 1997). This leads schools to function differently;

schools have different grading standards and treat students differently depending on the social class of the school. In low-income schools, irregular grade patterns often require students to make different transitions (Entwisle et al. 1997). Additionally, students from lower-income families move more often, and the timing of their moves often requires them to transfer between schools at times that interfere with their academics. When students move, there are many adjustments they need to make, and they often have no support to help with the transitions (Entwisle et al. 1997). Furthermore, because students who go to lower-income schools are constantly coming and going, teachers often find it necessary to reteach material to catch new students up, leaving all students behind (Entwisle et al. 1997).

Racial Achievement Gap

While there is a substantial achievement gap by social class, there has also always been an achievement gap by race, disproportionately impacting Black and Latinx students. Black and Latinx students are less likely than White and Asian students to be exposed to advanced classes and receive a high school diploma (Sablich 2016). Moreover, Black and White students do not attend equal colleges; Black students only make up 4% of undergraduate students in the top-rated colleges in the United States and make up 26% of enrollment in the lower-ranked colleges (Sablich 2016). Additionally, Black students are less likely than White students to have access to college preparatory courses; in the 2011-2012 school year, 57% of Black students had access to Mathematics and Science college preparatory courses while 81% of Asian American students and 71% of White students had access to those courses. Even when Black students do have access to these courses, they are significantly underrepresented in those courses (UNCF n.d).

Students of color are often in schools with fewer resources than White students; schools with at least 90% students of color spend \$733 less per student annually than schools with at least 90% White students (UNCF n.d). Black students are also more likely to have less qualified teachers. There has been evidence that there is systemic bias in teachers' expectations for Black students as teachers often expect Black students to perform more poorly than other students (UNCF n.d). Furthermore, Black students typically spend less time in the classroom due to being disciplined, which puts them further behind in school; Black students are 3.8 times as likely as White students to receive one or more out-of-school suspensions (UNCF n.d).

Schools with predominantly students of color have always been more likely to have fewer resources and be in less safe settings. Many of these students have fewer resources at home as well. These disparities have continued to impact academic achievement (United States Department of Education 2021). In 2015 White students had an average Reading score that was 26 points higher than Black students in fourth and eighth-grade, and in twelfth grade, 7% of Black students were performing at or above proficient on a Mathematics exam while 32% of White students' scores were at or above a proficient level (UNCF n.d.) Additionally, many students of color have always had less experienced teachers, been in less academically challenging courses and programs, and have had lower expectations for their educational achievement (United States Department of Education 2021). OCR's Civil Rights Data Collection found that students of color have significantly less access to opportunities in high school, including classes that help prepare students for STEM careers; when students of color do have access to these classes, the classes are usually taught by inexperienced teachers as schools with predominantly students of color are 1.5 times more likely to hire inexperienced teachers compared to predominantly White schools (United States Department of Education 2021).

Contribution of Capital on Educational Disparities

Capital is also a significant contributor to disparities in education. One form of capital that increases the disparities in education is cultural capital. Cultural capital can be gained in various ways depending on the time period, society, and social class, and it is gained unconsciously (Bourdieu 1986). The most potent aspect of cultural capital is its transmission, and there is a link between economic capital and cultural capital (Bourdieu 1986). Cultural capital, especially in its objectified state, demonstrates an autonomous and coherent universe with its own laws and transcending individual wills that remain irreducible (Bourdieu 1986). Cultural capital relates to education because there are informal academic standards in schools where teachers reward students for having more general habits, skills, and styles; these general expectations are based on the dominant class in society which is often the middle class (Lareau and Weininger 2003).

Due to cultural capital, middle-class students often have an advantage in schools through the hidden curriculum. Schools are middle-class institutions, and students are expected to behave in a middle-class way, but these expectations are not taught explicitly; many middle-class students who learn these expectations at home have more success meeting teachers' expectations and succeeding in school than working-class students (Calarco 2018). As students get older, they slowly adopt their family's class-based strategies and begin internalizing their parents' messages when dealing with school difficulties. Middle-class parents view seeking out support as a beneficial skill, expect their children to get rewarded for requesting things, teach their children to interact with authority figures in assertive ways and avoid consequences for mistakes, and prioritize good grades (Calarco 2018). On the contrary, working-class families often teach their children skills like respect (Calarco 2018). These differences lead to class-based differences in a

student's willingness to seek out help from their teachers in school; middle-class students typically take a proactive approach while working-class students are typically more patient. When working-class students do ask for help, unlike middle-class students, they rarely ask for clarification if they are still confused, which puts them at a significant disadvantage as they often end up doing their work incorrectly or not at all (Calarco 2018).

Social capital, which is the amount of resources people have connected to a network of institutional relationships that give its members backing to the collectively owned capital and insights into the world, also increases educational disparities (Bourdieu 1986). The amount of social capital one has is dependent on the size of their network and how much economic, cultural, and symbolic capital each of their connections has (Bourdieu 1986). It was found that students in religious schools often have lower dropout rates because they have access to a religious community outside of school (Coleman 1988). Additionally, children in single-parent families in public and private schools have a dropout rate two times higher than students with two parents. However, in religious schools, students in single-parent homes do not have a higher dropout rate than students in two-parent homes. This is thought to be because students in religious schools have greater social capital, emphasizing that social capital in the community can make up for missing social capital in a family (Coleman 1988).

Racial and Ethnic Disparities Exacerbated by the Covid-19 Pandemic

As seen, there have already been many race and class-based disparities in education, which the Covid-19 pandemic has now exacerbated. Since people of color were more likely to lose their jobs than White people during the pandemic, ethnic and racial disparities in education are increasing (Ali 2021). For example, in the Washington DC school districts, students of color

and already at-risk students had the most significant achievement drop (EmpowerK12 2020). Additionally, Asian students had a 2% increase in achievement, Black students had a 15% decrease in achievement, Latinx students had an 8% decrease in achievement, and White students had a 3% increase in achievement in Mathematics average percentile changes between the fall of 2019 and 2020 in Washington DC (EmpowerK12 2020). Furthermore, Asian students had a 3% increase in achievement, Black students had a 15% decrease in achievement, Latinx students had a 12% increase in achievement, and White students had a 3% increase in achievement in average Reading percentile changes in Washington DC between the fall of 2019 and fall of 2020 (EmpowerK12 2020).

A reason White people had an increase in achievement while most students of color had a decrease in achievement is that even before the Covid-19 pandemic began, students in vulnerable communities were already impacted by inequality. These inequalities ranged from insufficient resources to very high student-teacher ratios and unequal access to educational resources (Simon 2021). During the pandemic, these inequalities were exacerbated; Black and Hispanic households with school-aged children were 1.3 to 1.4 times more likely than White families to have limited access to the necessary technology to do school from home (Simon 2021).

Digital Divide: Difficulty Accessing Remote Learning

Throughout the Covid-19 pandemic, disparities in internet access increased racial disparities in education (Ali 2021). The digital divide has disproportionately impacted Black, Latinx, and Native American students; these students make up 54% of the digital divide but are only 40% of the total population (Ali *et al.* 2020). The specific demographic breakdown of the digital divide is as follows: White students make up 40% of the digital divide while making up

47% of the population, Asian students make up 3% of the digital divide while making up 5% of the population, Latinx students make up 33% of the digital divide while only making up 27% of the population, Black students make up 19% of the digital divide while only making up 15% of the population, and Native American students make up 4% of the digital divide while only making up 1% of the student population (Ali et al. 2020). Native American students appear to be disproportionately affected as more than 70% of Native American students do not have internet access (Ali et al. 2020). Additionally, Black and Hispanic families with school-aged children were 1.3 to 1.4 times as likely as White families to have limited access to the necessary technology during remote learning (Simon 2021).

As of the summer of 2020, around one-third of teachers in predominantly Black schools said that their students did not have access to the necessary technology to log into school, and one in five teachers said their students did not have access to necessary technology in schools where less than 10% of the school population was Black (United States Department of Education 2021). Similarly, for Latinx students, a study of more than 60,000 secondary school students and 22,000 upper-elementary school students found that 30% of Latinx students did not have access to reliable internet service (United States Department of Education 2021).

By the fall of 2020, the digital gap had narrowed slightly, but students in Black and Latinx households were still three to four percent less likely than White households to have reliable internet access (Dorn et al. 2021). In October of 2020, around one in ten Black and Latinx families still did not have consistent access to necessary technology compared to 6.7% of White households (United States Department of Education 2021). Additionally, the Southern Education Foundation found that one in five Black children did not have internet access in their homes which is significant since most places like public libraries and other places where students

would have been able to access these resources in the past were closed (Garcia and Weiss 2020). Since Black students were less likely to have access to the necessary technology, standardized test scores reported during the pandemic showed results that were more correlated with life circumstances than students' abilities. Due to teachers not being with the students when they took the tests, they did not have the resources to effectively interpret the results and find ways to support their students (Garcia and Weiss 2020).

A reason the digital divide had a significant impact on Black students is that in the spring of 2020, the labor market impacted the housing stability of Black families much more than White families. This caused many Black homeowners and renters to struggle to pay rent, leading them to struggle even more with paying for the technology needed for remote learning (Francis and Weller 2020). There were racial disparities among the groups that had limited access to the necessary resources; Black parents with limited access were likely to have spent two to three fewer hours teaching their children while White parents with the same limitations were only expected to have taught their children one or two fewer hours a week (Francis and Weller 2020). Additionally, White families without reliable access to necessary resources were much less likely to experience job loss and have no savings at the same time, making it so they could afford to spend more time with their children to even out not having access to necessary resources (Francis and Weller 2020). The racial differences in the digital divide are expected to impact students' educational outcomes (Francis and Weller 2020).

English Learners Achievement Gap

Doing school remotely was most likely challenging for other vulnerable groups, including migrant children and English learners. These children are thought to have faced more

difficulties because their parents may not have been as familiar with the curriculum, making learning from home a lot more challenging; for these children especially, a school's ability to provide resources for remote learning directly impacted how engaged they were and their academic progress throughout the year (Darmody et al. 2021).

Bridgeport Connecticut demonstrates an achievement gap between students who are English Learners and those who are not; at Harding High School, it is estimated that only one in seven English-Learner students will be proficient in English within the next five years, and the Covid-19 pandemic has exacerbated this achievement gap (Thomas 2020). Additionally, in Connecticut as a whole, it is estimated that only one in three English Learners will be proficient in English within the next five years (Thomas 2020).

In general, across the United States, it has become evident that in-person learning disruptions may have impacted English Learner students the most. By schools closing, students no longer had the opportunity to receive intense language teaching and practice their English in different social and academic contexts (United States Department of Education 2021). Additionally, remote learning made it so English Learner families did not have access to web-based learning that they depended on schools to connect them to (United States Department of Education 2021). Many English Learner students also had more financial and caregiving responsibilities when doing school online, making it more difficult for them to participate in school (United States Department of Education 2021). Furthermore, many school districts struggled to have enough staff to help English Learners during remote learning (United States Department of Education 2021). Evidence has demonstrated that the pandemic increased disparities in the learning outcomes for English Learner students; in the fall of 2020, many school districts reported that more English Learner students were failing classes. For example, a

California school district reported that the number of English Learner students failing grades increased from 34% to 50%, and other school districts across the United States saw similar trends (United States Department of Education 2021).

Limited Access to In-Person Learning in the Fall of 2020

In-person school leads students to be more engaged in school and with their teachers, but in the fall of 2020, students of color were less likely than White students to be learning in-person. From late 2020 to early 2021, 75% of White students had full-time access to in-person learning, 63% of Black students had full-time access to in-person learning, and 59% of Latinx students had full-time access to in-person learning (Jenco 2021), and as of March of 2021, 58% of White fourth-graders were enrolled in an entirely in-person school while only 36% of Black fourth-graders, 35% of Latinx fourth-graders, and 18% of Asian fourth-graders were enrolled in an in-person school (United States Department of Education, 2021). The disparate access to in-person learning is expected to have wide-ranging impacts on students (Jenco 2021). Many factors are thought to have contributed to these disparities, including the fact that many students of color live in urban areas with higher levels of Covid-19 in the community and that more Black and Latinx people had been hospitalized or died from Covid-19 compared to other races (Jenco 2021).

Academic Impact on Students of Color

Students of color have been disproportionately academically impacted during the Covid-19 pandemic. Students who were in schools with predominantly Black students ended the 2019-2020 school year with six months of unfinished learning in both Mathematics and Reading,

students who were in predominantly Latinx schools ended the school year being six months behind in Mathematics and five months behind in Reading, and students in predominantly White schools ended the year four months behind in Mathematics and three months behind in Reading (Dorn et al. 2021). Furthermore, there was an 83% increase in students failing at least two classes in the Fairfax County public schools in Northern Virginia. The most significant increase was from students with disabilities, English Learner students, and Latinx students (EmpowerK12 2020).

It is estimated that when schools reopened in Washington DC in January of 2021, Black students had lost 10.3 months of learning and Hispanic students had lost 9.2 months of learning while the average student only lost 6.8 months of learning; it is estimated that this learning loss may grow the achievement gap by 15-20% (EmpowerK12 2020). Similarly, in the Ohio education system, Black students' test scores declined by almost 50% more than White students' test scores, equivalent to about half a school year's worth of learning (Kogan and Lavertu 2021). Additionally, in the same school system, achievement declines were more evident for Black students than Latinx and Asian students, and the racial difference regarding the impact of the Covid-19 pandemic was apparent when it came to students having a high enough test score to move onto fourth grade; the number of Black students moving onto fourth grade was 13.8% lower than previous years, the number of Latinx students moving onto fourth grade was 9.3% lower than previous years, the number of White students moving onto fourth grade was 5.8% lower than previous years, and the number of Asian-American students moving onto fourth grade was 3.4% lower than previous years (Kogan and Lavertu 2021).

McKinsey and Co. estimate that schools going remote in the spring of 2020 put White students behind by one to three months in Mathematics while students of color were set back by

three to five months; they estimate that the more extended education is impacted by the Covid-19 pandemic, the greater these academic losses will become (Meckler and Natanson 2020). The same study compared the student testing gap by race and found that in elementary schools with over 50% students of color, the average Reading score was only 77% of the previous year's average scores, while the average Reading score in schools with more than 50% of their students being White was 90% of what it was the previous years. In addition, they found that Mathematics scores in elementary schools with over 50% students of color were 59% of what they were in previous years, while average scores in schools with over 50% of their students being White were 69% of what they were in previous years (Meckler and Natanson 2020). Furthermore, it was reported that 30% of Latinx students failed at least one class in the spring of 2020, which was 16% higher than the previous years, while the percentage of White students failing one class only changed by 1% in the Carbondale Elementary School district in Southern Illinois (Meckler and Natanson 2020).

Racial Disparities in School Engagement

Public health, education, and economic harms caused by the Covid-19 pandemic are most likely going to increase inequities impacting Black, Latinx, Native American, and English Learning students as well as students with disabilities; schools are essential for providing services like after-school programs, meal programs, and counseling for many groups of children across the country (Kuhfeld *et al.* 2020). School districts attempted to incorporate these resources into a remote setting, but it was less successful than in-person (Kuhfeld *et al.* 2020).

In the fall of 2020, Black and Latinx students were twice as likely as White students to have no contact with a teacher over a week and were 6% less likely than White students to have

live classes (Dorn et al. 2020). It is predicted that the losses in earnings from the Covid-19 pandemic will be much more significant for Black and Latinx students than for White students; it is estimated that Black students will lose \$2,186 a year while working over 40 years, Latinx students will lose \$1,809 a year, and White students will only lose \$1,348 a year (EmpowerK12 2020).

Racial disparities are also prevalent in school enrollment (Meckler and Natanson 2020). For example, in Connecticut, attendance among Black and Latinx students, students with disabilities, children from low-income families, and English Learners dropped by 5% in the 2020-2021 school year (Meckler and Natanson 2020). Similarly, in the Chicago public school system, the enrollment rate of Black students in pre-kindergarten decreased by 44%, and the enrollment of Latinx students in pre-kindergarten decreased by 30% (Meckler and Natanson 2020).

Racial Discrimination

Racial discrimination, which has increased since the Covid-19 pandemic began, impacts students' academics and mental health. Anti-Asian hate has been rising since the Covid-19 pandemic began, with many people of Asian descent being blamed for the pandemic (Wakabayashi *et al.* 2020). In the United States, both in-person and online forms of anti-Asian hate have increased through anti-Chinese social media posts, media coverage, policies, comments from different public leaders, and conspiracy theories (Wakabayashi et al. 2020). This has made Asian-American students very vulnerable to increased psychological distress, lower academic grades, and lower engagement in school (Wakabayashi et al. 2020).

Learning Obstacles

Students of color have had worsened mental health during the Covid-19 pandemic, and Latinx, multiracial, and Black students faced more obstacles learning remotely than White or Asian students (White, Liburd, and Coronado. 2021). In the spring of 2020, Asian students on average had 1.78 obstacles, White students had an average of 1.83 obstacles, Native Hawaiian or Pacific Islander students reported an average of 2.16 obstacles, Black students reported an average of 2.24 obstacles, Multi-Race students reported an average of 2.28 learning obstacles, and Latinx students reported an average of 2.28 obstacles (White et al. 2021). A reason for these obstacles may be due to students being linguistically isolated, living in crowded conditions, not having access to technology, not having an adult in their house with a high school diploma or an equivalency of a high school diploma, having a disability, or living in poverty (Spievack and Gallagher 2020).

Changed Post-Graduation Plans

Students of color are also more likely to have changed post-graduation plans because of the Covid-19 pandemic; 18% of White students said their plans have changed, while 30% of students of color reported their plans changing (White et al. 2021). A reason that students of color had changed post-graduation plans may have been because the pandemic disproportionately affected people of color financially. When the Covid-19 pandemic began, more than four in ten Latinx and Black families and half of all Native American families had their hours or wages reduced or lost their jobs (Smith 2020).

Class Disparities in Education During the Covid-19 Pandemic

Just as the pandemic has exacerbated racial disparities within education, it has also exacerbated class-based disparities. Students from low-income families struggled more than others with remote learning. A high school teacher said that while one of his students loved his class, they did not have time to do it anymore as their family situation required them to care for their siblings (Meckler and Natanson 2020). In general, families who were already struggling financially before the Covid-19 pandemic most likely struggled even more once the pandemic began. Issues that arose from the financial difficulties during the Covid-19 pandemic, such as homelessness, food insecurity, job loss, lower child care options, and lack of healthcare, have contributed to difficulties during remote learning and have increased the equality gap, which will lead to more achievement gaps in the future (Ali 2021).

A primary reason for the economic achievement gap is an increase in unemployment due to the Covid-19 pandemic; the most prominent test score declines were in areas with the most significant job losses (Kogan and Lavertu 2021). It is estimated that the Covid-19 pandemic will take the already significant achievement gap between middle-class and low-income students and make it significantly worse; when schools were shut down, parents with college degrees were operating homeschools, and many parents who had the time to do so were teaching their children entirely. However, parents who were less educated and had in-person jobs did not have the resources to teach their children. Their children also may have had more responsibilities than before the Covid-19 pandemic (Rothstein 2020). Children living in low-income, overcrowded, or unsafe neighborhoods also may have experienced toxic stress from what they were exposed to, which likely interfered with their emotional health and learning (Rothstein 2020).

Digital Divide

When schools were remote due to the Covid-19 pandemic, about 15 million to 16 million American students did not have adequate access to online resources. On average, students without adequate access to the necessary technology had, even before the Covid-19 pandemic, a 0.4 point lower GPA (Ali et al. 2020). The pandemic has made inequalities worse, and the digital divide during the Covid-19 pandemic could lead disconnected students to lose seven to fourteen months of learning, could cause 232,000 high school students to drop out of school, and could lead to a total annual income loss of \$110 billion across all the students in K-12 schools who were negatively impacted by the digital divide (Ali et al. 2020).

Across the United States, in the states with the largest digital divide, around 50% of students do not have adequate internet access, and in the states with the smallest digital divide, one in four students do not have adequate internet access (Ali et al. 2020). Additionally, the most significant number of disconnected students live in Texas, California, and Florida, and rural Southern states have the most disconnected students (Ali et al. 2020).

While the digital divide impacts students of all income levels, the students who are most likely to be disconnected are students from lower-income families; students from families that make less than \$50,000 a year are only 30% of the K-12 population but account for more than half of all students who are disconnected (Ali et al. 2020). More specifically, students from families that make over \$100,000 a year account for 38% of the K-12 population but only make up 18% of the digital divide; students in families that make between \$75,000 and \$100,000 a year account for 14% of the overall K-12 population but only make up 11% of the digital divide; students whose parents make between \$50,000 and \$75,000 only make up 16% of the K-12 population but make up 19% of the divide; and students whose families make under \$50,000 a

year only make up 32% of the K-12 population but make up 52% of the digital divide (Ali et al. 2020). Additionally, high-income students were using online resources more than low-income students during the Covid-19 pandemic; 65.8% of students in households with an annual income of under \$50,000 were using online resources, while 76.5% of students in households that had an income between \$50,000 and \$99,999 had children who were using online resources (McElrath 2020). Furthermore, households with an annual income of less than \$50,000 and households with an annual income of \$50,000 to \$99,999 were more likely to use paper materials sent home for remote learning than students in households with an annual income of over \$100,000 (McElrath 2020).

Disparities in Academic Success

A survey sent out to more than 1,500 families across the United States in the spring of 2020 found that the Covid-19 pandemic is negatively impacting all students' education but is impacting some students more than others; the results showed disparities in academic success during remote learning depended on family income and found that remote learning had a severe negative impact on many of the most vulnerable students because millions of families do not have the necessary resources to help their children succeed (Parents Together Action. 2020). Low-income parents were ten times as likely to say that their kids did little or no remote learning compared to high-income parents; students from low-income homes were three times as likely as those from high-income homes to not have regular access to necessary technology; low-income students were five times as likely as those who were high-income to not go to a school that offered distant learning materials; and low-income parents were twice as likely as high-income parents to say that remote learning went poorly or very poorly (Parents Together Action. 2020).

Additionally, students with more financial stress in their lives were more likely to have had a decline in school bonding than students who were not under financial stress (Branje and Morris 2021).

During the Covid-19 pandemic, students from more affluent households have had more support than students from lower-income households. Students from higher-income households were more likely to have been offered help from the school during remote learning, and their parents were spending more time doing remote learning with them than students from lower-income families (Darmody et al. 2021). Additionally, during the Covid-19 pandemic, parents had been responsible for teaching their children; higher-income families had been more successful with this than lower-income families. Higher-income parents typically had more resources at home to help their children learn and were more likely to be working from home themselves (Darmody et al. 2021). When schools were closed, parents with higher levels of education were more likely to teach their children or actively support them. In contrast, parents without any degrees were less confident teaching from home. When schools stay closed for at least 34 days, students in wealthier families have the privilege of having more than eight full days' worth of extra learning (Darmody et al. 2021).

Wealth and Education

In the United States, wealth and education have always been intertwined into an intergenerational cycle; wealthier families provide more educational opportunities for their children, leading them to make more wealth. This has led to an inequality gap that is expected to widen due to the Covid-19 pandemic (Francis and Weller 2020). Furthermore, in the spring of 2020, the transition to remote school required parents to help fund their children's education

when many parents lost parts of their income or jobs. This made it more challenging for parents to help their children through online learning (Francis and Weller 2020).

Available resources also impacted how well parents could support children through remote learning; in many families, resources needed to be shared among several children and adults in the household. The unequal access to resources sometimes translated into poor quality work (Darmody et al. 2021). Many students living in lower-income households also did not have a quiet place to study (Darmody et al. 2021). Additionally, when learning remotely, low-income students were engaging 16% less in school than when learning in-person, while high-income students were only engaging 2% less in school than when learning in-person (Dorn et al. 2020).

Not having available resources, while fueling the opportunity gap, has most likely made it more difficult for students to engage with school and has most likely made students less interested in school; this will lead to an increase in dropout rates among disadvantaged students and the students who stay in school will be significantly behind their more advantaged peers (Garcia and Weiss 2020). In addition, during the Covid-19 pandemic, traditional assessments have been challenging for students who do not have access to the necessary resources and environments that allow them to pass tests and, as a result, can cause some students to not do as well on their assessments (Garcia and Weiss 2020).

Students Falling Behind

Students in low-income schools fell seven months behind in Mathematics due to the Covid-19 pandemic, and there has been an increase in the number of high school students in low-income schools who are dropping out of school or not enrolling in college; 26% of low-income high school seniors abandoned their post-graduation plans due to the Covid-19

pandemic (Dorn et al. 2021). Additionally, by the end of the 2020-2021 school year, students whose families made less than \$25,000 a year were on average seven months behind in Mathematics and six months behind in Reading; students whose families made between \$25,000 and \$75,000 a year were on average five months behind in Mathematics and four months behind in Reading; and students whose families made over \$75,000 a year were four months behind in Mathematics and three months behind in Reading (Dorn et al. 2021).

In the Washington DC school districts, students in lower-income schools retained five months of Reading while the students in the wealthier school districts ended up getting ahead during the 2019-2020 school year (EmpowerK12 2020). Additionally, there are expected to be drops in early literacy proficiency among lower-income students, which can put impacted students at a disadvantage that is expected to last through school (EmpowerK12 2020). For example, in the Montgomery County Public schools in Maryland, over 36% of ninth graders from low-income families failed English in the fall of 2020, which was 6% higher than the fall of 2019 (Meckler and Natanson 2020).

Differences in Education Received

Students in high poverty elementary schools were expected to spend 2.5 hours on instructional activities during the day when their school was remote, while students from low poverty elementary schools were expected to spend 2.73 hours a day on school when their school was remote, and 24% of high poverty schools mainly just reviewed content while remote compared to 12% of low-poverty schools (Rickles *et al.* 2020). Furthermore, only 39% of high poverty school districts had live virtual classrooms for elementary school students when remote, while 56% of low poverty school districts had live virtual classrooms (Rickles et al. 2020).

In general, wealthier school districts were more likely than poorer school districts to have required teachers to provide live instruction; only 14.5% of school districts that had the highest number of students receiving free or reduced lunch expected teachers to provide live instruction when schools were remote while 25% of wealthy school districts expected teachers to provide live instruction (Gross and Opalka 2020). This may be due to concerns about internet access in low-income areas and demonstrates how access to necessary technology can impact students' learning and teachers' expectations when schools are remote (Gross and Opalka 2020). Another reason why wealthier school districts were more likely than poorer school districts to provide live instruction when teaching remotely may be that wealthier school districts have access to more resources as poorer school districts often receive less funding; school districts with the most poverty get around \$1000 less per student in state and local funding than school districts with the lowest poverty rates (Camera 2018). Additionally, historically, school districts that serve more poor students have had fewer high-quality teachers, advanced course offerings, early education programs, and school counselors (Camera 2018).

Once schools began reopening in the fall of 2020, schools primarily serving low-income students had more difficulty opening. Schools that primarily serve low-income students are typically under-resourced, overcrowded, and do not have enough staff, which could increase the chances of Covid-19 spreading, making a safe reopening challenging (Wakabayashi et al. 2020). Additionally, many low-income students live with others who are at risk of having severe complications from Covid-19 or live in very crowded houses, which may have influenced their parent's decision on whether or not to send them to school in person (White et al. 2021). Furthermore, because of these circumstances, decision-makers needed to consider health

disparities and social inequalities that could put students at an increased risk of contracting Covid-19 or getting a severe illness from Covid-19 if they did contract it (White et al. 2021).

Rural Versus Urban School Districts

There has been a sizable academic divide between rural and urban school districts during the Covid-19 pandemic, as rural school districts are typically lower income. In addition, internet access is typically worse in rural school districts than in suburban and urban school districts. As a result, rural students received less instruction from their teachers, were less in touch with their teachers, and their teachers monitored their academic progress less than students in urban and suburban school districts (Gross and Opalka 2020). Additionally, only 27% of rural school districts expected teachers to teach, while over half of urban school districts expected teachers to teach (Gross and Opalka 2020). Similarly, only 43% of rural school districts expected teachers to be aware of students' progress, while 65% of urban school districts expected teachers to be aware of students' progress (Gross and Opalka 2020). There was also a 25% difference between the number of rural and urban school districts that required teachers to keep track of students attendance, and there was a 17% difference between the number of rural school districts that required teachers to provide a grade of some sort compared to urban school districts (Gross and Opalka 2020). The academic differences between rural, urban, and suburban schools may be due to the differences in technology access, as urban and suburban areas often have more access to technology resources than rural school districts (Vogels 2021).

Mental Health Impact of the Covid-19 Pandemic

Previous research shows that the Covid-19 pandemic has and will continue to profoundly impact students' mental health. It is already leading to long-term psychological issues in youth that are expected to lead to long-term psychiatric disorders (de Figueirido *et al.* 2021). It is no surprise that young people's mental health has worsened due to the Covid-19 pandemic since early adverse life experiences and feeling lonely or isolated are leading causes of mental illness (CDC 2021). While it is not unexpected that so many young people have worsening mental health, it is concerning because untreated mental health impacts people long-term; untreated mental health can worsen mental health, which often impacts the mind and leads people not to sleep and to an endless cycle of fatigue and irritability (Evolution Research Group 2020). Untreated mental health can also impact the body, especially the heart and the immune system. The heart and immune system often react to a stress response by causing the heart to beat faster and the blood vessels to be tighter, leading to a weakened immune system and heart disease (Evolution Research Group 2020).

Loss of School Structure

A reason for worsening mental health in students is the lack of school structure they had during the Covid-19 pandemic. Being in school gives students structure, and routine and consistency allow students to focus on academics (Child & Adolescent Behavioral Health 2022). Due to the structure school gives students, school shutdowns have caused a lot of anxiety around the unknowns; for some students, it is a healthy amount of fear and worry, but for others, the anxiety is so intense it is leading them to have difficulty concentrating, sleeping, and engaging in the things they enjoy doing (Child & Adolescent Behavioral Health 2022). While the stress of

the Covid-19 pandemic seems to have impacted all students, high school seniors have been disproportionately impacted. Many high school seniors are now worried that they will not graduate on time, are worried that they are not fully prepared for college, and are worried that they will not get accepted into college (Child & Adolescent Behavioral Health 2022).

Worsening Mental Health

While the general school stress around the pandemic is normal, there have been reports of increased anxiety, depression, and mental health crises. In October of 2021, the American Academy of Pediatrics, the American Academy of Child and Adolescent Psychiatry, and the Children's Hospital Association said that the mental health impact of the Covid-19 pandemic on adolescents is now a national emergency (Vestal 2021). In addition, the University of Washington Medicine has found that for people under the age of 27, there has been a 30% increase between 2019 and 2021 in the number of people being diagnosed with depression and a 50% increase in the number of people being diagnosed with anxiety (University of Washington SMART Center, Seattle Children's Hospital, and Center on PBIS 2021). Similarly, the Centers for Disease Control has reported that across the United States, the number of emergency mental health-related visits for people aged 12-17 increased by 31% since the pandemic began (University of Washington SMART Center et al. 2021). Additionally, the American Psychological Association said that 81% of people ages 13-17 have been a lot more stressed during the Covid-19 pandemic than before (Rao and Rao 2021). Furthermore, since the pandemic began, there has been a concern about the increase of suicide ideation in children, teens, and young adults as the rate of this age group's suicide ideation is twice the rate of people who are older than 40 (University of Washington SMART Center et al. 2021).

Many youth are also experiencing general fatigue, tiredness, sleep difficulties, lowered cognitive thinking, and memory issues (University of Washington SMART Center et al. 2021). Since mental health in youth appears to have declined since the Covid-19 pandemic began, people need to understand that those who have had more negative experiences during the pandemic will have a more challenging time recovering and are more likely to be impacted mentally; the people who have struggled the most may experience even worse mental health if the Covid-19 pandemic gets worse or if restrictions increase again (University of Washington SMART Center et al. 2021).

Impact of the Return to In-Person Learning

The return to in-person learning has caused a lot of stress for students. Some students are worried about getting sick or getting others sick from Covid-19 or another illness when returning to in-person learning, and some students have already lost people from Covid-19 and are worried about losing more people to it (University of Washington SMART Center et al. 2021). Additionally, the disruption to so many school activities during the Covid-19 pandemic has led to increased depression in students, which is expected to lead to greater numbers of suicide ideations (University of Washington SMART Center et al. 2021). Furthermore, for some students who were not very engaged in remote learning, coming back to in-person learning has caused a lot of anxiety about successfully re-engaging in school and catching up on missed learning (University of Washington SMART Center et al. 2021).

Since the return to in-person learning has been very stressful for many, it would be helpful for students to have mental health support. However, there is a shortage of school psychologists nationwide; it is recommended by the National Association of School

Psychologists that there should be one psychologist for every 500 students, but Maine is currently the only state that meets their standard (Vestal 2021). While there is a short supply of school psychologists, there has been an increase in referrals as more students need support than before (Vestal 2021).

Behavioral Impact of The Covid-19 Pandemic on K-12 Students

As a result of the many mental health challenges that youth are experiencing due to the Covid-19 pandemic, there has been an increase in behavioral issues. “Pandemic Apathy” has become common, which includes denying and ignoring consequences and extreme hopelessness (University of Washington SMART Center et al. 2021). The experiences children have had related to anxiety, grief, and depression have been very prevalent in schools during the 2021-2022 school year as many younger students are crying and are acting in disruptive ways, and many of the older students are more violent and are bullying more than before (Vestal 2021). Additionally, for some students who do not show their sadness and fear, the pressure of school has become very intense for them (Vestal 2021). The mental health impact of the Covid-19 pandemic on healthy adolescents has led them to communicate less with peers, cope through video games, and not sleep; playing video games to cope often leads to worsened mental health problems in youth and often prevents them from using healthy coping mechanisms and not sleeping often leads to higher levels of depression and anxiety in adolescents (Cohen *et al.* 2021).

Visible Worsening Behaviors

The behavioral issues seen in schools across the United States are thought to be due to the stress the pandemic has placed on children, leading students to act out (Belsha 2021). As a result, schools across the United States are seeing increased amounts of student misbehavior, ranging from students talking in class to an increasing number of fights and students possessing weapons (Chapman 2021). Some schools are also seeing students trash bathrooms, run out of classrooms, and fight, while other schools are seeing students withdraw in ways that include putting their heads down and refusing to talk (Belsha 2021). A Chicago social worker said that she expected to see more anxiety and frustration amongst students but did not expect to see the significant increase in negative behavior; she said that referrals are up compared to previous years as middle schoolers are bullying each other by saying things that they used to only say online. She also said that there have been a lot more physical and verbal fights and that she and many other social workers are getting calls from parents concerned about their children's short tempers (Belsha 2021).

Cross Country Education (2021) says that there are certain behaviors people working with youth should be aware of due to the pandemic. These behaviors include distraction, clinginess, and withdrawal. With distraction, they talk about how the pandemic has led students to be more preoccupied with what is currently happening in the world, leading them to struggle to connect what they are learning about to their own lives; this behavior comes out of the students' social and emotional needs but is leading students to struggle in school (Cross Country Education 2021). They say that clinginess is seen in students being overly attached to something, which can include their phone or other inanimate objects, their peers, their teachers, or their parents; a reason for this behavior is thought to be the student looking for validation and security

(Cross Country Education 2021). Finally, they discuss how withdrawal is seen through students not coming to school, being late for school, and not showing interest in what they are doing; they believe that withdrawal is most likely due to the students feeling like they do not have control over their lives and what is happening around them (Cross Country Education 2021).

Socially Falling Behind

The pandemic has also led many students to be very behind socially, especially elementary school students. Some of these students struggle to share with their classmates and walk through the hallways (Belsha 2021). Many kids have also struggled with anxiety from the transition back to in-person learning as they got used to being around their families more; some kids have felt very overstimulated and socially anxious when returning to in-person learning (Campbell 2021). Many young kids, especially those in kindergarten and first grade, are very unaware and self-centered, which is thought to be due to missing many of the formative social experiences that students usually gain in pre-school (Campbell 2021). The fact that kids are socially behind has led to an increase in students wanting the teachers' constant attention, picking on their friends to get their teachers' attention, having tantrums, and stealing toys and objects from other students (Campbell 2021).

The pandemic has not just impacted elementary school students' social and emotional development but also adolescents and young adults; it is expected that adolescents and young adults will have impacted social relationships due to school being online and social distancing requirements (Green *et al.* 2021). Adolescents are an age group who need social interaction, which is a crucial part of a process that they go through to understand who they are; for some

adolescents, throughout the Covid-19 pandemic, their concern has been less about figuring out who they are but are instead figuring out how they are going to survive (Lowry 2021).

Academic Impact on K-12 Education in Massachusetts

Massachusetts was hit hard and quickly by the Covid-19 pandemic in March of 2020. Massachusetts handled the Covid-19 pandemic by going into a state of emergency that lasted until June 15th of 2021 and by putting many restrictions and protocols in place. These restrictions include but are not limited to limits on gatherings, mask requirements, reopening protocols and business restrictions, and safety protocols and restrictions in K-12 schools (Mass.gov 2022).

Gathering restrictions began in March of 2020 and were constantly changing depending on the prevalence of Covid-19 in the state of Massachusetts. However, for many months, the gathering restrictions were as low as ten people (Mass.gov 2022). The mask mandate began in May of 2020 and has changed throughout the pandemic, but masks have continued to be required in most public areas throughout the entire pandemic (Mass.gov 2022). Reopening in Massachusetts went in phases beginning in May of 2020 and progressing and backtracking on and off until the state of emergency ended on June 15th of 2021 (Mass.gov 2022). Additionally, K-12 schools were also impacted by the Covid-19 pandemic and had no choice but to be closed for many months. On March 15th of 2020, all K-12 schools closed and stayed closed until June 29th of 2020 (Mass.gov 2022).

The Impact on K-12 Education in Massachusetts

Due to the restrictions put in place in Massachusetts to combat the Covid-19 pandemic, K-12 education in Massachusetts was affected. When looking specifically at the academic issues and disparities that have come out of the Covid-19 pandemic in Massachusetts, there is limited available data. However, it was found that less than 6 in 10 Massachusetts parents believe that their children have learned enough during the Covid-19 pandemic to be academically successful and move on to the next grade, and in April of 2021, 16% of parents said that they would consider holding their child back a grade (Sobey 2021). Additionally, 26% of parents in Massachusetts do not believe that their children learned enough to stay on track, and 21% of parents think that remote learning has compromised their children's education (Sobey 2021).

While parents in Massachusetts do not feel like their children have done well academically throughout the Covid-19 pandemic, many also do not think that Massachusetts has done a good job educating their children. In a poll, 29% of parents gave the Massachusetts education system a C for how it has handled education during the Covid-19 pandemic, 26% gave Massachusetts a B, 18% gave Massachusetts a D, 18% gave Massachusetts an F, and 10% gave Massachusetts an A (Sobey 2021). Additionally, parents with at least three children were more likely to give the Massachusetts school system an F than parents with one or two children (Sobey 2021).

The Massachusetts Comprehensive Assessment System (MCAS) scores for students in grades 3-8 demonstrates that the Covid-19 pandemic has impacted students' academic performance. More students appear to be struggling in both Mathematics and English Language Arts compared to previous years, with more students struggling in Mathematics; 46% of students at least met expectations in English Language Arts in 2021 while 52% were at least meeting

expectations in 2019, and 33% of students were at least meeting expectations in Mathematics in 2021 while 49% were at least meeting expectations in Mathematics in 2019 (LeBlanc 2021).

While all students in Massachusetts appear to have been affected by the Covid-19 pandemic, not all students had the same learning model in the fall of 2020, which appeared to be based on race and class. In the fall of 2020, nearly 25% of school districts were remote in Massachusetts, but students who were Black, Latino, and from lower-income families were the most likely to be learning remotely (DeCosta-Klipa 2020). A poll that included 1,549 parents who had kids in K-12 schools across Massachusetts found that 80% of Latino children who have parents making less than \$75,000 a year were learning remotely, and 73% of Black students whose parents were making less than \$75,000 a year were learning remotely while 49% of White students whose parents were making less than \$75,000 a year were learning remotely (DeCosta-Klipa 2020). Additionally, 42% of Black and 45% of Latino students whose families were making more than \$75,000 a year were remote, while 36% of White students whose families were making over \$75,000 a year were fully remote in the fall of 2020 (DeCosta-Klipa 2020). Furthermore, students who had higher-income parents with college degrees were more likely to be in school for part of the day than those who did not in the fall of 2020 (DeCosta-Klipa 2020).

Conclusions From Previous Research and Expected Findings

Overall, it is evident that there have always been disparities based on race, class, and location in K-12 education, even before the Covid-19 pandemic began. For example, there was already a summer learning gap, making it so students from better-off families had more opportunities to grow and be stimulated during the summer, putting them at a significant

advantage over students from lower-income families. Additionally, students who had access to a preschool were better set up for academic success through school and had a significant advantage over those who did not attend a preschool. Furthermore, even before the Covid-19 pandemic began, students of color were at an academic disadvantage. On average, Black and Latinx students had lower test scores than students from other races. The Covid-19 pandemic appears to have exacerbated these academic disparities even further.

In regards to racial disparities in education during the pandemic, in general, the Covid-19 pandemic impacted students of color the most as they were more likely to be financially impacted by the pandemic and more likely to catch Covid-19 and get severe illness from it if they did contract it compared to White students. Additionally, Black, Latinx, and Native American students were the most impacted by the digital divide and were less likely to have had in-person school in the fall of 2020 when some schools returned to in-person learning. Both being impacted by the digital divide and being less likely to have had in-person learning in the fall of 2020 puts these students at a significant academic disadvantage. The Covid-19 pandemic also negatively impacted English Learner students as they did not have access to the necessary resources to continue learning English; more English Learner students were failing classes than before the Covid-19 pandemic.

When looking at social class disparities in education, students from higher social classes were at a significant advantage compared to those from lower social classes. When schools shut down in the spring of 2020, there was an expectation that parents teach their children at home; this made it so parents who had a higher level of education were working from home, had more time, and were a lot more successful when teaching their children than parents who were less educated and had jobs that were considered essential and had to be in person during the Covid-19

lockdown. Additionally, during the Covid-19 lockdown, many low-income students were expected to take care of their younger siblings and have more responsibilities at home, preventing them from focusing entirely on their academics. Furthermore, higher-income families had more available resources, and higher-income schools offered more resources and support to students than lower-income schools.

While the Covid-19 pandemic has impacted students' academics, it also impacted students' mental health, leading to an increase in negative behavior. There appears to be an increase in youth with anxiety, depression, and suicide ideation. While returning to in-person learning may appear to be beneficial for youth, the return also caused a lot of stress and anxiety. The mental health challenges have led to behavioral issues in schools ranging from students withdrawing to having physical fights. Many students are also a lot more clingy than in the past. In addition, the pandemic impacted students socially; many of the younger students struggle to interact in school, and many of the older students have had impacted social relationships.

When looking at Massachusetts specifically, it is very clear that test scores in Mathematics and English Language Arts have declined since the Covid-19 pandemic began and that students are struggling the most in Mathematics. Additionally, students of color and low-income students were more likely than White students and higher-income students to be fully remote in the fall of 2020.

Since the Covid-19 pandemic is still very prevalent, I expect the impact to be more significant the longer it goes on, and that data will constantly change until the pandemic ends. However, from what others have found on how the Covid-19 pandemic has increased disparities in education, I predict that I will also find that the Covid-19 pandemic exacerbated disparities in education. In addition, I expect to find that the Covid-19 pandemic impacted everyone, but I

expect to find that lower-income students and students of color, especially Black, Latinx, and Native American students were impacted the most. Based on previous research, I also expect to find that students' mental health and behavior declined due to the pandemic.

When looking at Massachusetts specifically, there is limited previous research on how the Covid-19 pandemic has impacted K-12 education. This study will contribute to that research. However, based on the previous research, I expect to find that students' academics were impacted, and I expect to find that lower-income students and students of color were the most impacted. I also expect to find that students' test scores declined more in Mathematics than English Language Arts.

Chapter 2: Methods

This study uses data on the 2019 and 2021 Massachusetts Comprehensive Assessment System (MCAS) test scores from the Massachusetts Department of Elementary and Secondary Education (Massachusetts Department of Elementary and Secondary Education. 2022) and interviews with educators working in schools across Massachusetts to fully understand how the Covid-19 pandemic has impacted students' academics, behavior, and mental health, and to better understand which students were most academically impacted as a result of the Covid-19 pandemic.

The MCAS scores were used in two different data analyses. In the first analysis, z-score differences were used to determine which subgroups had the greatest changes in MCAS scores between 2019 and 2021 to better understand which subgroups have been most academically impacted by the Covid-19 pandemic. In the second analysis, linear regressions were used to determine which factors led to changes in MCAS scores between 2019 and 2021 to understand which schools and students were most impacted academically due to the Covid-19 pandemic.

Interviews were conducted to better understand how the academic impact, academic disparities, and behavioral issues are seen in K-12 schools across Massachusetts and to understand which solutions may be the most effective. Participants were asked questions about their student's access to technology, disparities they are seeing in the classroom now that schools are back in person and how the disparities are being addressed, and about the behavioral and mental health issues they are seeing in their school and how these issues are being addressed.

Quantitative Data: MCAS Results by Subgroup

For the quantitative data that looked at the MCAS changes by subgroup, I used data from the Massachusetts Department of Education (Massachusetts Department of Elementary and Secondary Education. 2022). On their website, I found data on MCAS results by subgroups for both the 2018-2019 school year and 2020-2021 school year for 3rd-grade Mathematics and English Language Arts, 4th-grade Mathematics and English Language Arts, 5th-grade Mathematics, English Language Arts, and Science and Technical Engineering, 6th-grade Mathematics and English Language Arts, 7th-grade Mathematics and English Language Arts, 8th-grade Mathematics, English Language Arts, and Science and Technical Engineering, and 10th-grade Mathematics and English Language Arts. I recorded all this data in individual spreadsheets.

I next created a spreadsheet where I had two sheets for each grade level and subject; one sheet showed the change in the number of students failing expectations, and the other sheet showed the change in the number of students exceeding expectations. On each sheet, I created a table with the first column being the student group; the groups included were Economically Disadvantaged students, African American and Black students, American Indian or Alaskan Native students, Asian students, Hispanic and Latino students, Multi-Race and Non-Hispanic or Latino students, Native Hawaiian or Pacific Islander students, White students, Non-Economically Disadvantaged students, English Language Learner and Former English Learner students, and All Students. The subsequent columns were the percent failed or exceeding in 2019, the percent failed or exceeding in 2021, the number of cases in 2019, the number of cases in 2021, the z-score, the p-value, the significance, the percentage point change, and the

percentage change. I calculated z-scores to test whether these differences were statistically significant, and I calculated the percentage point changes and the percentage changes.

I next created two graphs for each grade and subgroup. One graph was the changes in the percentage of students failing expectations between 2019 and 2021, and the other was the changes in the percentage of students exceeding expectations between 2019 and 2021 by subgroup. Each graph included results from 2019 and 2021. The vertical axis on each graph was the subgroup, and the horizontal axis was the percentage of students failing or exceeding expectations.

I then analyzed all the graphs and tables to understand the differences by subgroups in the percentage of students failing and exceeding expectations in each included grade level and subject between 2019 and 2021.

Quantitative Data: Factors that Contributed to Changes in MCAS Scores

For this part of the quantitative data, I looked at different characteristics associated with most school districts in Massachusetts in order to determine which characteristics led to a change in MCAS scores between 2019 and 2021. I focused on 3rd, 6th, and 10th grades. For each grade, I looked at English Language Arts and Mathematics average test score changes, changes in the percentage of students failing expectations, and changes in the percentage of students exceeding expectations between 2019 and 2021.

To do this, I first created a spreadsheet. The spreadsheet included the school district, the state assigned district identification number, the average percentage of students learning in person, the percentage of Economically Disadvantaged students in 2019, the percentage of Non-Economically Disadvantaged students in 2019, the percentage of African American

students in 2019, the percentage of Asian students in 2019, the percentage of Hispanic students in 2019, the percentage of White students in 2019, the percentage of Native American students in 2019, the percentage of Native Hawaiian or Pacific Islander students in 2019, the percentage of Multi-Race and Non-Hispanic students in 2019, the percentage of English Language Learners in 2019, the district's equitable score, the district's expenditures per pupil, the district's average household income, and then the average test scores, the percentage of students failing expectations, and the percentage of students exceeding expectations in each included grade and subject for both 2019 and 2021. I got the district, the state assigned district identification number, the percentage of Economically Disadvantaged students in 2019, the percentage of Non-Economically Disadvantaged students in 2019, all the racial demographics, the percentage of English Language Learners in 2019, all the test scores, all the percentages of students failing expectations, and all the percentages of students exceeding expectations from the Massachusetts Department of Elementary and Secondary Education (2022). I got the average percentage of students learning in person from the Covid-19 School Data Hub (2021), and the data was changed on excel to get the average percentage of students learning in person at each school district during the 2020-2021 school year rather than the learning model. I got the equitable score from a report on WalletHub titled *Most and Least Equitable School Districts in Massachusetts* (McCann 2021); this score was based on the average household income and the expenditures per pupil. The most equitable school is ranked number one. I also got the expenditures per pupil number and the household income from the same report on WalletHub (McCann 2021).

Once I had all this data in a spreadsheet, I imported it into Jamovi and calculated all the changes in test scores, the percentage of students failing expectations, and the percentage of students exceeding expectations between 2019 and 2021. I then used Jamovi to do linear

regression calculations for the change in average test scores, change in the percentage of students failing expectations, and the change in the percentage of students exceeding expectations for each included test score and grade level. The independent variables included in each regression were the average percentage of students learning in person, the percentage of Economically Disadvantaged students in 2019, the percentage of African American students in 2019, the percentage of Asian students in 2019, the percentage of Hispanic students in 2019, the percentage of Native American students in 2019, the percentage of Native Hawaiian or Pacific Islander students in 2019, the percentage of Multi-Race and Non-Hispanic students in 2019, the percentage of English Language Learners in 2019, the equitable score, the expenditures per pupil, and the household income by district. I then recorded the intercept and the independent variables' estimate and the R-square value for each regression. I next created a regression table for each set of test scores.

Once I created the regression tables, I analyzed the data to determine which subgroups led to positive and negative changes between 2019 and 2021 in the average test scores, the percentage of students failing expectations, and the percentage of students exceeding expectations for all included grades and subjects.

Qualitative Data: Interviews

For the qualitative part of the data collection, my goal was to supplement the quantitative data by getting educators' perspectives on the impact the Covid-19 pandemic has had on and continues to have on K-12 education in Massachusetts. I wanted to understand the disparities beyond numbers, and since it was not feasible to understand behavior through numbers, I hoped that the interviews would help me understand how students' behavior has changed because of the

Covid-19 pandemic. For these reasons, the questions I asked participants were “Do you know if most students in your school had the necessary technology to do school online? If not, how did your school support students who do not have those resources?”, “Have you noticed any disparities in education in your school? If so, in what ways have you noticed these disparities, and are they worse since before the Covid-19 pandemic began?”, “How has your school been addressing the disparities in education?”, “Do you notice a change in students’ behavior since the pandemic began? If so, why do you think it has changed?”, “How has your school been addressing the behavioral issues?”, and “Is there anything else you would like to add?”.

I recruited the informants through personal connections, Union College alumni, and cold emailing. The informants included seven elementary school teachers, two elementary school principals, one elementary school speech pathologist, five middle school teachers, one middle school principal, one middle school dean of diversity, ten high school teachers, three high school principals, a town’s METCO director, and a school social worker for students in K-12 schools.

The interviews were done either through zoom or a phone call. The specific information I got from each participant is confidential to protect their privacy. At the start of each interview, I explained to the participant that everything they say is completely confidential and that the Union College Human Subjects Committee approved the protocols for this, I explained what my research is on and how I would use the information gathered from the interview, and I would ask the participant if they were comfortable with me taking notes on what they were saying. Once the interview started, I would ask the participant each question, and if I had clarifying questions, I would ask those questions to ensure that my understanding of what they were saying was accurate. Once I conducted all the interviews, I went through all the notes and found trends throughout the data and key findings.

Chapter 3: Changes in MCAS Scores by Subgroup

This section compares statewide aggregate Massachusetts Comprehensive Assessment System (MCAS) scores from 2019 to 2021 to understand how the Covid-19 pandemic has impacted students' academic performance so far. It includes all the test scores for which there is available data. These test scores include 3rd-grade Mathematics, 3rd-grade English Language Arts, 4th-grade Mathematics, 4th-grade English Language Arts, 5th-grade Mathematics, 5th-grade English Language Arts, 5th-grade Science and Technical Engineering, 6th-grade Mathematics, 6th-grade English Language Arts, 7th-grade Mathematics, 7th-grade English Language Arts, 8th-grade Mathematics, 8th-grade English Language Arts, 8th-grade Science and Technical Engineering, 10th-grade Mathematics, and 10th-grade English Language Arts. With each subject, test scores from the years 2019 and 2021 were compared by looking at the proportion of students failing to meet expectations and the number of students exceeding expectations. Each subject looked at all students and then individual subgroups to determine the most impacted subgroups. The subgroups included are Economically Disadvantaged students, African American or Black students, American Indian or Alaskan Native students, Asian students, Hispanic or Latino students, Multi-Race and Non-Hispanic or Latino students, Native Hawaiian or Pacific Islander students, White students, Non-Economically Disadvantaged students, and English Learner or Former English Learner students. The order of the data goes by grade level in ascending order beginning with 3rd grade and ending with 10th grade.

Among the many differences detailed below, the following pattern stands out: students' performance on the MCAS declined during the pandemic. Whether we look at the youngest or the oldest, those at the top or bottom of achievement, by economic status or racial group with a few notable exceptions, more students failed expectations, and fewer exceeded expectations.

There are some critical patterns, though, within that: all students appeared to struggle more in Mathematics than other subjects, and students in the older grades appeared to be less impacted than the younger ones.

In regards to Economically Disadvantaged students compared to Non-Economically Disadvantaged students, with a few exceptions, there was a greater increase in the number of Non-Economically Disadvantaged students failing to meet expectations and a greater decrease in the number of Economically Disadvantaged students exceeding expectations.

Except for a few exceptions, English Learner or Former English Learner students appeared to have a bigger increase in the number of students failing to meet expectations in Mathematics than the other subjects; they appeared to have struggled more with English Language Arts in the older grades than in the younger grades; they seemed to have been less impacted in Mathematics in the older grades than the younger grades; and appeared to be more affected in Science and Technical Engineering in 5th grade than in 8th grade.

For the most part, African American or Black students were more impacted in Mathematics than English Language Arts or Science and Technical Engineering, and overall, African American or Black students in the younger grades appeared to be more impacted than students in the older grades.

American Indian or Alaskan Native students seemed to be more impacted in Mathematics than English Language Arts or Science and Technical Engineering, and except for a few exceptions, they appeared to be more impacted in the younger grades than in the older grades.

Asian students were more impacted in Mathematics than other subjects, and for the most part, Asian students in the older grades seemed to have been less academically impacted than students in the younger grades.

Hispanic or Latino students seemed to be impacted more in Mathematics than English Language Arts and Science and Technical Engineering. In Mathematics, Hispanic or Latino students in the younger grades were more impacted than students in the older grades.

In regards to Multi-Race and Non-Hispanic or Latino students, students in the older grades did better in Mathematics than students in the younger grades; in English Language Arts, there were more significant increases in the number of students failing to meet expectations than decreases in the number of students exceeding expectations; and Multi-Race and Non-Hispanic or Latino students appeared to have been less impacted in Science and Technical Engineering than English Language Arts and Mathematics.

When looking at Native Hawaiian or Pacific Islander students, overall, students in the older grades were less impacted than students in the younger grades, and these students were more likely to have an increase in the number of students failing to meet expectations than a decrease in the number of students exceeding expectations between 2019 and 2021.

Finally, for the most part, White students in the older grades were less impacted in Mathematics than the younger grades; in English Language Arts, White students were more likely to have an increase in the number of students failing to meet expectations than a decrease in the number of students exceeding expectations; and in Science and Technical Engineering, White students appeared to do better in 8th-grade than in 5th-grade.

Overall, as seen in the results below, while every group appeared to have been impacted, racial disparities exist in students' academic progress during the pandemic. However, these results show no prominent class-based disparities.

Elementary School

MCAS Results by Subgroup: 3rd Grade Mathematics Failing To Meet Expectations

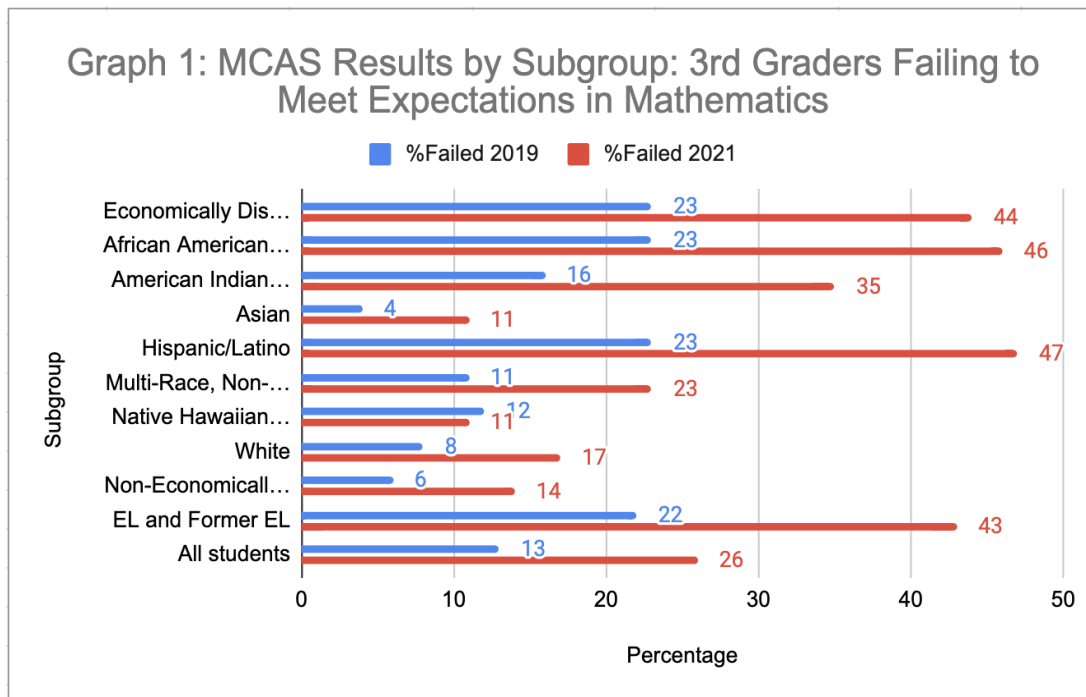


Table 1: Difference by Subgroup In Failing to Meet Expectations in Grade 3 Mathematics						
Subgroup	% Failed 2019	%Failed 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	23	44	-51.824	0.0001	21	91.30%
African American/Black	23	46	-27.202	0.0001	23	100%
American Indian or Alaskan Native	16	35	-3.432	0.0003	19	118.75%
Asian	4	11	-13.235	0.0001	7	175%
Hispanic/Latino	23	47	-44.534	0.0001	24	104.35%
Multi-Race, Non-Hispanic/ Latino	11	23	-12.444	0.0001	12	109.09%
Native Hawaiian or Pacific Islander	12	11	0.138	0.3264	-1	-8.33%
White	8	17	-37.048	0.0001	9	112.50%
Non-Economically Disadvantaged	6	14	-37.557	0.0001	8	133.33%
EL and Former EL	22	43	-37.121	0.0001	21	95.45%
All students	13	26	-60.038	0.0001	13	100%

From looking at Graph 1 and Table 1, it is evident that the Covid-19 pandemic impacted 3rd-grade Mathematics as more students appear to have failed expectations in 2021 than in 2019. Among all students, there was a 13 percentage point change between 2019 and 2021, and the percentage change was 100%, meaning that the number of students failing to meet expectations in 2021 was twice what it was in 2019. Additionally, the z-score for the difference in the number of students failing to meet expectations between 2019 and 2021 is statistically significant as the p-value is below 0.05.

All the subgroups but Native Hawaiian or Pacific Islander students had an increase in the number of students failing to meet expectations between 2019 and 2021. The rise in failure is

exceptionally high among Non-Economically Disadvantaged students with a 133.3 percentage change, Asian students with a 175% change, and American Indian or Alaskan Native students with a 118.75 percentage change. All of the data on the increased number of students failing to meet expectations was statistically significant. The only group that had fewer students failing to meet expectations in 2021 than 2019 were Native Hawaiian or Pacific Islander students who had an 8.33 percent decrease in the number of students failing to meet expectations between 2019 and 2021, but the data on the Native Hawaiian or Pacific Islander students is not statistically significant and is equivalent to no change.

MCAS Results by Subgroup: 3rd Grade Mathematics Exceeding Expectations

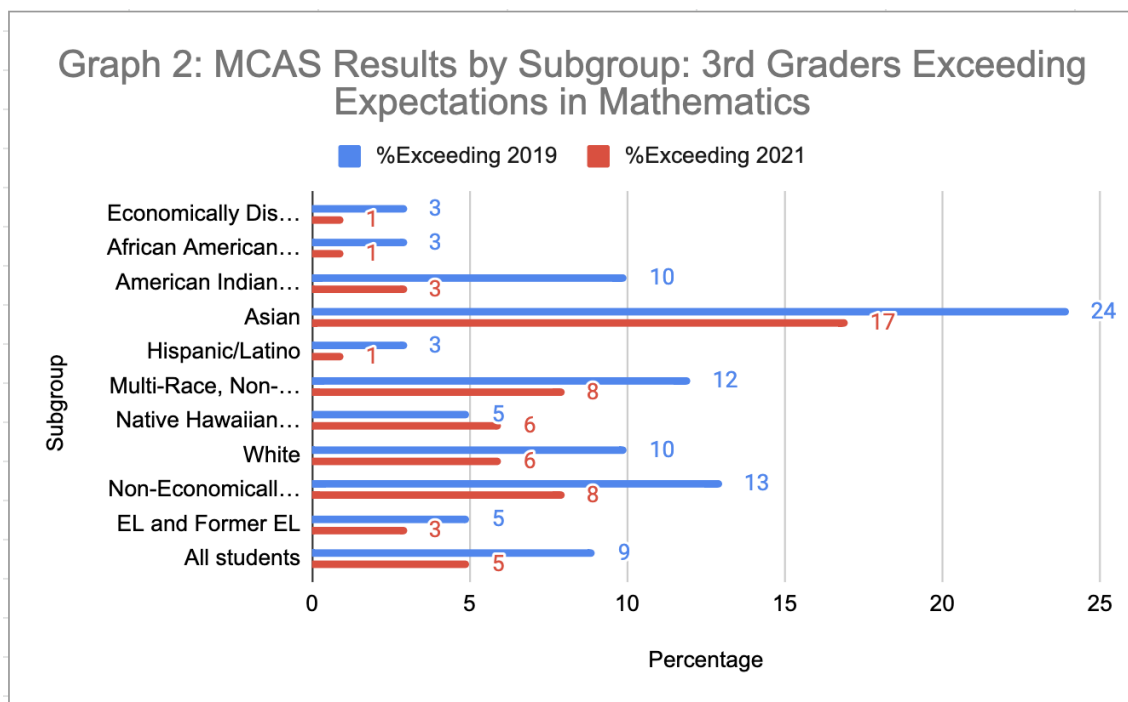


Table 2: Difference by Subgroup In Exceeding Expectations In 3rd Grade Mathematics						
Subgroup	% Exceeding 2019	% Exceeding 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	3	1	16.209	0.0001	-2	-66.67%
African American/Black	3	1	7.852	0.0001	-2	-66.67%
American Indian or Alaskan Native	10	3	2.269	0.0116	-7	-70%
Asian	24	17	8.567	0.0001	-7	-29%
Hispanic/Latino	3	1	12.263	0.0001	-2	-66.67%
Multi-Race, Non-Hispanic/ Latino	12	8	5.137	0.0001	-4	-33.33%
Native Hawaiian or Pacific Islander	5	6	-0.192	0.4247	1	20%
White	10	6	20.258	0.0001	-4	-40%
Non-Economically Disadvantaged	13	8	23.253	0.0001	-5	-38.46%
EL and Former EL	5	3	8.214	0.0001	-2	-40%
All students	9	5	28.635	0.0001	-4	-44.44%

At the other end of the spectrum of success in Mathematics, it is evident that fewer students exceeded expectations in 3rd-grade Mathematics in 2021 compared to 2019, further demonstrating the impact the Covid-19 pandemic has had on 3rd-grade Mathematics. When looking at all students, there was a -4 percentage point change between 2019 and 2021, and 44.44% fewer students were exceeding expectations in 3rd-grade Mathematics in 2021 than in 2019. The z-score for all students exceeding expectations in 2021 compared to 2019 was statistically significant.

All subgroups except Native Hawaiian or Pacific Islander students had a decrease in the number of students exceeding expectations in 3rd-grade Mathematics between 2019 and 2021. The most significant decreases were among Hispanic or Latino students who had a decrease of

66.67% percent, American Indian or Alaskan Native students who had a decrease of 70%, African American or Black students who had a decrease of 66.67%, and Economically Disadvantaged students who also had a percentage decrease of 66.67%. All of the data on the decreases in the number of students exceeding expectations in 3rd-grade Mathematics is statistically significant. The only group that had an increase in the number of students exceeding expectations were Native Hawaiian or Pacific Islander students, who had a 20% increase, but the increase is not statistically significant.

MCAS Results by Subgroup: 3rd English Grade English Language Arts Failing To Meet Expectations

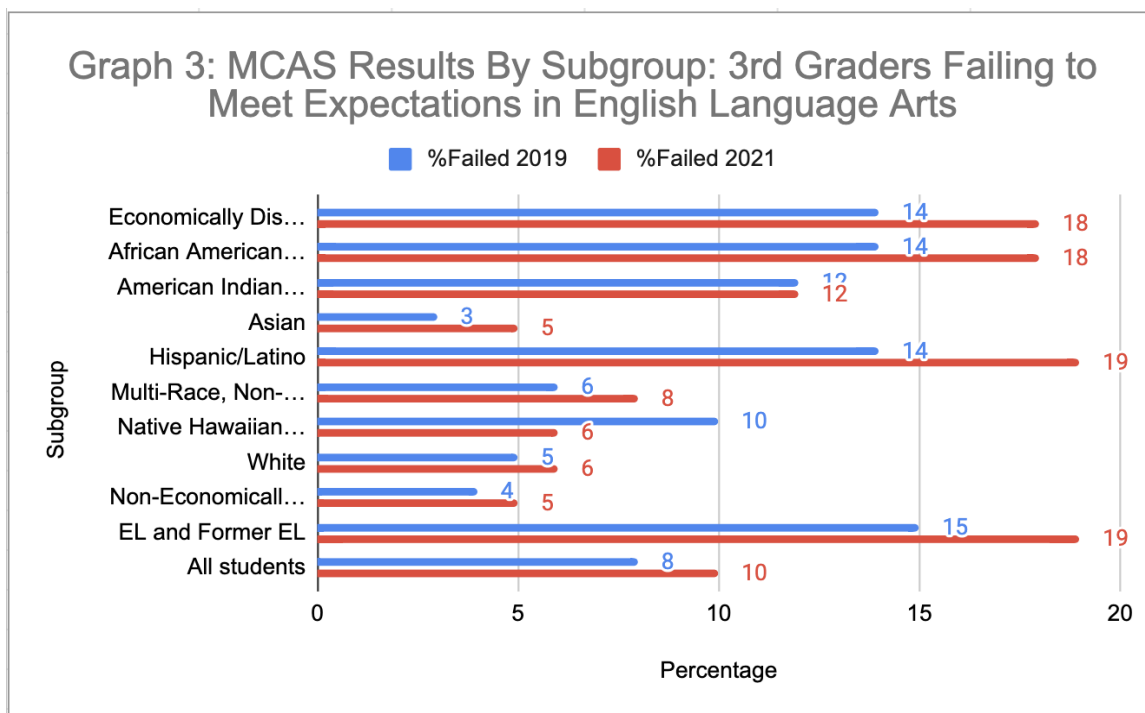


Table 3: Difference by Subgroup in Failing To Meet Expectations in 3rd Grade English Language Arts						
Subgroup	% Failed 2019	%Failed 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	14	18	-12.403	0.0001	4	28.57%
African American/Black	14	18	-5.964	0.0001	4	29%
American Indian or Alaskan Native	12	12	0	0.5	0	0.00%
Asian	3	5	-5.037	0.0001	2	66.67%
Hispanic/Latino	14	19	-11.558	0.0001	5	35.71%
Multi-Race, Non-Hispanic/ Latino	6	8	-3.015	0.0013	2	33.33%
Native Hawaiian or Pacific Islander	10	6	0.653	0.2578	-4	-40%
White	5	6	-5.956	0.0001	1	20%
Non-Economically Disadvantaged	4	5	-6.786	0.0001	1	25%
EL and Former EL	15	19	-8.593	0.0001	4	26.67%
All students	8	10	-12.652	0.0001	2	25%

As with mathematics, there is an apparent increase in the number of students failing to meet expectations in 3rd-grade English Language Arts in 2021 compared to 2019, which shows the pandemic's impact on 3rd grade English Language Arts. When looking at all students, there was a 2 percentage point change between 2019 and 2021 in the number of students failing to meet expectations in 3rd-grade English Language Arts, and 25% more students were failing to meet expectations in 2021 compared to 2019. Additionally, the z-score for the difference of all students failing to meet expectations in 3rd-grade English Language Arts in 2021 compared to 2019 is statistically significant.

Every subgroup but American Indian or Alaskan Native students and Native Hawaiian or Pacific Islander students had an increase in the number of students failing to meet expectations in

3rd-grade English Language Arts between 2019 and 2021. The groups most impacted include Multi-Race and Non-Hispanic or Latino students as they had a 33.33% increase in the number of students failing to meet expectations, Hispanic or Latino students as they had a 35.71% increase in the number of students failing to meet expectations, and Asian students who had an increase of 66.67% in the number of students failing to meet expectations in 3rd-grade English Language Arts between 2019 and 2021. All of the z-scores for the increases are statistically significant. Additionally, there was no change in the number of American Indian or Alaskan Native students failing to meet expectations, and there was a 40% decrease in the number of Native Hawaiian or Alaskan Native students failing to meet expectations between 2019 and 2021, but these differences are not statistically significant.

MCAS Results by Subgroup: 3rd Grade English Language Arts Exceeding Expectations

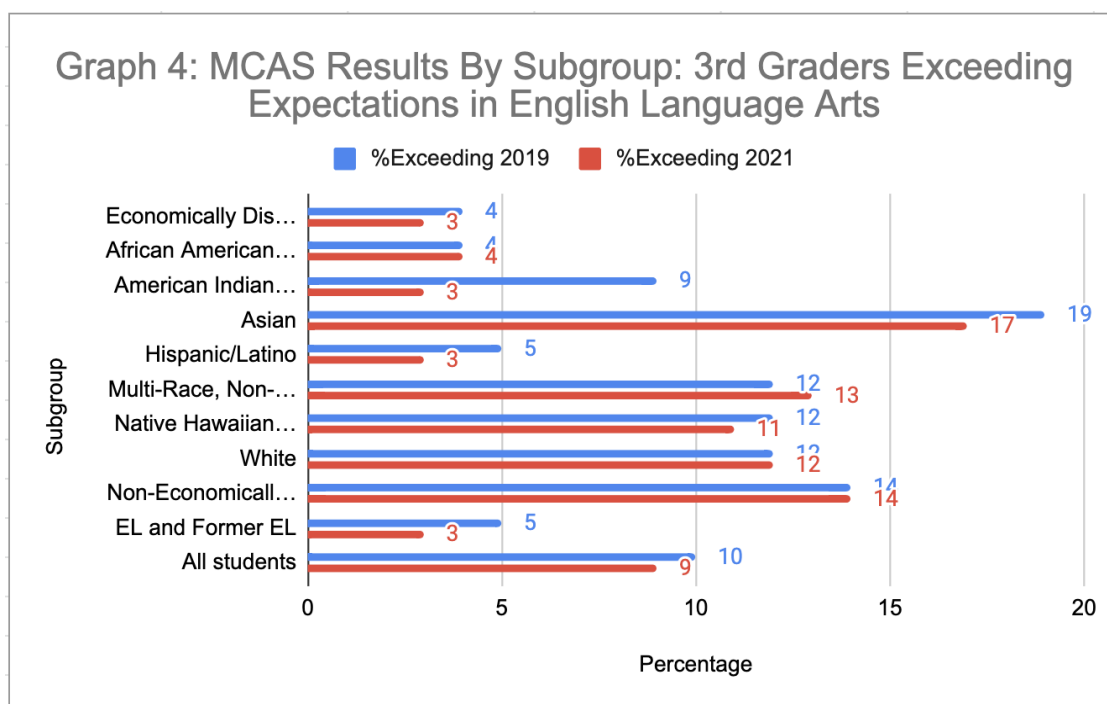


Table 4: Difference by Subgroup In Exceeding Expectations In 3rd Grade English Language Arts						
Subgroup	% Exceeding 2019	% Exceeding 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	4	3	6.17	0.0001	-1	-25%
African American/Black	4	4	0	0.5	0	0.00%
American Indian or Alaskan Native	9	3	2.014	0.0222	-6	-66.67%
Asian	19	17	2.563	0.0052	-2	-10.53%
Hispanic/Latino	5	3	8.745	0.0001	-2	-40%
Multi-Race, Non-Hispanic/ Latino	12	13	-1.162	0.123	1	8.33%
Native Hawaiian or Pacific Islander	12	11	0.137	0.4443	-1	-8.33%
White	12	12	0	0.5	0	0.00%
Non-Economically Disadvantaged	14	14	0	0.5	0	0.00%
EL and Former EL	5	3	8.208	0.0001	-2	-40%
All students	10	9	6.186	0.0001	-1	-10%

Fewer students exceeded expectations in 3rd-grade English Language Arts in 2021 than in 2019, emphasizing the Covid-19 pandemic's impact on 3rd grade English Language Arts. There was a 1 percentage point decline in all students exceeding expectations between 2019 and 2021, representing a 10% reduction in the rate of students exceeding expectations. The z-score for the difference in the number of all students exceeding expectations is statistically significant.

The impact the Covid-19 pandemic had on students exceeding expectations in 3rd-grade English Language Arts varied by subgroup; some groups had a decrease in the number of students exceeding expectations, some groups had an increase, and some groups had no change. The groups where there was a decrease include English Learner and Former English Learner students, Native Hawaiian or Pacific Islander students, Hispanic or Latino students, Asian

students, American Indian or Alaskan Native students, and Economically Disadvantaged students. The groups with the greatest decreases include English Learner and Former English Learner students as this subgroup had a percentage decrease of 40%, Hispanic or Latino students who also had a percentage decrease of 40%, and American Indian or Alaskan Native students who had a percentage decrease of 66.67%. The data for the subgroups that had a decrease in the number of students exceeding expectations is statistically significant for every subgroup except Native Hawaiian or Pacific Islander students. The group that had an increase in the number of students exceeding expectations were Multi-Race and Non-Hispanic or Latino students, but this increase is not statistically significant. Finally, the groups that had no change in the number of students exceeding expectations were Non-Economically Disadvantaged students, White students, and African American or Black students.

MCAS Results by Subgroup: 4th Grade Mathematics Failing Expectations

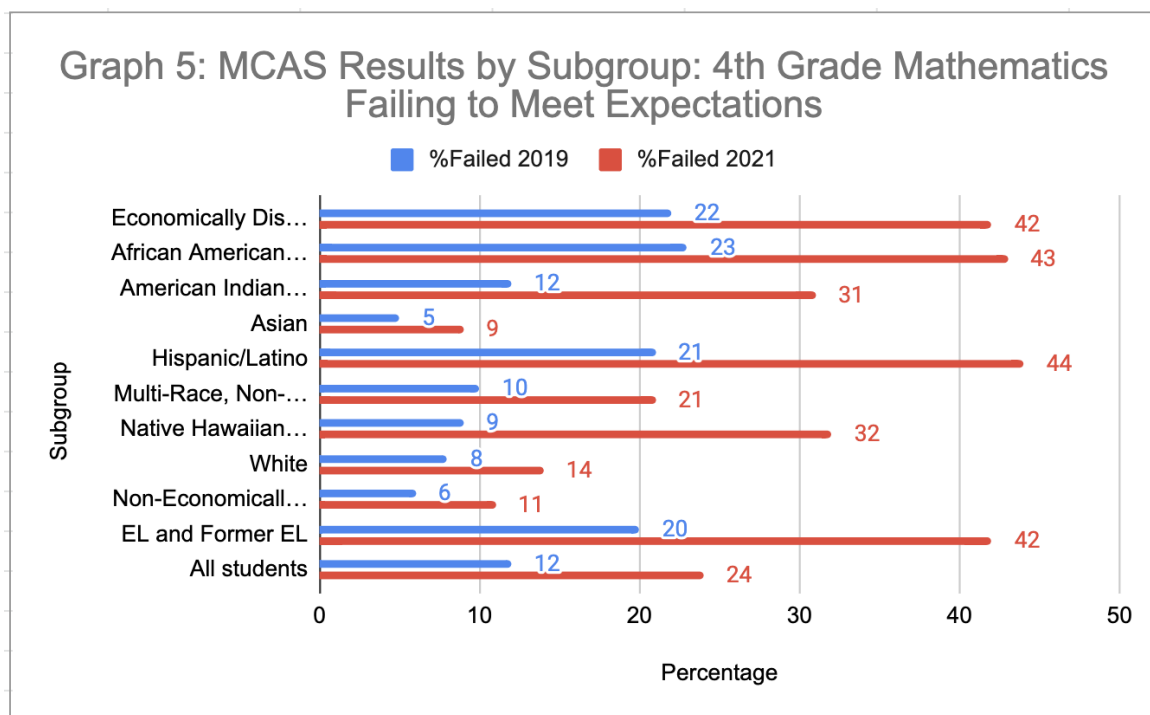


Table 5: Difference by Subgroup in Failing to Meet Expectations in 4th Grade Mathematics						
Subgroup	% Failed 2019	%Failed 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	22	42	-50.391	0.0001	20	90.91%
African American/Black	23	43	-24.201	0.0001	20	86.96%
American Indian or Alaskan Native	12	31	-4.142	0.0001	19	158.33%
Asian	5	9	-7.741	0.0001	4	80%
Hispanic/Latino	21	44	-43.874	0.0001	23	109.52%
Multi-Race, Non-Hispanic/ Latino	10	21	-11.803	0.0001	11	110%
Native Hawaiian or Pacific Islander	9	32	-3.363	0.004	23	255.56%
White	8	14	-26.397	0.0001	6	75%
Non-Economically Disadvantaged	6	11	-25.535	0.0001	5	83.33%
EL and Former EL	20	42	-39.108	0.0001	22	110%
All students	12	24	-57.754	0.0001	12	100%

Based on available data, the Covid-19 pandemic clearly impacted students' achievement in 4th-grade Mathematics as there was a doubling in the number of students failing to meet expectations between 2019 and 2021. Among all students, there was a percentage point change of 12, and twice the number of students failed to meet expectations in 2021 compared to 2019. This data is statistically significant.

Every included subgroup had an increase in the number of students failing to meet expectations in 4th-grade Mathematics between 2019 and 2021. The subgroups that were the most impacted include English Learner and Former English Learner students who had an increase of 110%, Native Hawaiian or Pacific Islander students who had an increase of 255.56%, Multi-Race and Non-Hispanic or Latino students who had an increase of 110%, Hispanic or

Latino students who had an increase of 109.52%, and American Indian or Alaskan Native students who had an increase of 158.33% between 2019 and 2021 in the number of students failing to meet expectations in 4th-grade Mathematics. The data for all the subgroups is statistically significant.

MCAS Results by Subgroup: 4th Grade Mathematics Exceeding Expectations

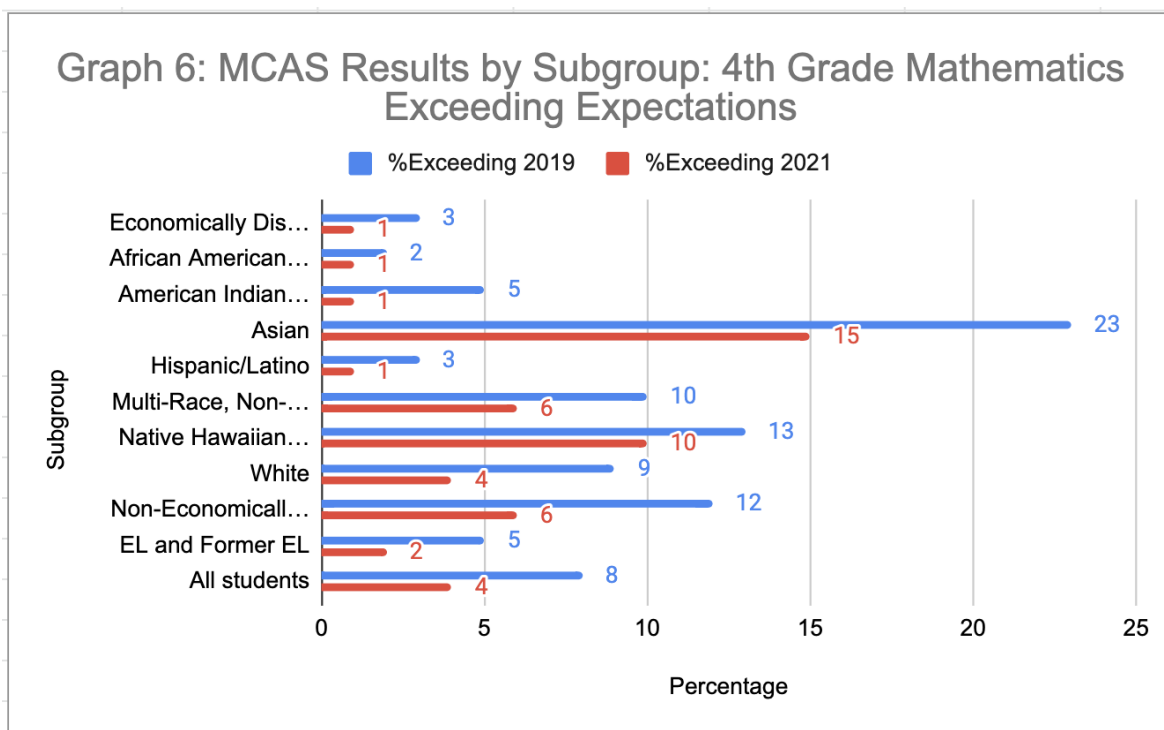


Table 6: Difference by Subgroup in Exceeding Expectations in 4th-Grade Mathematics						
Subgroup	% Exceeding 2019	% Exceeding 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	3	1	16.449	0.0001	-2	-66.67%
African American/Black	2	1	4.625	0.0001	-1	-50%
American Indian or Alaskan Native	5	1	2.135	0.0162	-4	-80%
Asian	23	15	10.112	0.0001	-8	-34.78%
Hispanic/Latino	3	1	12.409	0.0001	-2	-66.67%
Multi-Race, Non-Hispanic/Latino	10	6	5.704	0.0001	-4	-40%
Native Hawaiian or Pacific Islander	13	10	0.537	0.2946	-2	-23.08%
White	9	4	28.379	0.0001	-5	-56%
Non-Economically Disadvantaged	12	6	30.408	0.0001	-6	-50%
EL and Former EL	5	2	13.077	0.0001	-3	-60%
All students	8	4	31.19	0.0001	-4	-50%

Similar to the increase in the number of students failing to meet expectations, there was a decrease in the number of students exceeding expectations in 4th-grade Mathematics between 2019 and 2021. The percentage point difference for all students was -4, and there was a decrease of 50% between 2019 and 2021 in the number of students exceeding expectations in 4th-grade Mathematics. The z-score difference for all students exceeding expectations in 4th-grade Mathematics between 2019 and 2021 is statistically significant.

Every subgroup had a decrease in the number of students exceeding expectations in 4th-grade Mathematics between 2019 and 2021. The subgroups that were the most impacted were English Learner and Former English Learner students who had a 60% decrease, Hispanic or Latino students who had a decrease of 66.67%, and Economically Disadvantaged students who

had a decrease of 66.67% in the number of students exceeding expectations in 4th-grade Mathematics between 2019 and 2021. All of the differences are statistically significant except the difference for Native Hawaiian or Pacific Islander students.

MCAS Results by Subgroup: 4th Grade English Language Arts Failing to Meet Expectations

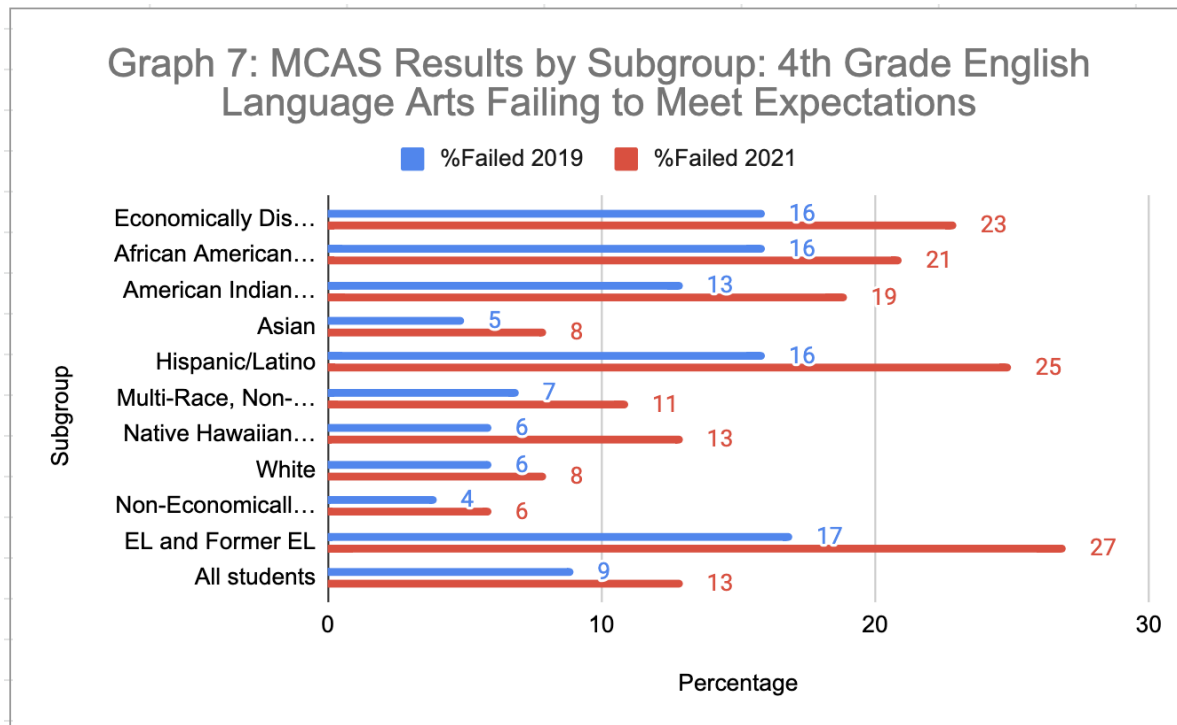


Table 7: Difference by Subgroup in Failing to Meet Expectations in 4th Grade English Language Arts						
Subgroup	% Failed 2019	%Failed 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	16	23	-20.364	0.0001	7	43.75%
African American/Black	16	21	-7.186	0.0001	5	31.25%
American Indian or Alaskan Native	13	19	-1.44	0.0749	6	46.15%
Asian	5	8	-6.002	0.0001	3	60%
Hispanic/Latino	16	25	-19.416	0.0001	9	56.25%
Multi-Race, Non-Hispanic/ Latino	7	11	-5.385	0.0001	4	57.14%
Native Hawaiian or Pacific Islander	6	13	-1.37	0.0853	7	116.67%
White	6	8	-10.783	0.0001	2	33.33%
Non-Economically Disadvantaged	4	6	-13.062	0.0001	2	50%
EL and Former EL	17	27	-19.406	0.0001	10	58.82%
All students	9	13	-23.442	0.0001	4	44.44%

The Covid-19 pandemic appeared to impact 4th-grade English Language Arts as there was an increase in the number of students failing to meet expectations in this subject between 2019 and 2021. There was a 4 percentage point change in the number of students failing to meet expectations, and the number of students failing to meet expectations was 44.44% higher in 2021 than in 2019. The difference for all students is statistically significant.

Every subgroup's academic performance was impacted in 4th-grade English Language Arts. The subgroups that were the most impacted include English Learner and Former English Learner students as the number of English Learner and Former English Learner students failing to meet expectations in 2021 was 58.82% higher than in 2019, Native Hawaiian or Pacific Islander students as the number of Native Hawaiian or Pacific Islander students failing to meet

expectations in 2021 was 116.67% higher than in 2019, and Asian students as the number of Asian students failing to meet expectations in 2021 was 60% higher than in 2019. All the increases are statistically significant except the increases for American Indian or Alaskan Native students and Native Hawaiian or Pacific Islander students.

MCAS Results by Subgroup: 4th Grade English Language Arts Exceeding Expectations

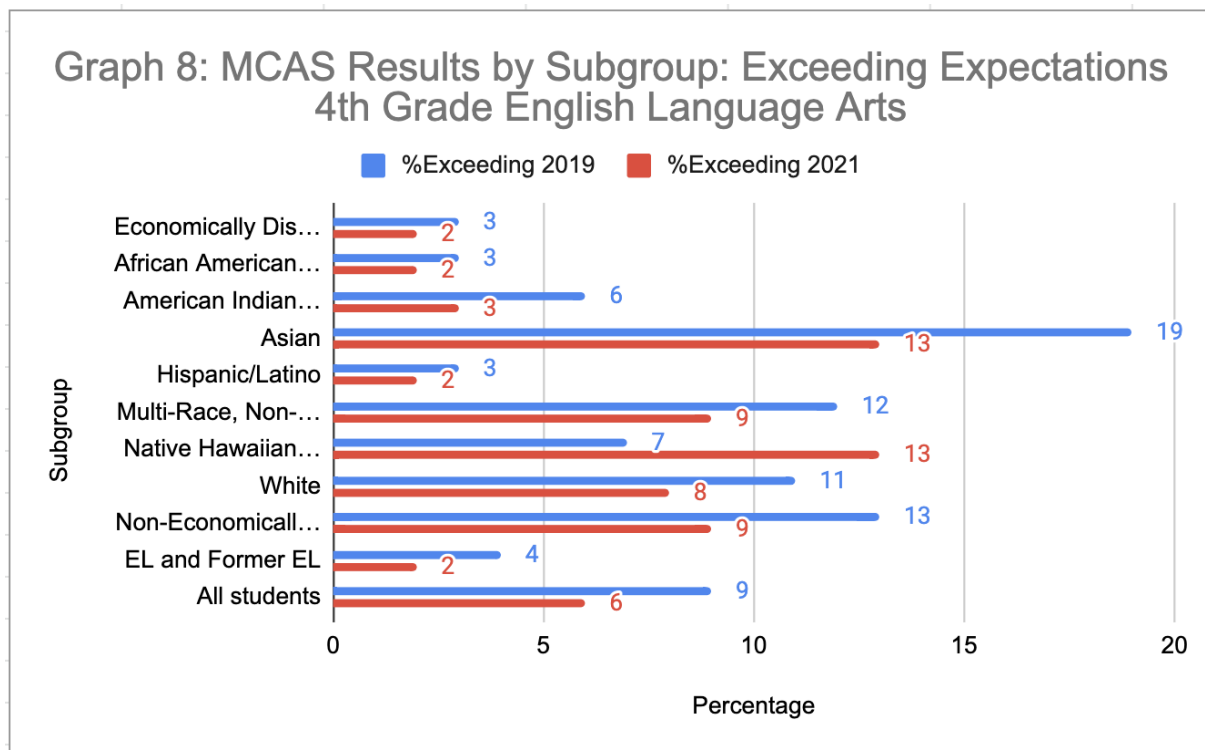


Table 8: Difference by Subgroup in Exceeding Expectations in 4th Grade English Language Arts						
Subgroup	% Exceeding 2019	% Exceeding 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	3	2	7.359	0.0001	-1	-33.33%
African American/Black	3	2	3.591	0.0001	-1	-33.33%
American Indian or Alaskan Native	6	3	1.295	0.0986	-3	-50%
Asian	19	13	8.098	0.0001	-6	-31.58%
Hispanic/Latino	3	2	5.548	0.0001	-1	-33.33%
Multi-Race, Non-Hispanic/ Latino	12	9	3.777	0.0001	-3	-25%
Native Hawaiian or Pacific Islander	7	13	-1.146	0.4404	6	85.71%
White	11	8	14.183	0.0001	-3	-27.27%
Non-Economically Disadvantaged	13	9	18.401	0.0001	-4	-30.77%
EL and Former EL	4	2	9.373	0.0001	-2	-50%
All students	9	6	21.004	0.0001	-3	-33.33%

On the opposite end of the spectrum in 4th-grade English Language Arts, one-third fewer students exceeded expectations in 2021 than in 2019, which continues to demonstrate the impact the Covid-19 pandemic had on academic performance in this subject. All students had a percentage point change of -3 and a 33.33% decrease in the number of students exceeding expectations between 2019 and 2021. This difference is statistically significant.

Excluding Native Hawaiian or Pacific Islander students, all subgroups had a decrease in the number of students exceeding expectations in 4th-grade English Language Arts between 2019 and 2021. The most impacted subgroups include English Learner and Former English Learner students and American Indian or Alaskan Natives students, who both had a 50% decrease between 2019 and 2021. The decreases are statistically significant for every subgroup

except American Indian or Alaskan Native students. Additionally, Native Hawaiian or Pacific Islander students had a non-statistically significant increase in the number of students exceeding expectations in 4th-grade English Language Arts between 2019 and 2021.

MCAS Results By Subgroup: Students Failing to Meet Expectations in 5th Grade Mathematics

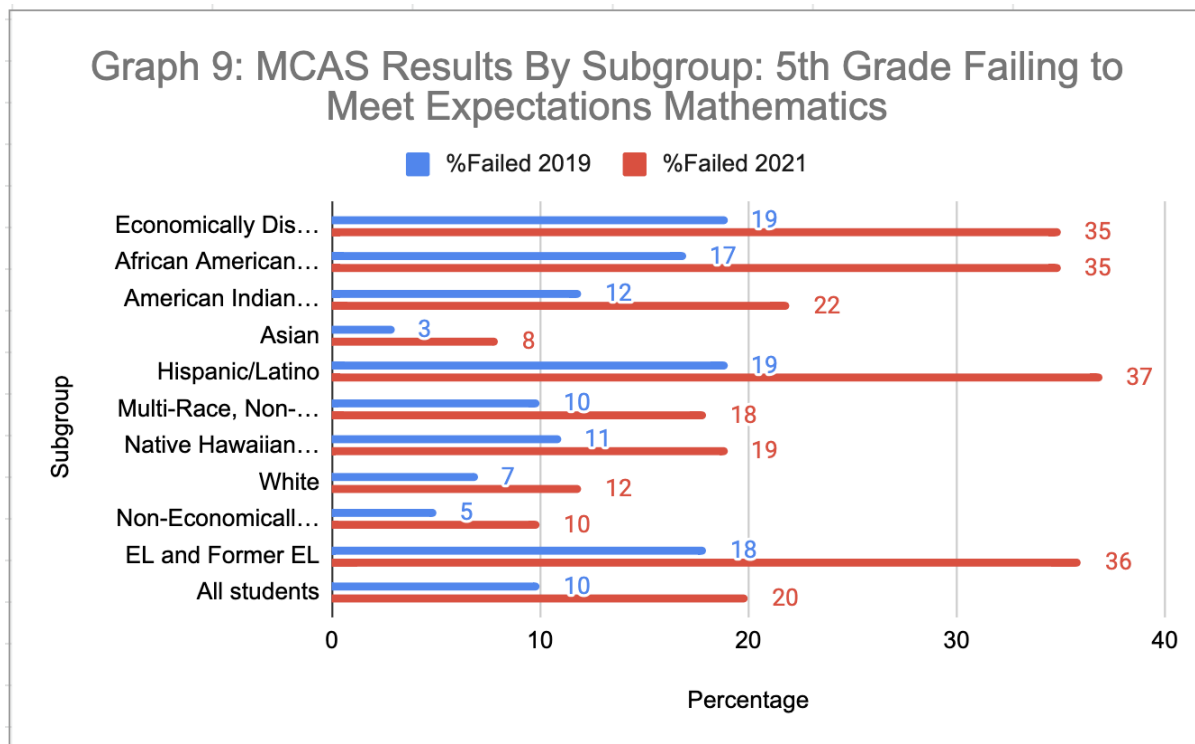


Table 9: Difference by Subgroup in Failing to Meet Expectations in 5th Grade Mathematics						
Subgroup	% Failed 2019	% Failed 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	19	35	-42.062	0.0001	16	84.21%
African American/Black	17	35	-23.344	0.0001	18	105.88%
American Indian or Alaskan Native	12	22	-2.277	0.0113	10	83.33%
Asian	3	8	-10.855	0.0001	5	166.67%
Hispanic/Latino	19	37	-35.426	0.0001	18	94.74%
Multi-Race, Non-Hispanic/Latino	10	18	-8.767	0.0001	8	80%
Native Hawaiian or Pacific Islander	11	19	-1.129	0.1292	8	72.73%
White	7	12	-23.801	0.0001	5	71.42%
Non-Economically Disadvantaged	5	10	-27.369	0.0001	5	100%
EL and Former EL	18	36	-33.034	0.0001	18	100%
All students	10	20	-52.026	0.0001	10	100%

Similar to many subjects, students' achievement in 5th-grade Mathematics has also been impacted by the Covid-19 pandemic as there was an increase in the number of students failing to meet expectations between 2019 and 2021. All students had a percentage point change of 10, and the number of students failing to meet expectations in 2021 was twice that in 2019. The z-score difference for all students is statistically significant.

Every subgroup's academic performance in 5th-grade Mathematics was impacted. The subgroups that had the biggest increases in the percentage of students failing to meet expectations include Asian students who had an increase of 166.67% and African American or Black students who had an increase of 105.88% between 2019 and 2021 in the number of

students failing to meet expectations in 5th-grade Mathematics. Excluding Native Hawaiian or Pacific Islander students, all the increases are statistically significant.

MCAS Results by Subgroup: Students Exceeding Expectations in 5th Grade Mathematics

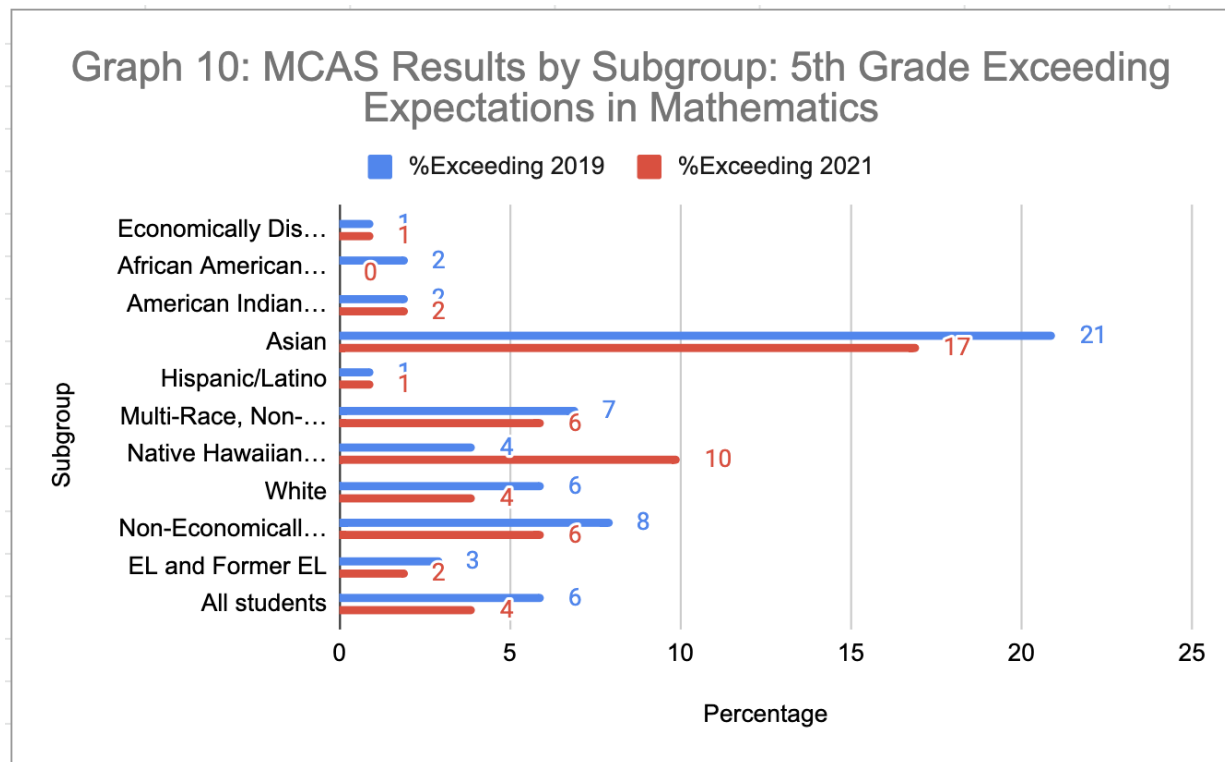


Table 10: Difference by Subgroup In Exceeding Expectations in 5th Grade Mathematics						
Subgroup	% Exceeding 2019	% Exceeding 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	1	1	0	0.5	0	0.00%
African American/Black	2	0	11.574	0.0001	-2	-100%
American Indian or Alaskan Native	2	2	0	0.5	0	0.00%
Asian	21	17	5.063	0.0001	-4	-19.04%
Hispanic/Latino	1	1	0	0.5	0	0.00%
Multi-Race, Non-Hispanic/ Latino	7	6	1.535	0.0618	-1	-14.29%
Native Hawaiian or Pacific Islander	4	10	-1.18	0.119	6	150%
White	6	4	12.951	0.0001	-2	-33.33%
Non-Economically Disadvantaged	8	6	11.431	0.0001	-2	-25%
EL and Former EL	3	2	5.116	0.0001	-1	-33.33%
All students	6	4	17.092	0.0001	-2	-33.33%

Further demonstrating the impact the Covid-19 pandemic had on students' performance in 5th-grade Mathematics, fewer students were exceeding expectations in 2021 than in 2019. All students had a percentage point change of -2 and a decrease of 33.33% between 2019 and 2021. This difference is statistically significant.

The majority of the subgroups had a decrease in the number of students exceeding expectations in 5th-grade Mathematics between 2019 and 2021. The subgroup with the most significant decrease was African American or Black students, who had a decrease of 100% between 2019 and 2021. All of the decreases for the number of students exceeding expectations are statistically significant except the decrease for Multi-Race and Non-Hispanic or Latino students. Additionally, Native Hawaiian or Pacific Islander students had an increase in the

number of students exceeding expectations, and Economically Disadvantaged, American Indian or Alaskan Native, and Hispanic or Latino students had no change; these differences are not statistically significant.

MCAS Results by Subgroup: Grade 5 English Language Arts Failing to Meet Expectations

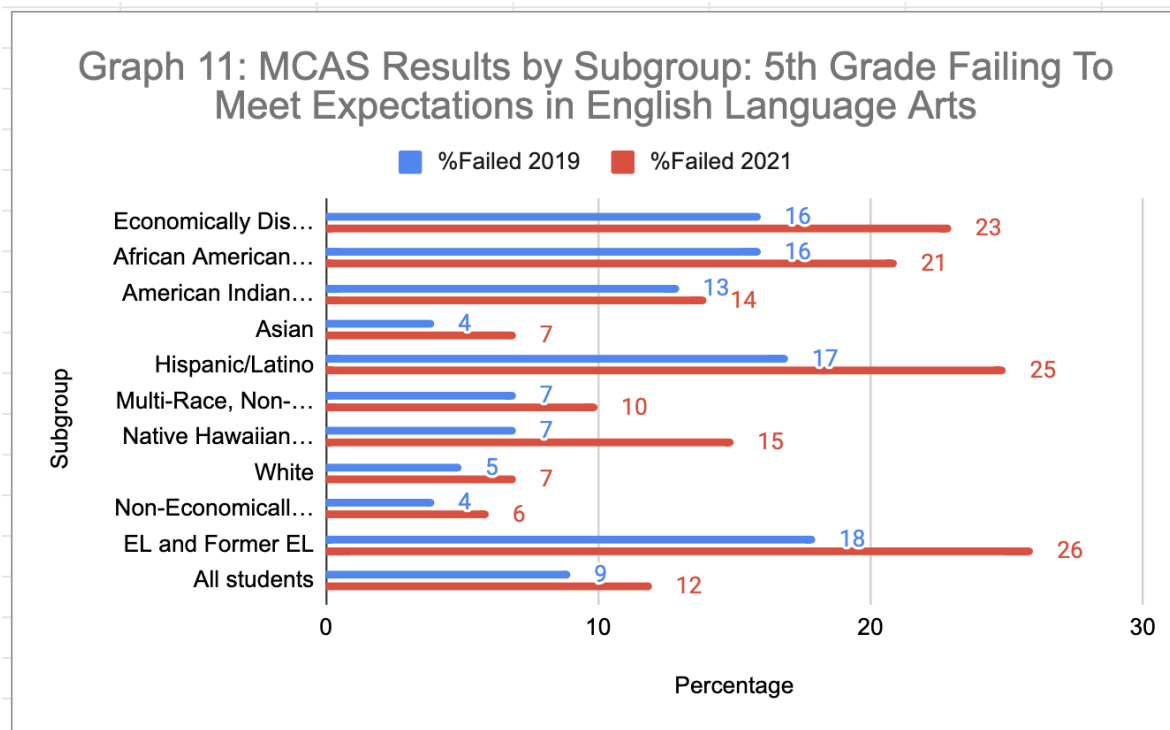


Table 11: Difference by Subgroup in Failing To Meet Expectations in 5th Grade English Language Arts						
Subgroup	% Failed 2019	%Failed 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	16	23	-20.381	0.0001	7	43.75%
African American/Black	16	21	-7.203	0.0001	5	31.25%
American Indian or Alaskan Native	13	14	-0.251	0.4013	1	7.69%
Asian	4	7	-6.506	0.0001	3	75%
Hispanic/Latino	17	25	-17.103	0.0001	8	47.06%
Multi-Race, Non-Hispanic/ Latino	7	10	-4.07	0.0001	3	42.86%
Native Hawaiian or Pacific Islander	7	15	-1.287	0.1003	8	114.29%
White	5	7	-11.758	0.0001	2	40%
Non-Economically Disadvantaged	4	6	-13.134	0.0001	2	50%
EL and Former EL	18	26	-15.475	0.0001	8	44.44%
All students	9	12	-18.095	0.0001	3	33.33%

Continuing to demonstrate the academic impact the Covid-19 pandemic has had on K-12 education, there was an increase in the number of students failing to meet expectations in 5th-grade English Language Arts between 2019 and 2021. All students had a percentage point change of 3 and an increase of 33.33% in the number of students failing to meet expectations in 5th-grade English Language Arts between 2019 and 2021. This difference is statistically significant.

All subgroups had an increase in the number of students failing to meet expectations in 5th-grade English Language Arts. The subgroups that were the most impacted include Non-Economically Disadvantaged students who had an increase of 50%, Native Hawaiian or Pacific Islander students who had an increase of 114.29% and Asian students who had an

increase of 75% between 2019 and 2021 in the number of students failing to meet expectations in 5th-grade English Language Arts. The differences are statistically significant for every subgroup except Native Hawaiian or Pacific Islander students and American Indian or Alaskan Native students.

MCAS Results by Subgroup: Students Exceeding Expectations in 5th Grade English Language Arts

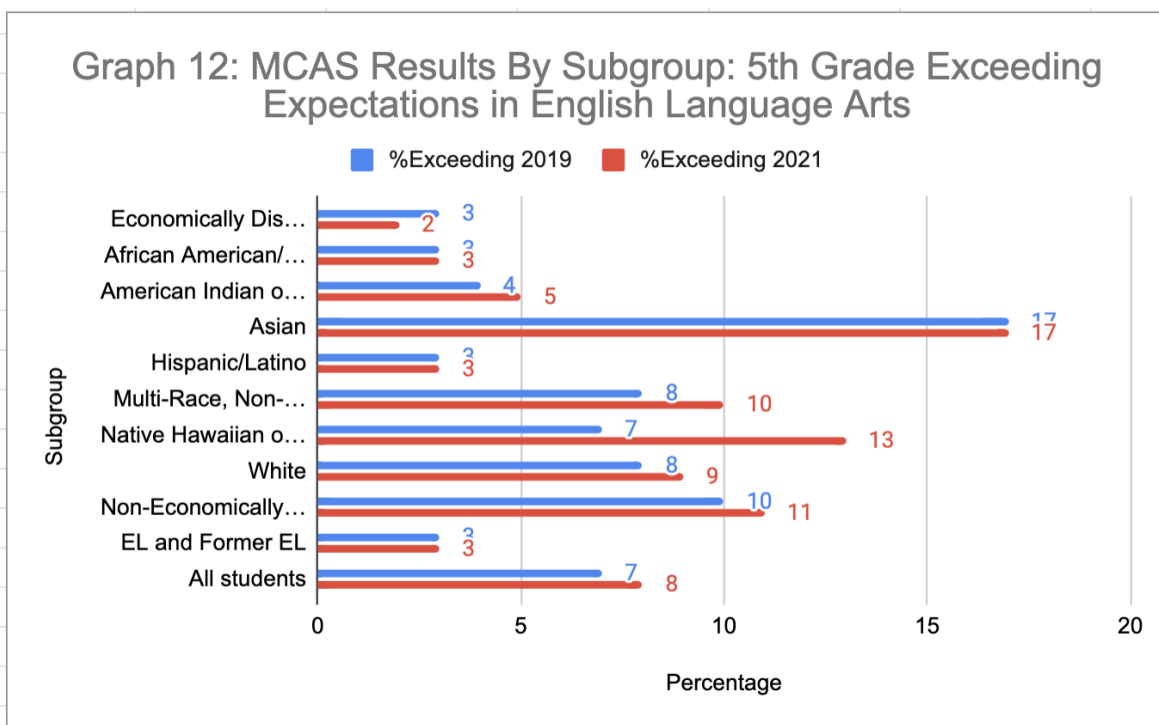


Table 12: Difference by Subgroup in Exceeding Expectations in 5th Grade English Language Arts						
Subgroup	% Exceeding 2019	% Exceeding 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	3	2	7.384	0.0001	-1	-33.33%
African American/Black	3	3	0	0.5	0	0.00%
American Indian or Alaskan Native	4	5	-0.412	0.3409	1	25%
Asian	17	17	0	0.5	0	0.00%
Hispanic/Latino	3	3	0	0.5	0	0.00%
Multi-Race, Non-Hispanic/Latino	8	10	-2.643	0.0041	2	25%
Native Hawaiian or Pacific Islander	7	13	-1.005	0.1587	6	85.71%
White	8	9	-5.019	0.0001	1	12.5%
Non-Economically Disadvantaged	10	11	-4.692	0.0001	1	10%
EL and Former EL	3	3	0	0.5	0	0.00%
All students	7	8	-7.024	0.0001	1	14.29%

On the other end of the spectrum in 5th-grade English Language Arts, there was an increase in students exceeding expectations. All students had a 1 percentage point change and an increase of 14.29% between 2019 and 2021 in the number of students exceeding expectations in 5th-grade English Language Arts. The difference for all students is statistically significant.

The change in the percentage of students exceeding expectations varied by subgroup. One subgroup had a decrease, some subgroups had an increase, and some groups had no change in the number of students exceeding expectations in 5th-grade English Language Arts between 2019 and 2021. The group that had a decrease in the number of students exceeding expectations were Economically Disadvantaged students, who had a statistically significant decrease of 33.33% between 2019 and 2021. The subgroups that had an increase in the number of students

exceeding expectations were Non-Economically Disadvantaged students, White students, Native Hawaiian or Pacific Islander students, Multi-Race and Non-Hispanic or Latino students, and American Indian or Alaskan Native students; the change is statistically significant for Non-Economically Disadvantaged students, White students, and Multi-Race and Non-Hispanic or Latino students. Finally, the subgroups that had no change between 2019 and 2021 were English Learner and Former English Learner students, Hispanic or Latino students, Asian students, and African American or Black students.

These results demonstrate a class-based disparity in academic achievement in 5th-grade English Language Arts as Economically Disadvantaged students had a decrease in the number of students exceeding expectations while Non-Economically Disadvantaged students had an increase in the number of students exceeding expectations. In most schools in the United States, 5th-grade English Language Arts students are reading challenging texts and are writing their own work while learning how to explain what they are reading, new vocabulary, how to develop topics, how to write opinion pieces, how to examine topics, how to incorporate evidence into their writing, how to apply grammar rules, and how to use technology (Parent Toolkit Staff 2020). These are topics that are already very challenging for students and would most likely be even more challenging learning them remotely and under unprecedented circumstances. Learning these topics also requires more resources; students from Non-Economically Disadvantaged families most likely had more resources and parental support than students from Economically Disadvantaged families, which could be why Non-Economically Disadvantaged students had an increase in the number of students exceeding expectations while Economically Disadvantaged students had a decrease in the number of students exceeding expectations in 5th-grade English Language Arts.

MCAS Results By Subgroup: Students Failing to Meet Expectations in 5th Grade Science and Technical Engineering

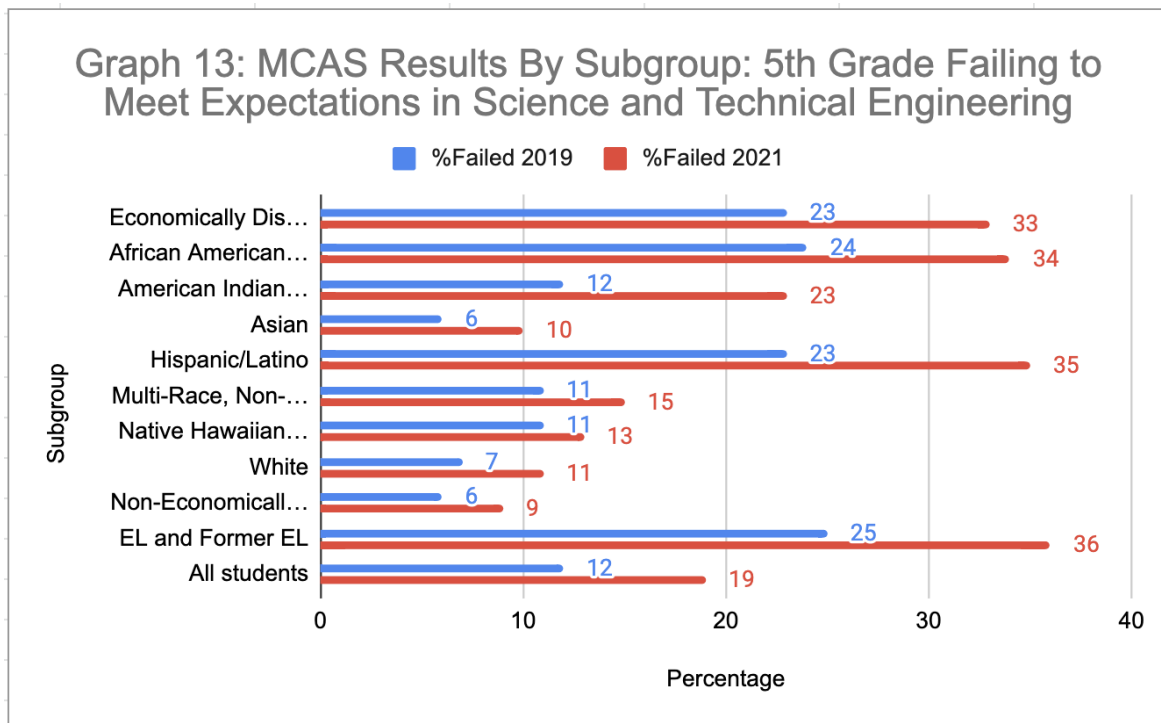


Table 13: Difference by Subgroup in Failing to Meet Expectations in 5th Grade Science and Technical Engineering						
Subgroup	% Failed 2019	% Failed 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	23	33	-25.696	0.0001	10	43.48%
African American/Black	24	34	-12.358	0.0001	10	41.67%
American Indian or Alaskan Native	12	23	-2.485	0.0066	11	91.67%
Asian	6	10	-7.293	0.0001	4	66.67%
Hispanic/Latino	23	35	-23.073	0.0001	12	52.17%
Multi-Race, Non-Hispanic/ Latino	11	15	-4.497	0.0001	4	36.36%
Native Hawaiian or Pacific Islander	11	13	-0.31	0.3821	2	18.18%
White	7	11	-19.492	0.0001	4	57.14%
Non-Economically Disadvantaged	6	9	-16.432	0.0001	3	50%
EL and Former EL	25	36	-19.18	0.0001	11	44%
All students	12	19	-35.784	0.0001	7	58.33%

Student performance in 5th-grade Science and Technical Engineering appeared to be impacted by the Covid-19 pandemic as more students were failing to meet expectations in 2021 than in 2019. All students had a percentage point difference of 7 and an increase of 58.33% between 2019 and 2021.

Every subgroup had an increase in the number of students failing to meet expectations in 5th-grade Science and Technical Engineering. The most affected subgroups include Asian students who had an increase of 66.67%, and American Indian or Alaskan Native students who had an increase of 91.67% between 2019 and 2021 in the number of students failing to meet expectations in 5th-grade Science and Technical Engineering. All the changes are statistically significant except for Native Hawaiian or Pacific Islander students.

MCAS Results by Subgroup: Students Exceeding Expectations in 5th Grade Science and Technical Engineering

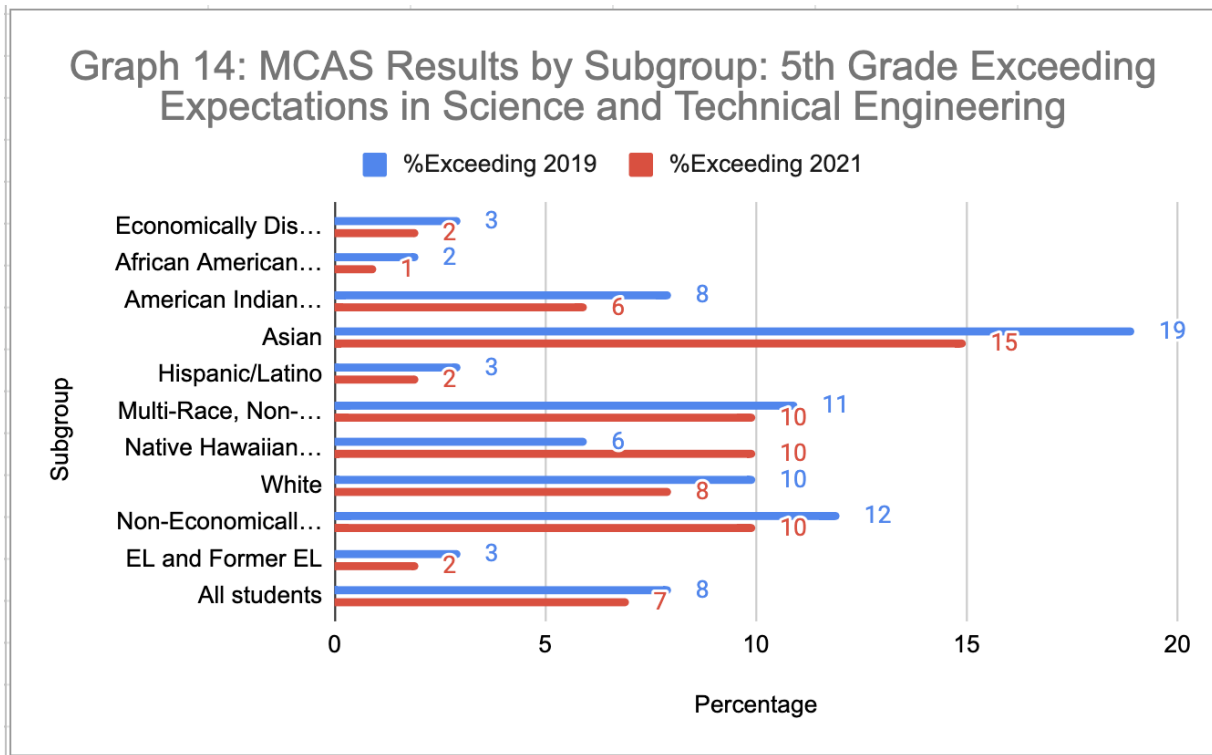


Table 14: Difference by Subgroup in Exceeding Expectations in 5th Grade Science and Technical Engineering						
Subgroup	% Exceeding 2019	% Exceeding 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	3	2	7.37	0.0001	-1	-33.33%
African American/Black	2	1	4.637	0.0001	-1	-50%
American Indian or Alaskan Native	8	6	0.681	0.2483	-2	-25%
Asian	19	15	5.287	0.0001	-4	-21.05%
Hispanic/Latino	3	2	5.564	0.0001	-1	-33.33%
Multi-Race, Non-Hispanic/Latino	11	10	1.232	0.1093	-1	-9.09%
Native Hawaiian or Pacific Islander	6	10	-0.74	0.2296	4	66.67%
White	10	8	9.823	0.0001	-2	-20%
Non-Economically Disadvantaged	12	10	9.296	0.0001	-2	-16.67%
EL and Former EL	3	2	5.111	0.0001	-1	-33.33%
All students	8	7	7.036	0.0001	-1	-12.5%

Continuing to demonstrate the Covid-19 pandemic's impact on 5th-grade Science and Technical Engineering, fewer students were exceeding expectations in 2021 than in 2019. All students had a percentage point change -1 and a 12.5% decrease in 5th-grade Science and Technical Engineering between 2019 and 2021. This difference is statistically significant.

All subgroups had a decrease in the number of students exceeding expectations except Native Hawaiian or Pacific Islander students. The groups who were most impacted include Economically Disadvantaged students who had a decrease of 33.33%, African American or Black students who had a decrease of 50%, Hispanic or Latino students who had a decrease of 33.33%, and English Learner or Former English Learner students who had a decrease of 33.33% between 2019 and 2021 in 5th-grade Science and Technical Engineering. Excluding American Indian or Alaskan Native students and Multi-Race and Hispanic or Latino students, the decreases

were statistically significant. Additionally, Native Hawaiian or Pacific Islander students had a non-statistically significant increase.

Middle School

MCAS Results by Subgroup: Students Failing to Meet Expectations in 6th Grade Mathematics

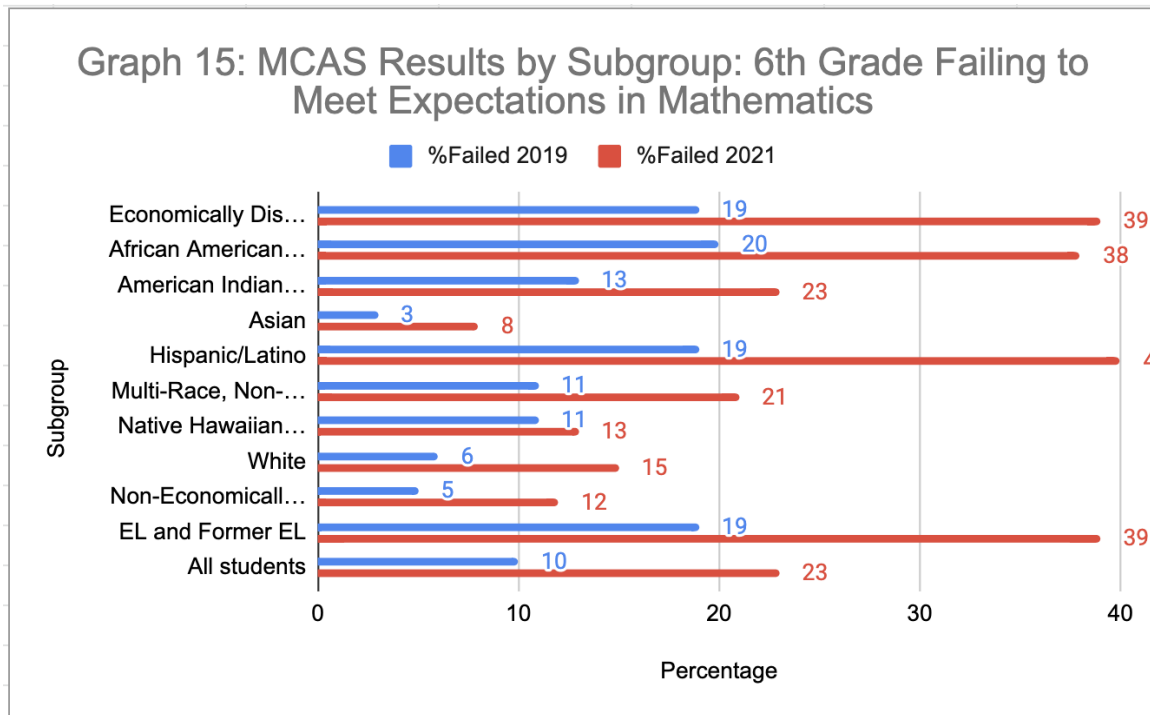


Table 15: Difference by Subgroup in Failing to Meet Expectations in 6th Grade Mathematics						
Subgroup	% Failed 2019	% Failed 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	19	39	-51.881	0.0001	20	105.26%
African American/Black	20	38	-23.036	0.0001	18	90%
American Indian or Alaskan Native	13	23	-2.336	0.0099	10	76.92%
Asian	3	8	-10.934	0.0001	5	166.67%
Hispanic/Latino	19	40	-40.853	0.0001	21	110.53%
Multi-Race, Non-Hispanic/Latino	11	21	-10.341	0.0001	10	90.91%
Native Hawaiian or Pacific Islander	11	13	-0.355	0.3632	2	18.18%
White	6	15	-41.293	0.0001	9	150%
Non-Economically Disadvantaged	5	12	-36.491	0.0001	7	140%
EL and Former EL	19	39	-35.264	0.0001	20	105.26%
All students	10	23	-65.707	0.0001	13	130%

Further demonstrating the impact the Covid-19 pandemic had on education, there was an increase in the number of students failing to meet expectations in 6th-grade Mathematics between 2019 and 2021. All students had a percentage point change of 13 and a statistically significant increase of 130% between 2019 and 2021.

Every subgroup had an increase in the number of students failing to meet expectations in 6th-grade Mathematics between 2019 and 2021. The most impacted subgroups include Asian students who had an increase of 166.67%, White students who had an increase of 150%, and Non-Economically Disadvantaged students who had an increase of 140%. The increases are statistically significant for every subgroup except Native Hawaiian or Pacific Islander students.

MCAS Results by Subgroup in Exceeding Expectations in 6th Grade Mathematics

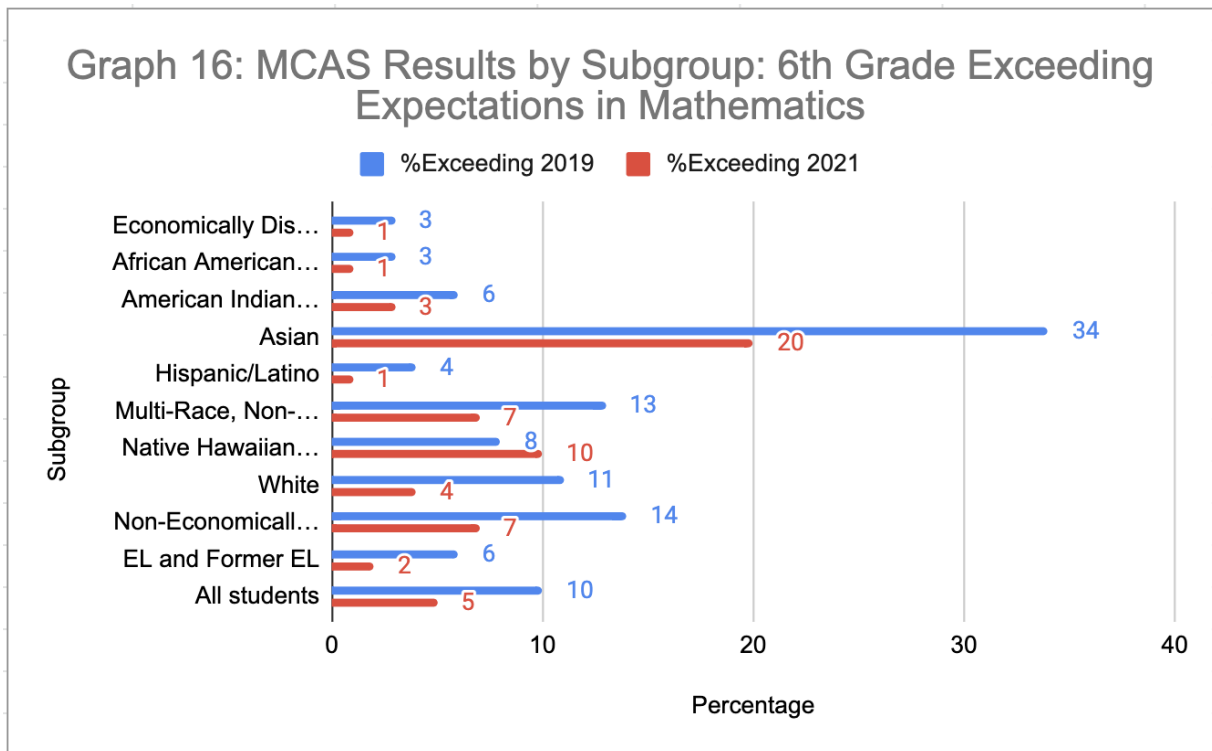


Table 16: Difference by Subgroup in Exceeding Expectations in 6th Grade Mathematics						
Subgroup	% Exceeding 2019	% Exceeding 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	3	1	16.44	0.0001	-2	-66.67%
African American/Black	3	1	8.201	0.0001	-2	-66.67%
American Indian or Alaskan Native	6	3	1.287	0.0985	-3	-50%
Asian	34	20	15.885	0.0001	-14	-41.18%
Hispanic/Latino	4	1	16.756	0.0001	-3	-75%
Multi-Race, Non-Hispanic/Latino	13	7	7.519	0.0001	-6	-46.15%
Native Hawaiian or Pacific Islander	8	10	-0.403	0.3446	2	25%
White	11	4	38.323	0.0001	-7	-63.64%
Non-Economically Disadvantaged	14	7	33.935	0.0001	-7	-50%
EL and Former EL	6	2	16.06	0.0001	-4	-66.67%
All students	10	5	35.699	0.0001	-5	-50%

Similar to the increase in the number of students failing to meet expectations in 6th-grade Mathematics, there was a decrease in the number of students exceeding expectations between 2019 and 2021. All students had a percentage point change of -5 and a statistically significant 50% decrease between 2019 and 2021.

Excluding Native Hawaiian or Pacific Islander students, every subgroup had a decrease in the number of students exceeding expectations in 6th-grade Mathematics between 2019 and 2021. The subgroups that were most impacted include Economically Disadvantaged students who had a decrease of 66.67%, African American or Black students who also had a decrease of 66.67%, Hispanic or Latino students who had a decrease of 75%, White students who had a decrease of 63.64%, and English Learner or Former English Learner students who had a decrease

of 66.67%. The decreases are statistically significant for every subgroup except American Indian or Alaskan Native students. Additionally, Native Hawaiian or Pacific Islander students had a non-statistically significant increase in the number of students exceeding expectations.

MCAS Results by Subgroup in Failing to Meet Expectations in 6th Grade English Language Arts

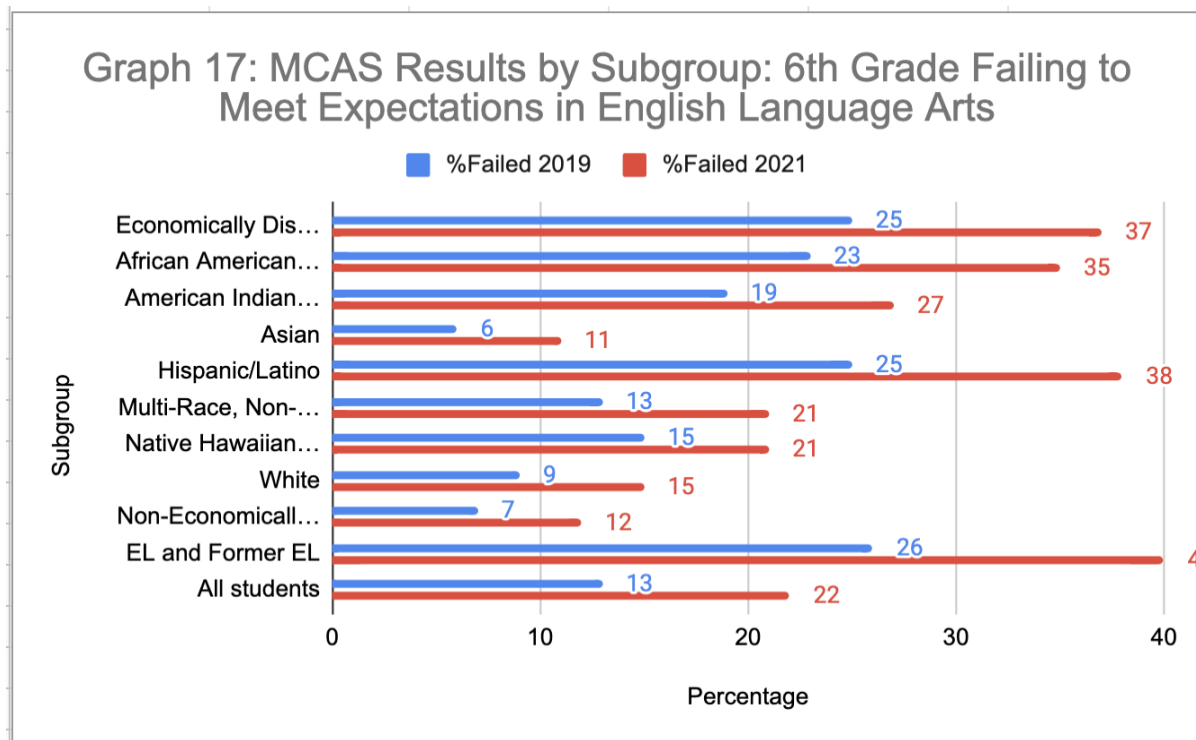


Table 17: Difference by Subgroup in Failing to Meet Expectations in 6th Grade English Language Arts						
Subgroup	% Failed 2019	% Failed 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	25	37	-30.054	0.0001	12	48%
African American/Black	23	35	-15.191	0.0001	12	52.17%
American Indian or Alaskan Native	19	27	-1.707	0.0446	8	42.11%
Asian	6	11	-8.929	0.0001	5	83.33%
Hispanic/Latino	25	38	-24.426	0.0001	13	52%
Multi-Race, Non-Hispanic/Latino	13	21	-8.034	0.0001	8	61.54%
Native Hawaiian or Pacific Islander	15	21	-0.9	0.1867	6	40%
White	9	15	-25.962	0.0001	6	66.67%
Non-Economically Disadvantaged	7	12	-24.821	0.0001	5	71.43%
EL and Former EL	26	40	-23.511	0.0001	14	53.85%
All students	13	22	-44.195	0.0001	9	69.23%

Advancing the understanding that the Covid-19 pandemic impacted K-12 education, there was an increase in the number of students failing to meet expectations in 6th-grade English Language Arts between 2019 and 2021. All students had a percentage point change of 9 and a statistically significant increase of 69.23% between 2019 and 2021.

The impact on students' achievement in 6th-grade English Arts was prevalent for all subgroups. The group that had the greatest increase in the number of students failing to meet expectations in 6th-grade English Language Arts between 2019 and 2021 were Asian students, who had an increase of 83.33%. The increases are statistically significant for every subgroup except Native Hawaiian or Pacific Islander students.

MCAS Results by Subgroup in Exceeding Expectations in 6th Grade English Language Arts

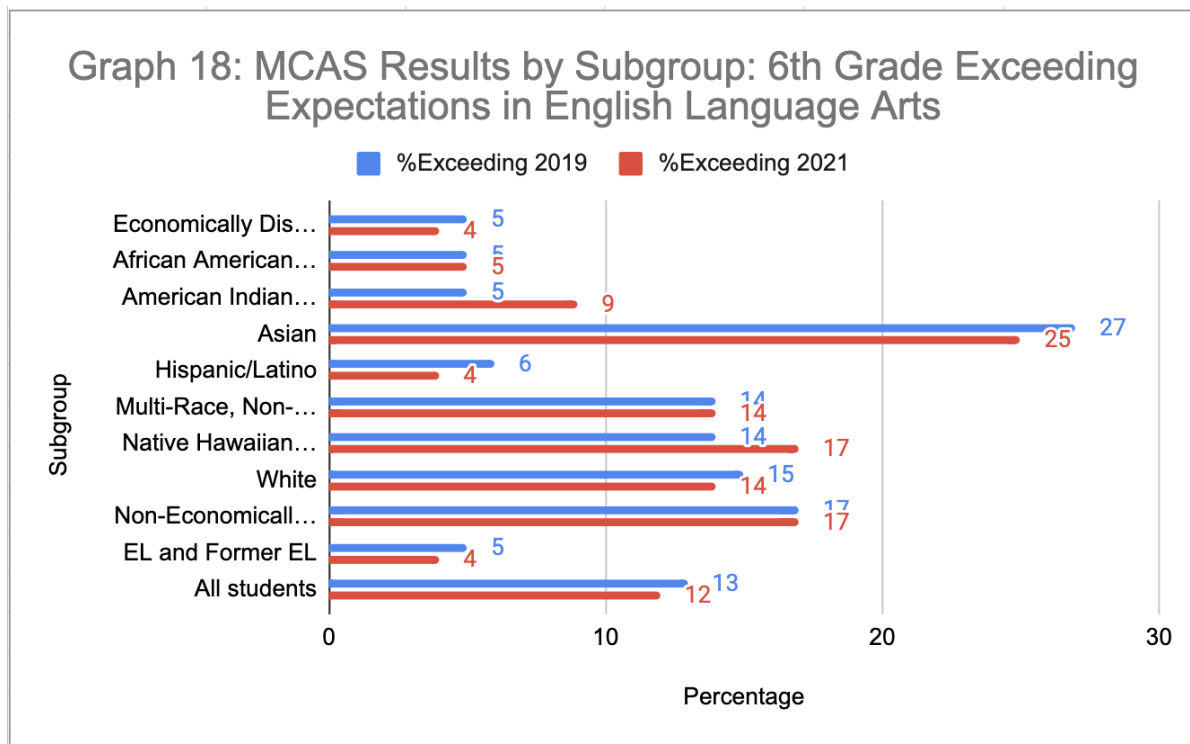


Table 18: Difference by Subgroup in Exceeding Expectations in 6th Grade English Language Arts						
Subgroup	% Exceeding 2019	% Exceeding 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	5	4	5.542	0.0001	-1	-20%
African American/Black	5	5	0	0.5	0	0.00%
American Indian or Alaskan Native	5	9	-1.408	0.0808	4	80%
Asian	27	25	2.266	0.116	-2	-7.41%
Hispanic/Latino	6	4	7.954	0.0001	-2	-33.33%
Multi-Race, Non-Hispanic/Latino	14	14	0	0.5	0	0.00%
Native Hawaiian or Pacific Islander	14	17	-0.477	0.3156	3	21.43%
White	15	14	4.008	0.0001	-1	-6.67%
Non-Economically Disadvantaged	17	17	0	0.5	0	0.00%
EL and Former EL	5	4	3.771	0.0001	-1	-20%
All students	13	12	5.631	0.0001	-1	-7.69%

On the other end of the spectrum, fewer students exceeded expectations in 6th-grade English Language Arts in 2021 than in 2019. All students had a percentage point change of -1 and a statistically significant decrease of 7.69% between 2019 and 2021.

While all students had a decrease in the number of students exceeding expectations in 6th-grade English Language Arts between 2019 and 2021, not all subgroups did. The groups that had a decrease were Economically Disadvantaged students, Asian students, Hispanic or Latino students, White students, and English Learner or Former English Learner students. The most impacted groups include the Economically Disadvantaged students who had a decrease of 20%, Hispanic or Latino students who had a decrease of 33.33%, and English Learner or Former English Learner students who had a decrease of 20% between 2019 and 2021. The decreases are

statistically significant for every subgroup except Asian students. Additionally, American Indian or Alaskan Native students and Native Hawaiian or Pacific Islander students had a non-statistically significant increase, and African American or Black students, Multi-Race and Non-Hispanic or Latino students, and Non-Economically Disadvantaged students had no change in the percentage of students exceeding expectations in 6th-grade English Language Arts between 2019 and 2021.

Regarding exceeding expectations in 6th-grade English Language Arts, while there are evident race disparities, there are even more apparent class-based disparities. Both in 2019 and 2021, more Non-Economically Disadvantaged students exceeded expectations in 6th-grade English Language Arts than Economically Disadvantaged students, which shows that there was already a gap (Massachusetts Department of Elementary and Secondary Education 2022). However, the same amount of Non-Economically Disadvantaged students exceeded expectations in 2019 and 2021, but fewer Economically Disadvantaged students exceeded expectations in 2021 than in 2019. English Language Arts is a subject that students often need a lot of support in and a subject that parents who can would most likely spend a lot of time helping their children on. Students from Economically Disadvantaged families often do not have the same resources and parental support as students from Non-Economically Disadvantaged families; this puts them at a disadvantage and could be why they struggled even more in 6th-grade English Language Arts during the Covid-19 pandemic than before the pandemic.

MCAS Results by Subgroup: Failing to Meet Expectations in 7th Grade Mathematics

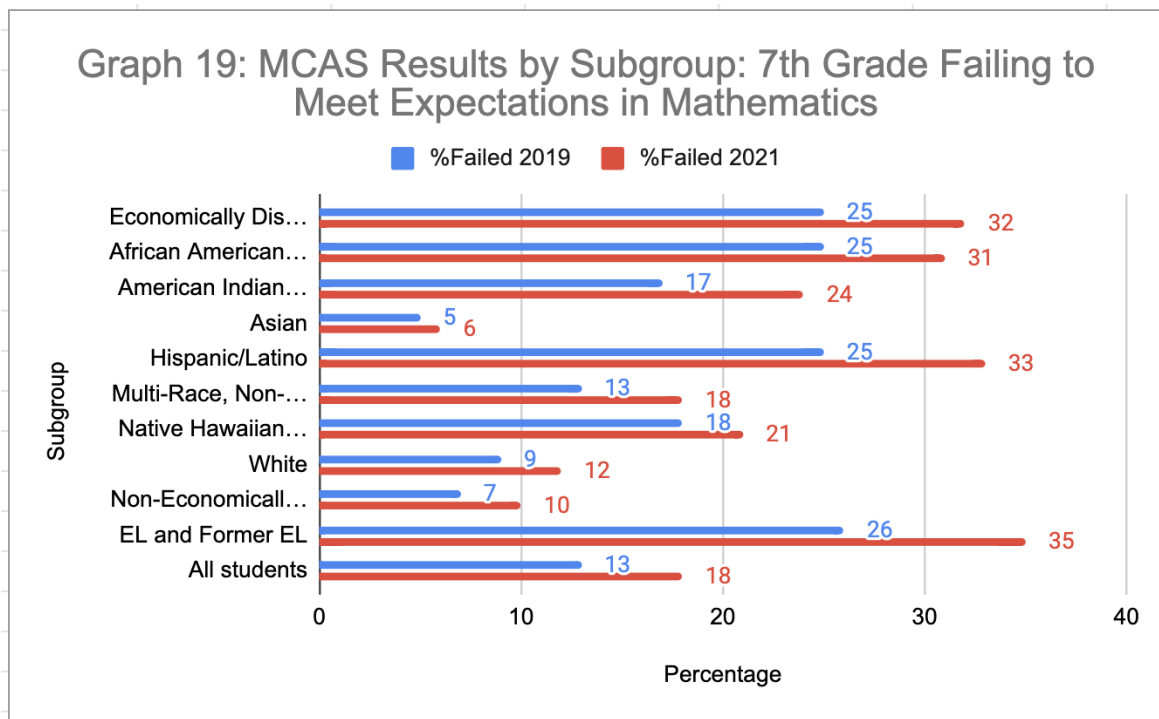


Table 19: Difference by Subgroup in Failing to Meet Expectations in 7th Grade Mathematics						
Subgroup	% Failed 2019	% Failed 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	25	32	-17.64	0.0001	7	28%
African American/Black	25	31	-7.6	0.0001	6	24%
American Indian or Alaskan Native	17	24	-1.49	0.0681	7	41.18%
Asian	5	6	-2.172	0.015	1	20%
Hispanic/Latino	25	33	-15.192	0.0001	8	32%
Multi-Race, Non-Hispanic/Latino	13	18	-5.013	0.0001	5	38.46%
Native Hawaiian or Pacific Islander	18	21	-0.425	0.3372	3	16.67%
White	9	12	-13.872	0.0001	3	33.33%
Non-Economically Disadvantaged	7	10	-15.814	0.0001	3	42.86%
EL and Former EL	26	35	-14.836	0.0001	9	34.62%
All students	13	18	-25.735	0.0001	5	38.46%

Continuing to show the academic impact the Covid-19 pandemic has had on K-12 education, there was an increase in the number of students failing to meet expectations in 7th-grade Mathematics between 2019 and 2021. All students had a percentage point change of 5 and a statistically significant increase of 38.46% between 2019 and 2021.

The Covid-19 pandemic impacted every subgroup in 7th-grade Mathematics. The most impacted groups include American Indian or Alaskan Native students who had an increase of 41.18%, and Non-Economically Disadvantaged students who had an increase of 42.86% between 2019 and 2021. The differences are statistically significant for every subgroup except American Indian or Alaskan Native students and Native Hawaiian or Pacific Islander students.

While the number of students failing to meet expectations in 7th-grade Mathematics has increased between 2019 and 2021, the increase is less significant than it was for 8th-grade Mathematics, 6th-grade Mathematics, 5th-grade Mathematics, 4th-grade Mathematics, and 3rd-grade Mathematics. A reason for this may be the 7th-grade Mathematics curriculum. As of 2017, students in 7th-grade Mathematics look at proportional relationships to solve mathematical and real-world issues, broaden their previous knowledge on operations with fractions, produce equivalent expressions from properties of operations, use algebraic and numerical expressions to solve real-world mathematical problems, draw and describe the relationships between geometrical figures, use geometry to solve real-world mathematical problems, draw inferences about a population using random sampling, look at two populations and draw comparative and informal references about them, and evaluate probability models (Massachusetts Department of Elementary and Secondary Education 2017). While these are challenging concepts, many build off what students had learned in previous years, which could be why students in 7th-grade struggled less in Mathematics than students in other grades.

MCAS Results by Subgroup: Exceeding Expectations in 7th Grade Mathematics

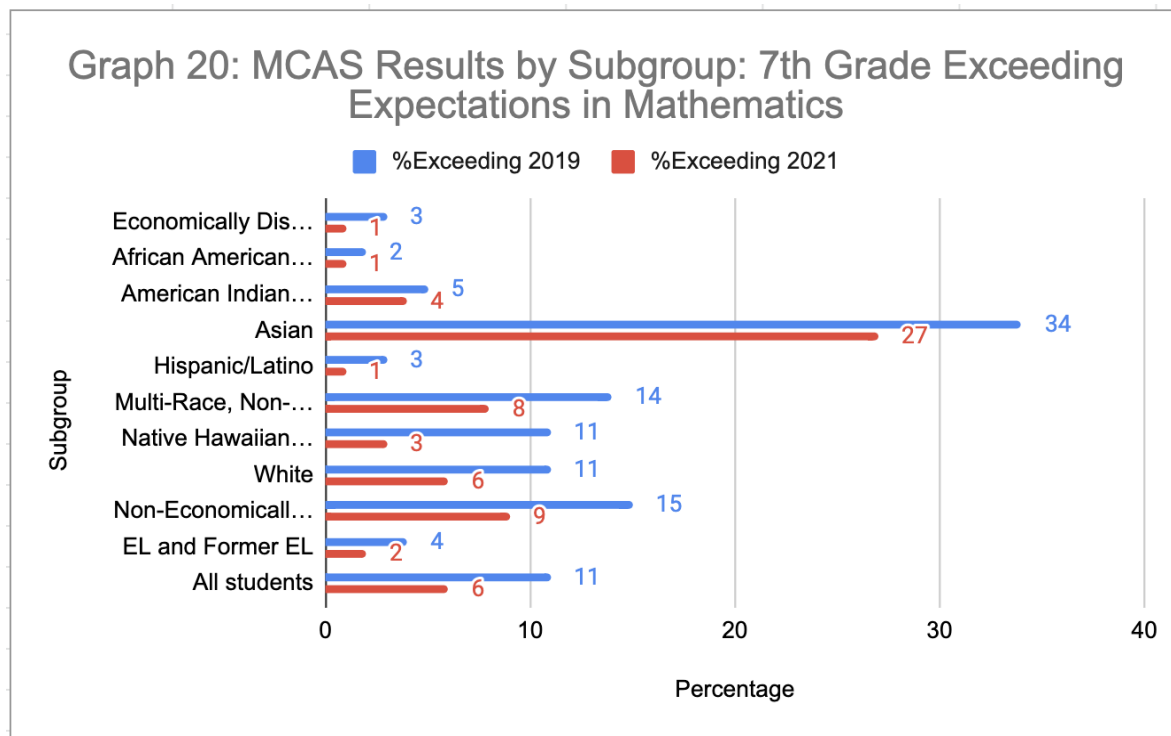


Table 20: Difference by Subgroup in Exceeding Expectations in 7th-Grade Mathematics						
Subgroup	% Exceeding 2019	% Exceeding 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	3	1	16.139	0.0001	-2	-66.67%
African American/Black	2	1	4.678	0.0001	-1	-50%
American Indian or Alaskan Native	5	4	0.413	0.0001	-1	-20%
Asian	34	27	7.535	0.0001	-7	-20.59%
Hispanic/Latino	3	1	12.272	0.0001	-2	-66.67%
Multi-Race, Non-Hispanic/Latino	14	8	6.947	0.0001	-6	-42.86%
Native Hawaiian or Pacific Islander	11	3	1.796	0.0359	-8	-72.73%
White	11	6	25.741	0.0001	-5	-45.45%
Non-Economically Disadvantaged	15	9	27.509	0.0001	-6	-40%
EL and Former EL	4	2	8.873	0.0001	-2	-50%
All students	11	6	33.628	0.0001	-5	-45.45%

Emphasizing the impact the Covid-19 pandemic has had on 7th-grade Mathematics, there was a decrease in the number of students exceeding expectations between 2019 and 2021. All students had a percentage point change of -5 and a statistically significant decrease of 45.45% between 2019 and 2021.

An impact in academic progress in 7th-grade Mathematics was prevalent for all subgroups. However, the groups impacted the most include Economically Disadvantaged students who had a decrease of 66.67%, Hispanic or Latino students who had a decrease of 66.67%, and Native Hawaiian or Pacific Islander students who had a decrease of 72.73% in the number of students exceeding expectations in 7th-grade Mathematics between 2019 and 2021. All the decreases are statistically significant.

MCAS Results by Subgroups: Failing to Meet Expectations in 7th Grade English Language Arts

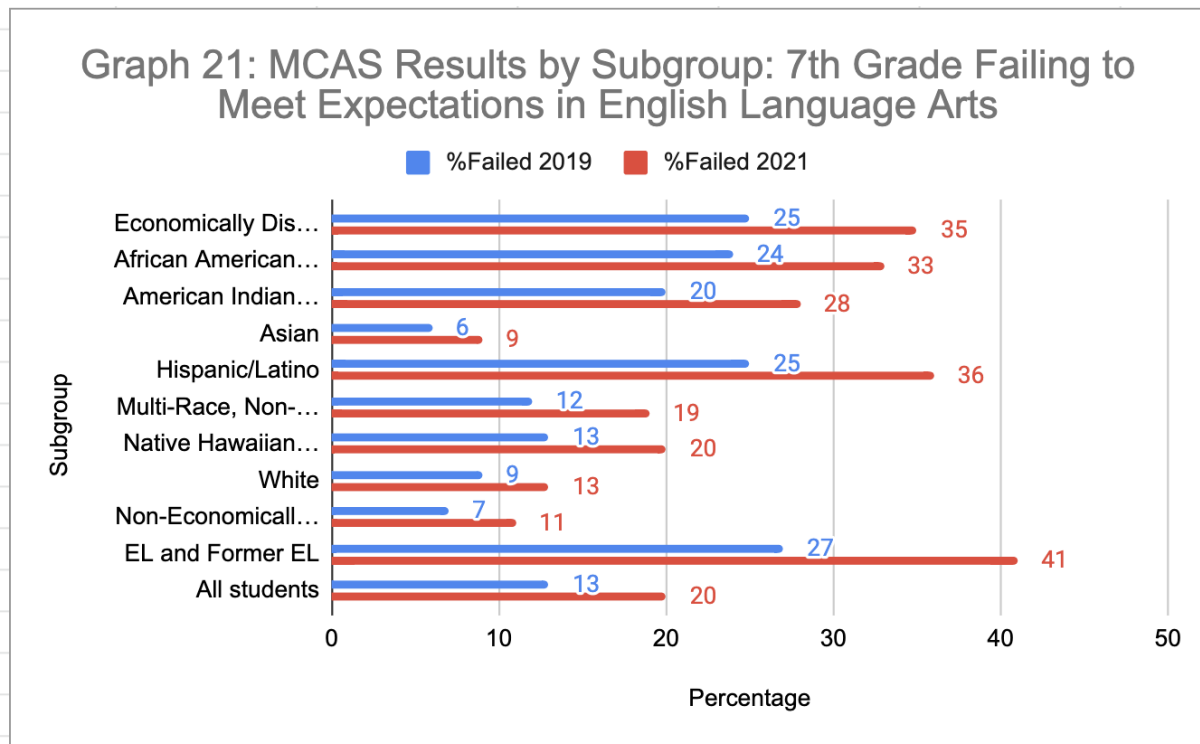


Table 21: Difference by Subgroup in Failing to Meet Expectations in 7th-Grade English Language Arts						
Subgroup	% Failed 2019	% Failed 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	25	35	-24.919	0.0001	10	40%
African American/Black	24	33	-11.363	0.0001	9	37.5%
American Indian or Alaskan Native	20	28	-1.62	0.0526	8	40%
Asian	6	9	-5.648	0.0001	3	50%
Hispanic/Latino	25	36	-20.653	0.0001	11	44%
Multi-Race, Non-Hispanic/Latino	12	19	-7.046	0.0001	7	58.33%
Native Hawaiian or Pacific Islander	13	20	-1.048	0.1587	7	53.85%
White	9	13	-18.137	0.0001	4	44.44%
Non-Economically Disadvantaged	7	11	-20.55	0.0001	4	57.14%
EL and Former EL	27	41	-22.566	0.0001	14	51.85%
All students	13	20	-35.196	0.0001	7	53.85%

The Covid-19 pandemic impacted students' academic performance in 7th-grade English Language Arts as more students failed to meet expectations in 2021 than in 2019. All students had a percentage point change of 7 and a statistically significant increase of 53.85% between 2019 and 2021.

Every subgroup had an increase in the number of students failing to meet expectations in 7th-grade English Language Arts between 2019 and 2021. The most impacted groups include Multi-Race and Non-Hispanic or Latino students who had an increase of 58.33% between 2019 and 2021, and Non-Economically Disadvantaged students who had an increase of 57.14% between 2019 and 2021. Furthermore, the increases are statistically significant for every

subgroup except American Indian or Alaskan Native students and Native Hawaiian or Pacific Islander students.

MCAS Results by Subgroups: Exceeding Expectations in 7th Grade English Language Arts

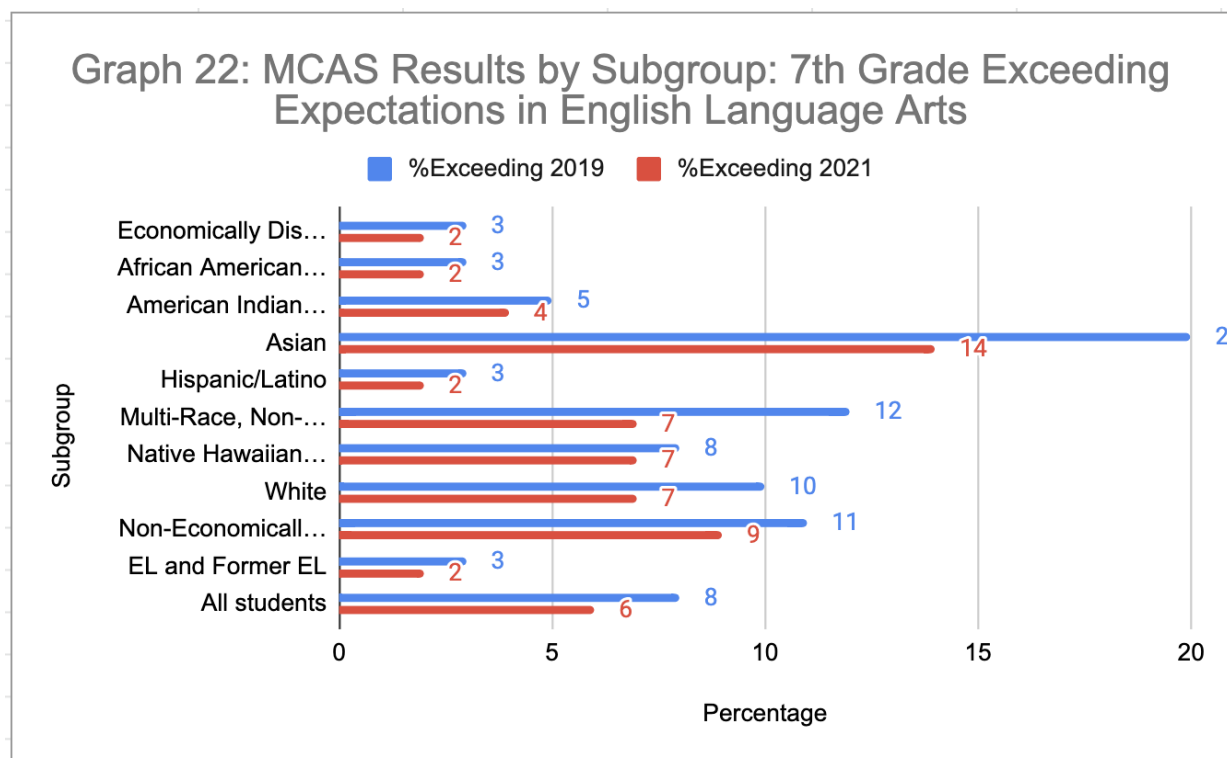


Table 22: Difference by Subgroup in Exceeding Expectations in 7th-Grade English Language Arts						
Subgroup	% Exceeding 2019	% Exceeding 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	3	2	7.25	0.0001	-1	-33.33%
African American/Black	3	2	3.639	0.0001	-1	-33.33%
American Indian or Alaskan Native	5	4	0.415	0.3372	-1	-20%
Asian	20	14	7.906	0.0001	-6	-30%
Hispanic/Latino	3	2	5.495	0.0001	-1	-33.33%
Multi-Race, Non-Hispanic/Latino	12	7	6.174	0.0001	-5	-41.67%
Native Hawaiian or Pacific Islander	8	7	0.211	0.4207	-1	-12.50%
White	10	7	15.373	0.0001	-3	-30%
Non-Economically Disadvantaged	11	9	9.862	0.0001	-2	-18.18%
EL and Former EL	3	2	4.84	0.0001	-1	-33.33%
All students	8	6	14.633	0.0001	-2	-25%

Further demonstrating the impact the Covid-19 pandemic has had on students' achievement in 7th-grade English Language Arts, there was a decrease in the number of students exceeding expectations between 2019 and 2021. All students had a percentage point change of -2 and a statistically significant decrease of 25% between 2019 and 2021.

Every subgroup had a decrease in the number of students exceeding expectations in 7th-grade English Language Arts between 2019 and 2021. The group impacted the most was Multi-Race and Non-Hispanic or Latino students, who had a decrease of 41.67% between 2019 and 2021. Except for Native Hawaiian or Pacific Islander students and American Indian or Alaskan Native students, all the decreases are statistically significant.

MCAS Results by Subgroups: Failing to Meet Expectations in 8th Grade Mathematics

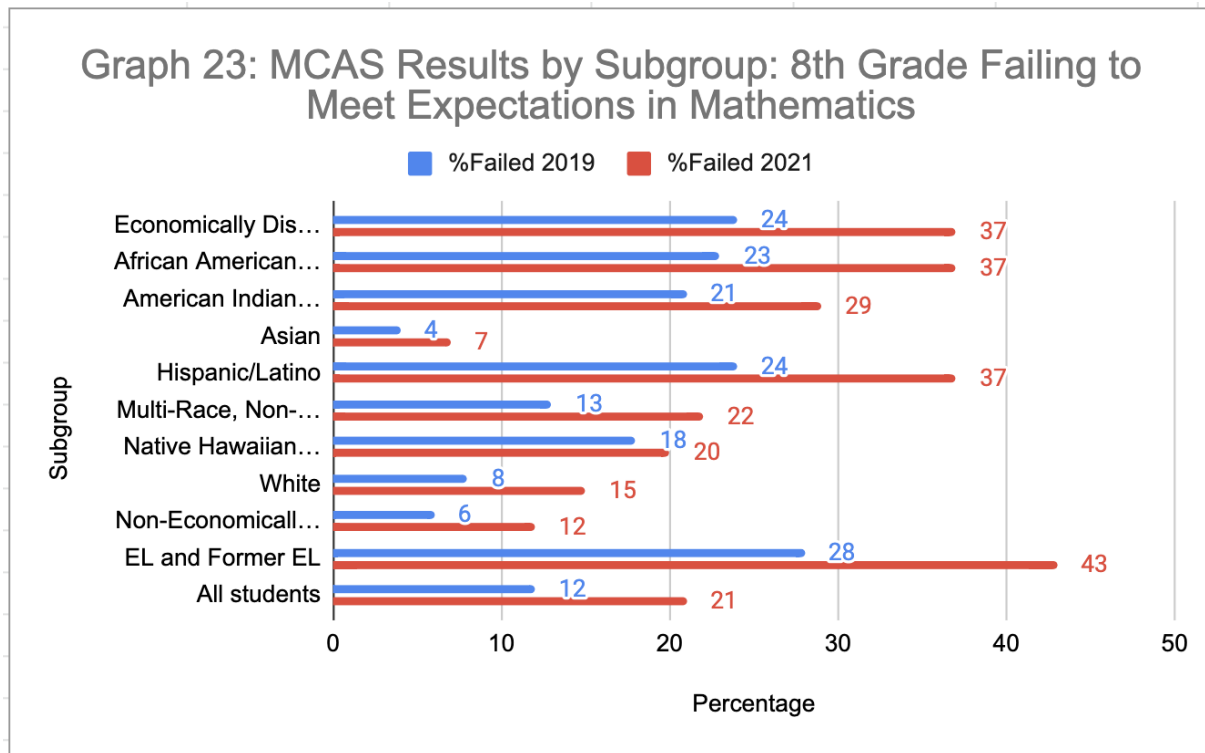


Table 23: Difference by Subgroup in Failing to Meet Expectations in 8th-Grade Mathematics						
Subgroup	% Failed 2019	% Failed 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	24	37	-31.8	0.0001	13	54.17%
African American/Black	23	37	-17.481	0.0001	14	60.87%
American Indian or Alaskan Native	21	29	-1.64	0.0505	8	38.10%
Asian	4	7	-6.497	0.0001	3	75%
Hispanic/Latino	24	37	-24.079	0.0001	13	54.17%
Multi-Race, Non-Hispanic/Latino	13	22	-8.474	0.0001	9	69.23%
Native Hawaiian or Pacific Islander	18	20	-0.286	0.3897	2	11.11%
White	8	15	-31.328	0.0001	7	87.5%
Non-Economically Disadvantaged	6	12	-31.077	0.0001	6	100%
EL and Former EL	28	43	-21.543	0.0001	15	53.57%
All students	12	21	-45.294	0.0001	9	75%

Proceeding with the impact the Covid-19 pandemic has had on K-12 education, more students were failing to meet expectations in 8th-grade Mathematics in 2021 than in 2019. All students had a percentage point change of 9 and a statistically significant increase of 75% between 2019 and 2021.

All subgroups had an increase in the number of students failing to meet expectations in 8th-grade Mathematics between 2019 and 2021. The subgroups with the most significant increases include White students who had an increase of 87.5% and Non-Economically Disadvantaged students who had an increase of 100% between 2019 and 2021. The increases are statistically significant for every subgroup except American Indian or Alaskan Native students and Native Hawaiian or Pacific Islander students.

MCAS Results by Subgroups: Exceeding Expectations in 8th Grade Mathematics

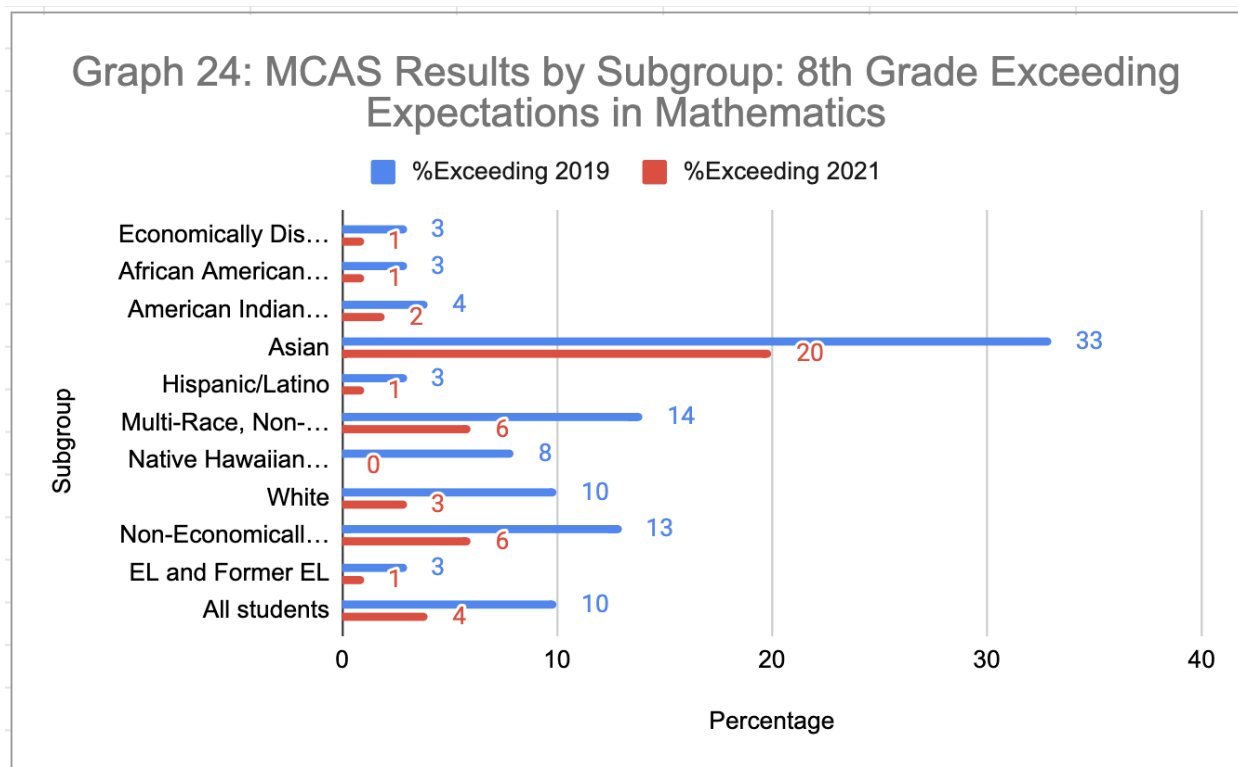


Table 24: Difference by Subgroup in Exceeding Expectations in 8th-Grade Mathematics						
Subgroup	% Exceeding 2019	% Exceeding 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	3	1	15.797	0.0001	-2	-66.67%
African American/Black	3	1	8.089	0.0001	-2	-66.67%
American Indian or Alaskan Native	4	2	1.049	0.1469	-2	-50%
Asian	33	20	14.632	0.0001	-13	-39.39%
Hispanic/Latino	3	1	11.986	0.0001	-2	-66.67%
Multi-Race, Non-Hispanic/ Latino	14	6	9.5	0.0001	-8	-57.14%
Native Hawaiian or Pacific Islander	8	0	2.322	0.0102	-8	-100%
White	10	3	41.553	0.0001	-7	-70%
Non-Economically Disadvantaged	13	6	36.087	0.0001	-7	-53.85%
EL and Former EL	3	1	9.744	0.0001	-2	-66.67%
All students	10	4	44.228	0.0001	-6	-60%

Emphasizing the impact the Covid-19 pandemic has had on student performance in 8th-grade Mathematics, there was a decrease in the number of students exceeding expectations in this subject between 2019 and 2021. All students had a percentage point change of -6 between 2019 and 2021 which is a statistically significant decrease of 60%. This decrease is greater than the decrease of the percentage of students exceeding expectations in Mathematics in other grades.

Every subgroup had a decrease in the number of students exceeding expectations in 8th-grade Mathematics between 2019 and 2021. The most impacted subgroups include Native Hawaiian or Pacific Islander students with a 100% decrease and White students with a 70%

decrease between 2019 and 2021. The decreases are statistically significant for every subgroup except American Indian or Alaskan Native students.

MCAS Results by Subgroups: Failing to Meet Expectations in 8th Grade English Language Arts

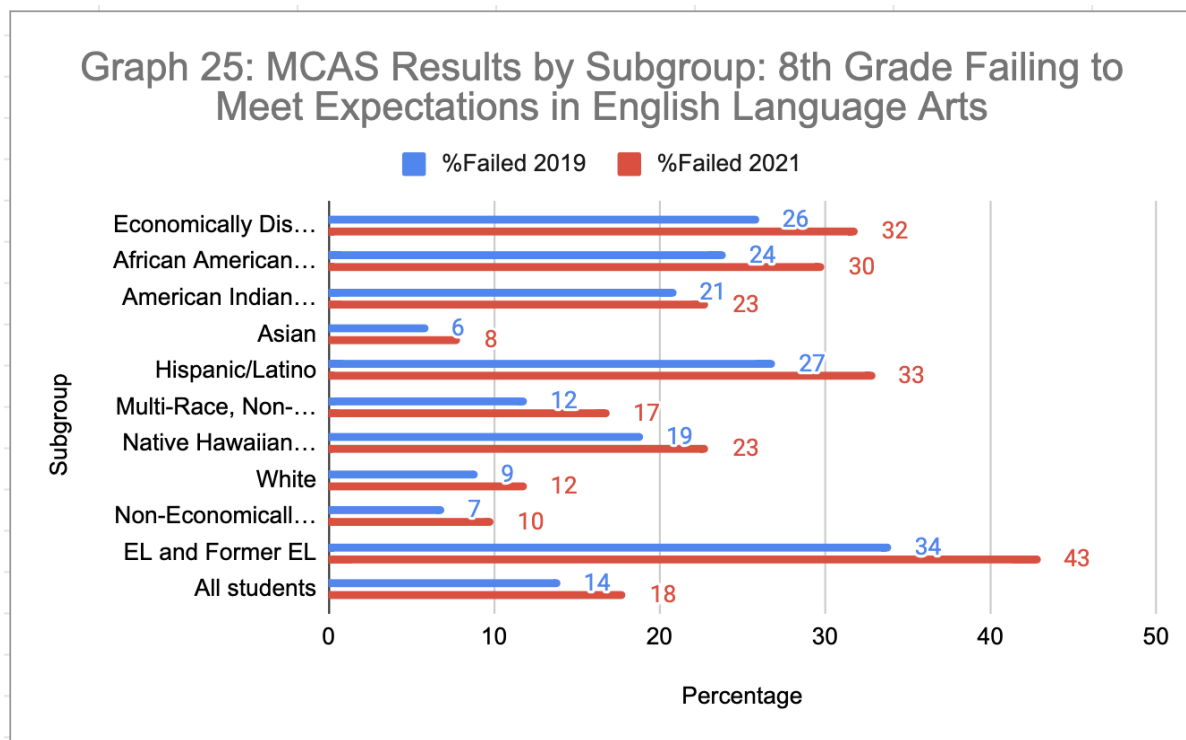


Table 25: Difference by Subgroup in Failing to Meet Expectations in 8th-Grade English Language Arts						
Subgroup	% Failed 2019	% Failed 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	26	32	-14.753	0.0001	6	23.08%
African American/Black	24	30	-7.648	0.0001	6	25%
American Indian or Alaskan Native	21	23	-0.426	0.3336	2	9.52%
Asian	6	8	-3.859	0.0001	2	33.33%
Hispanic/Latino	27	33	-11.062	0.0001	6	22.22%
Multi-Race, Non-Hispanic/Latino	12	17	-5.056	0.0001	5	41.67%
Native Hawaiian or Pacific Islander	19	23	-0.552	0.2877	4	21.06%
White	9	12	-13.963	0.0001	3	33.33%
Non-Economically Disadvantaged	7	10	-15.949	0.0001	3	42.86%
EL and Former EL	34	43	-12.599	0.0001	9	26.47%
All students	14	18	-20.29	0.0001	4	28.57%

Analogous to other subjects, the Covid-19 pandemic also impacted students' academic performance in 8th-grade English Language Arts as more students were failing to meet expectations in 2019 than in 2021. All students had a percentage point change of 4 and a statistically significant increase of 28.57%.

Every subgroup had an increase in the number of students failing to meet expectations in 8th-grade English Language Arts between 2019 and 2021. The groups that were the most impacted include Asian students who had an increase of 33.33%, Multi-Race and Non-Hispanic or Latino students who had an increase of 41.67%, and Non-Economically Disadvantaged students who had an increase of 42.86% between 2019 and 2021. The z-score differences are

statistically significant for every subgroup except American Indian or Alaskan Native students and Native Hawaiian or Pacific Islander students.

MCAS Results by Subgroups: Exceeding Expectations in 8th Grade English Language Arts

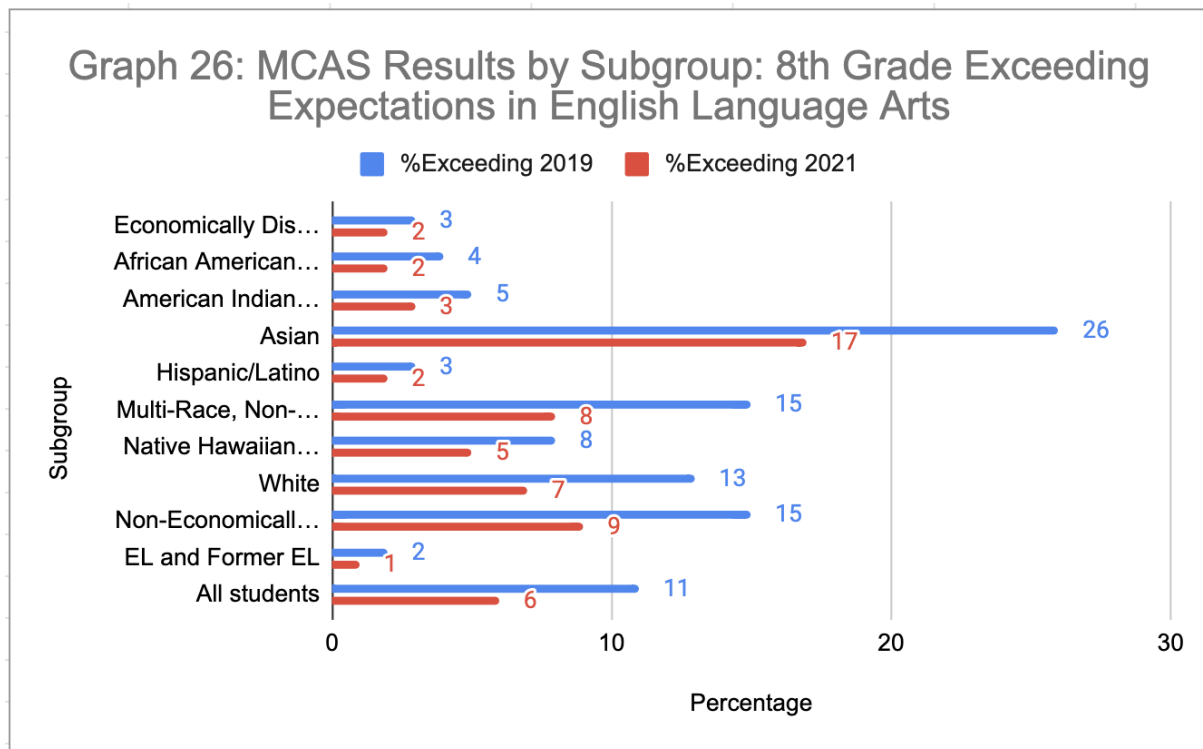


Table 26: Difference by Subgroup in Exceeding Expectations in 8th-Grade English Language Arts						
Subgroup	% Exceeding 2019	% Exceeding 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	3	2	7.103	0.0001	-1	-33.33%
African American/Black	4	2	6.63	0.0001	-2	-50%
American Indian or Alaskan Native	5	3	0.907	0.1814	-2	-40%
Asian	26	17	10.824	0.0001	-9	-34.62%
Hispanic/Latino	3	2	5.383	0.0001	-1	-33.33%
Multi-Race, Non-Hispanic/Latino	15	8	7.801	0.0001	-7	-46.67%
Native Hawaiian or Pacific Islander	8	5	0.683	0.2483	-3	-37.50%
White	13	7	28.944	0.0001	-6	-46%
Non-Economically Disadvantaged	15	9	27.744	0.0001	-6	-40%
EL and Former EL	2	1	5.594	0.0001	-1	-50%
All students	11	6	33.57	0.0001	-5	-45.45%

Further demonstrating how the Covid-19 pandemic has affected students' academic performance in 8th-grade English Language Arts, fewer students exceeded expectations in 2021 compared to 2019. All students had a percentage point change of -5 and a statistically significant decrease of 45.45%.

Each included subgroup also had a decrease in the number of students exceeding expectations in 8th-grade English Language Arts between 2019 and 2021. The most impacted subgroups include African American or Black students and English Learner and Former English Learner students, who both had a 50% decrease in the number of students exceeding expectations between 2019 and 2021. All decreases are statistically significant except for Native Hawaiian or Pacific Islander students and American Indian or Alaskan Native students.

MCAS Results by Subgroups: Failing to Meet Expectations in 8th Grade Science and Technical Engineering

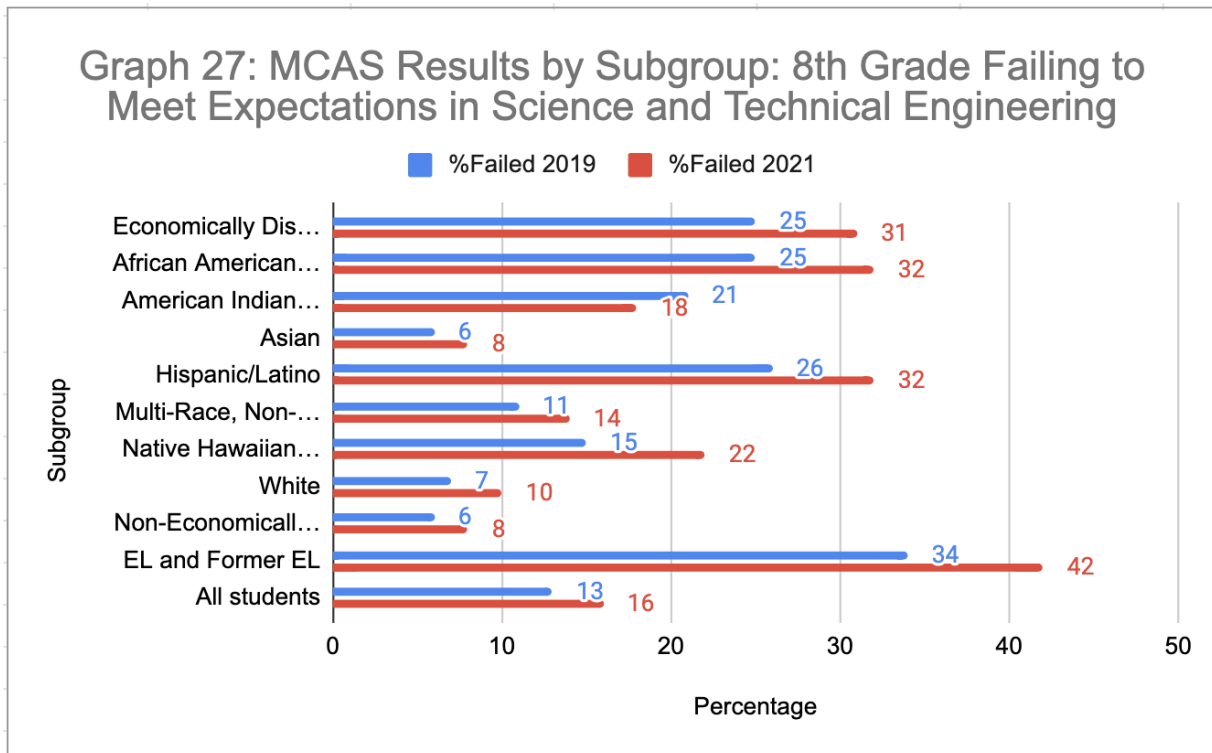


Table 27: Difference by Subgroup in Failing to Meet Expectations in 8th Grade Science and Technical Engineering						
Subgroup	% Failed 2019	% Failed 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	25	31	-13.38	0.0001	6	24%
African American/Black	25	32	-7.861	0.0001	7	28%
American Indian or Alaskan Native	21	18	0.631	0.2643	-3	-14.29%
Asian	6	8	-3.331	0.0004	2	33.33%
Hispanic/Latino	26	32	-9.877	0.0001	6	23.08%
Multi-Race, Non-Hispanic/Latino	11	14	-2.974	0.0015	3	27.27%
Native Hawaiian or Pacific Islander	15	22	-0.886	0.1867	7	46.67%
White	7	10	-14.676	0.0001	3	42.86%
Non-Economically Disadvantaged	6	8	-11.023	0.0001	2	33.33%
EL and Former EL	34	42	-10.013	0.0001	8	23.53%
All students	13	16	-14.73	0.0001	3	23.08%

Comparable to the Covid-19 pandemic's impact on previously discussed subjects, 8th-grade Science and Technical Engineering was also impacted as more students were failing to meet expectations in this subject in 2021 than in 2019. All students had a percentage point change of 3, which is a statistically significant increase of 23.08%.

Every subgroup but American Indian or Alaskan Native students had an increase in the number of students failing to meet expectations in 8th-grade Science and Technical Engineering between 2019 and 2021. The most impacted groups were Asian students who had an increase of 33.33%, Native Hawaiian or Pacific Islander students who had an increase of 46.67%, White students who had an increase of 42.86%, and Non-Economically Disadvantaged students who had an increase of 33.33% between 2019 and 2021. The increases are statistically significant for

every subgroup except Native Hawaiian or Pacific Islander students. Additionally, American Indian or Alaskan Native students had a non-statistically significant decrease in the number of students failing to meet expectations in 8th-grade Science and Technical Engineering between 2019 and 2021.

MCAS Results by Subgroups: Exceeding Expectations in 8th Grade Science and Technical Engineering

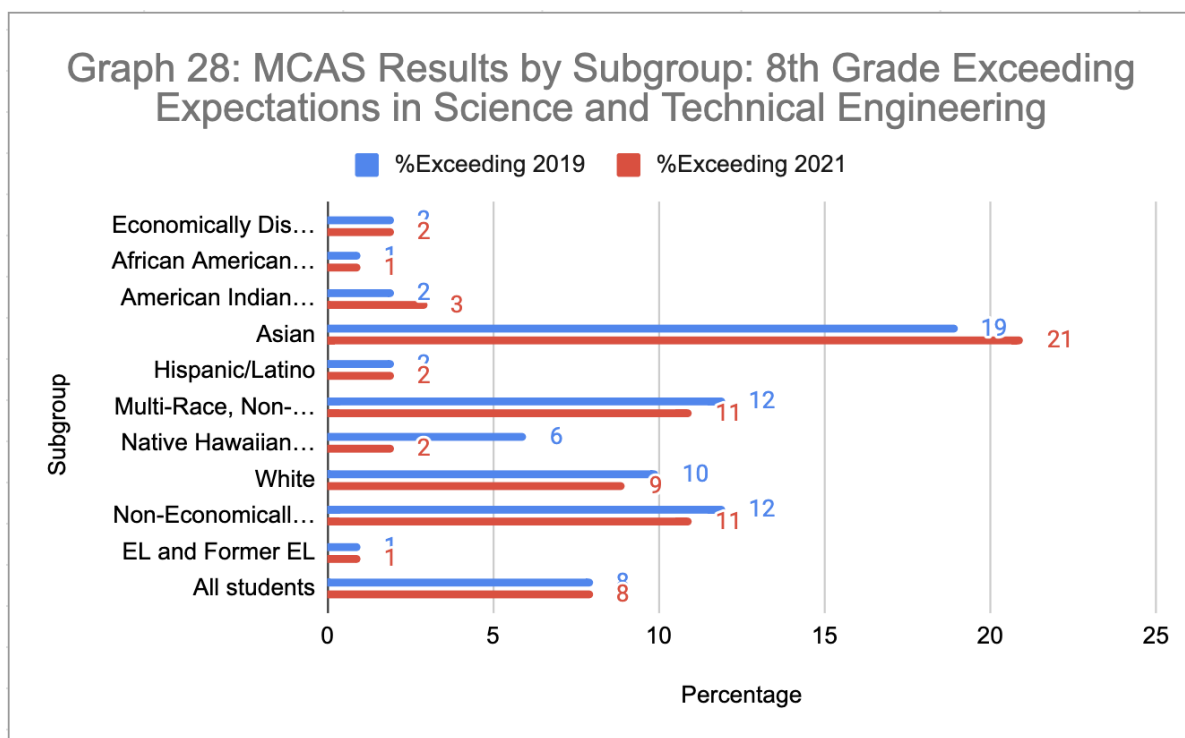


Table 28: Difference by Subgroup in Exceeding Expectations in 8th Grade Science and Technical Engineering						
Subgroup	% Exceeding 2019	% Exceeding 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	2	2	0	0.5	0	0.00%
African American/Black	1	1	0	0.5	0	0.00%
American Indian or Alaskan Native	2	3	-0.524	0.3015	1	50%
Asian	19	21	-2.146	0.0158	2	10.53%
Hispanic/Latino	2	2	0	0.5	0	0.00%
Multi-Race, Non-Hispanic/Latino	12	11	1.035	0.1492	-1	-8.33%
Native Hawaiian or Pacific Islander	6	2	1.074	0.1423	-4	-66.67%
White	10	9	4.705	0.0001	-1	-10%
Non-Economically Disadvantaged	12	11	4.457	0.0001	-1	-8.33%
EL and Former EL	1	1	0	0.5	0	0.00%
All students	8	8	0	0.5	0	0.00%

While there was an impact on the number of students failing to meet expectations in 8th-grade Science and Technical Engineering between 2019 and 2021, there appeared to be no change in the number of all students exceeding expectations.

Even though there was no change for all students, the difference in the percentage of students exceeding expectations in Science and Technical Engineering between 2019 and 2021 varied by subgroup. The subgroups that had a decrease in the number of students exceeding expectations were Multi-Race and Non-Hispanic or Latino students, Native Hawaiian or Pacific Islander students, White students, and Non-Economically Disadvantaged students; these decreases were only statistically significant for White and Non-Economically Disadvantaged students. The largest decrease was among Native Hawaiian or Pacific Islander students, who had

a decrease of 66.67%. The subgroups that had an increase in students exceeding expectations were American Indian or Alaskan Native students and Asian students; the increase Asian students had is statistically significant, but the increase American Indian or Alaskan Native students had is not. Finally, the subgroups that had no change between 2019 and 2021 were Economically Disadvantaged students, African American or Black students, Hispanic or Latino students, and English Learner or Former English Learner students.

High School

MCAS Results by Subgroups: Failing to Meet Expectations in 10th Grade Mathematics

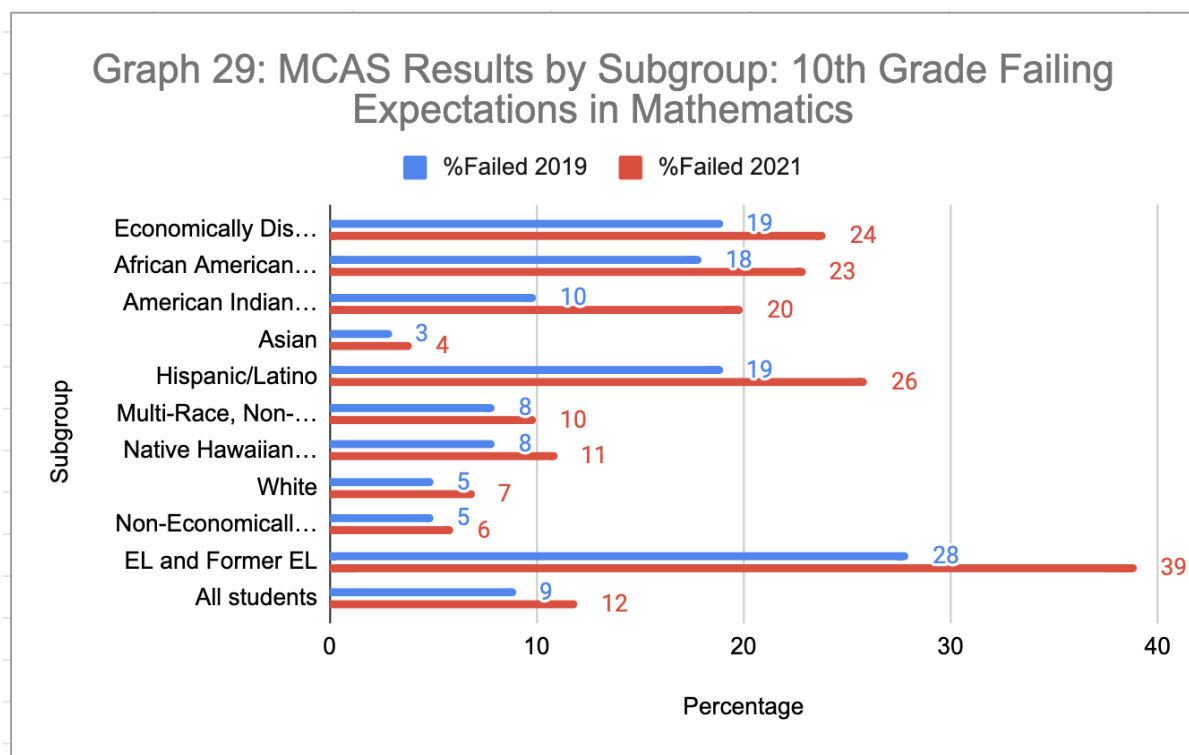


Table 29: Difference by Subgroup in Failing to Meet Expectations in 10th Grade Mathematics						
Subgroup	% Failed 2019	% Failed 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	19	24	-12.634	0.0001	5	26.32%
African American/Black	18	23	-6.757	0.0001	5	27.78%
American Indian or Alaskan Native	10	20	-2.499	0.0062	10	100%
Asian	3	4	-2.597	0.0047	1	33.33%
Hispanic/Latino	19	26	-13.243	0.0001	7	36.84%
Multi-Race, Non-Hispanic/Latino	8	10	-2.322	0.0102	2	25%
Native Hawaiian or Pacific Islander	8	11	-0.516	0.305	3	37.50%
White	5	7	-12.109	0.0001	2	40%
Non-Economically Disadvantaged	5	6	-6.597	0.0001	1	20%
EL and Former EL	28	39	-13.699	0.0001	11	39.29%
All students	9	12	-17.887	0.0001	3	33.33%

Continuing to display the Covid-19 pandemic's impact on academic performance, one-third more students failed to meet expectations in 10th-grade Mathematics in 2021 than in 2019. All students had a 3 percentage point change and a statistically significant increase of 33.33% between 2019 and 2021.

Every subgroup had an increase in the number of students failing to meet expectations in 10th-grade Mathematics between 2019 and 2021. The group that appears to have been the most impacted is American Indian or Alaskan Native students, who had an increase of 100%. The increases are statistically significant for every subgroup except Native Hawaiian or Pacific Islander students.

MCAS Results by Subgroups: Exceeding Expectations in 10th Grade Mathematics

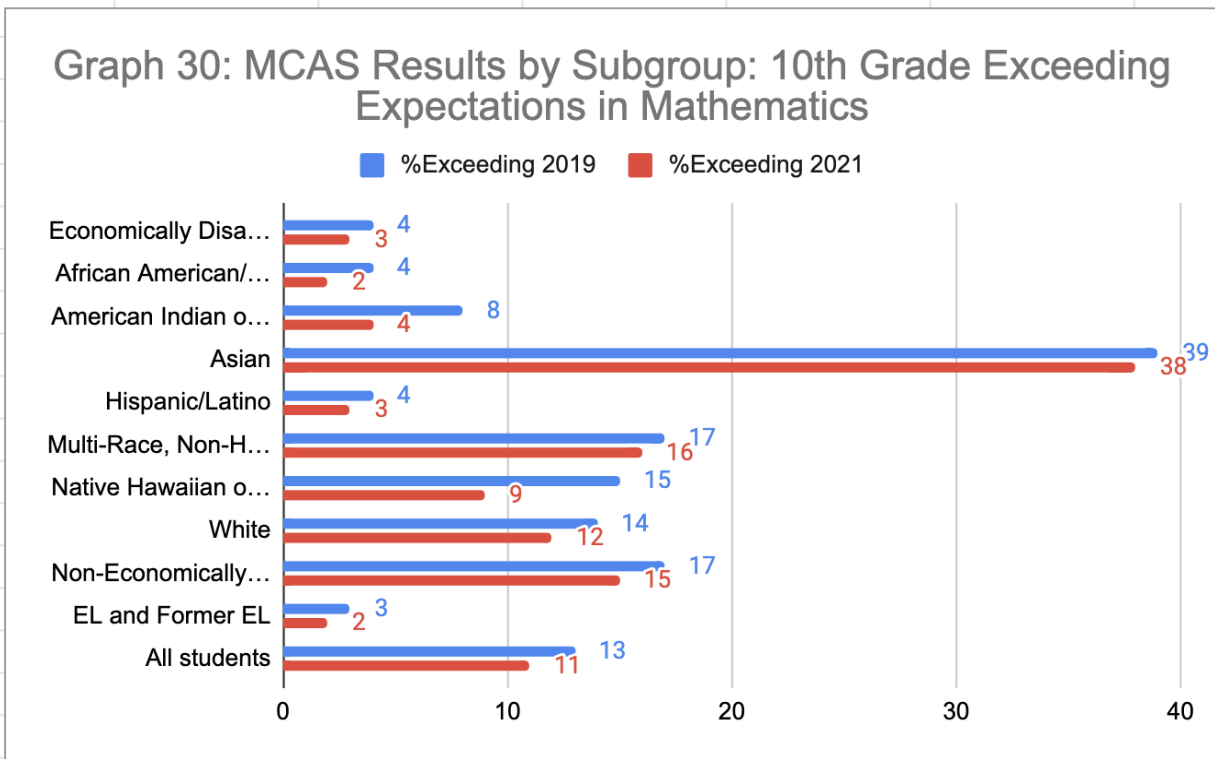


Table 30: Difference by Subgroup in Exceeding Expectations in 10th Grade Mathematics						
Subgroup	% Exceeding 2019	% Exceeding 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	4	3	5.64	0.0001	-1	-25%
African American/Black	4	2	6.456	0.0001	-2	-50%
American Indian or Alaskan Native	8	4	1.528	0.063	-4	-50%
Asian	39	38	0.984	0.1635	-1	-2.56%
Hispanic/Latino	4	3	4.296	0.0001	-1	-25%
Multi-Race, Non-Hispanic/Latino	17	16	0.894	0.1867	-1	-5.88%
Native Hawaiian or Pacific Islander	15	9	0.926	0.1762	-6	-40%
White	14	12	8.603	0.0001	-2	-14.29%
Non-Economically Disadvantaged	17	15	8.246	0.0001	-2	-11.76%
EL and Former EL	3	2	3.764	0.0001	-1	-33.33%
All students	13	11	11.294	0.0001	-2	-15.38%

Further proving the impact the Covid-19 pandemic has had on 10th-grade Mathematics, there was a decrease in the number of students exceeding expectations in 10th-grade Mathematics between 2019 and 2021. All students had a -2 percentage point change and a statistically significant decrease of 15.38% between 2019 and 2021.

Each subgroup had a decrease in the number of students exceeding expectations in 10th-grade Mathematics between 2019 and 2021. The subgroups impacted the most were African American or Black students who had a decrease of 50%, American Indian or Alaskan Native students who also had a 50% decrease, and Native Hawaiian or Pacific Islander students who had a 40% decrease. All decreases are statistically significant except the decreases for

American Indian or Alaskan Native students, Asian students, Multi-Race and Non-Hispanic and Latino students, and Native Hawaiian or Pacific Islander students.

MCAS Results by Subgroups: Failing to Meet Expectations in 10th Grade English Language Arts

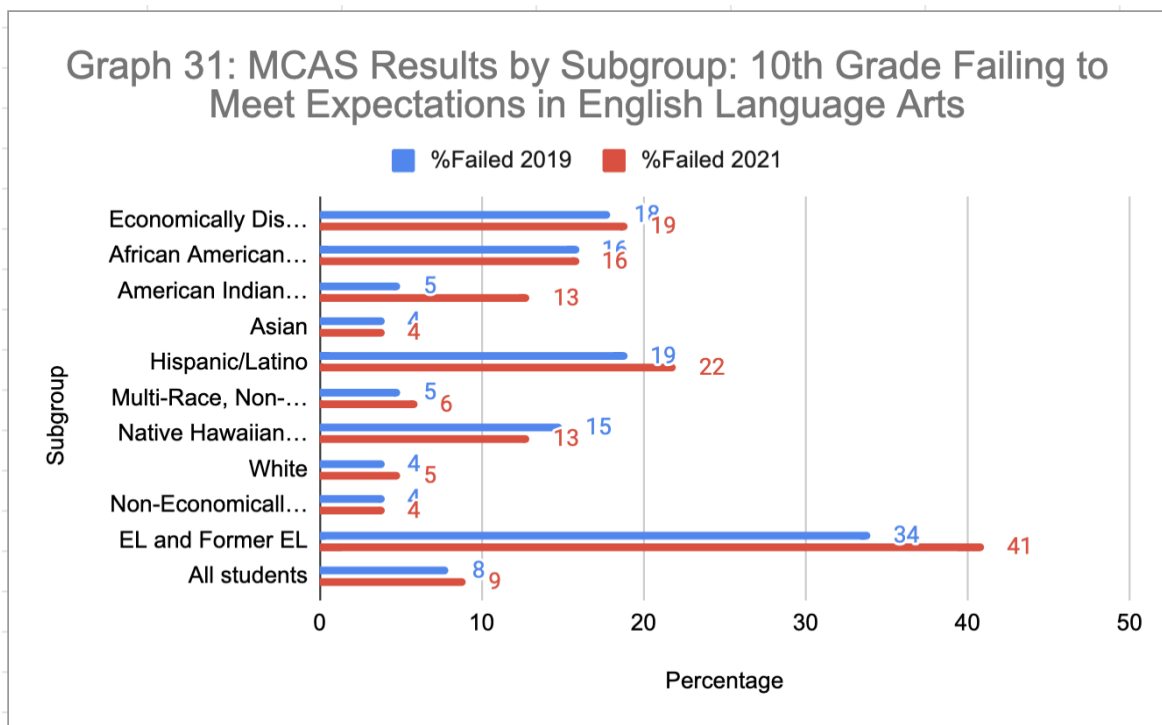


Table 31: Difference by Subgroup in Failing to Meet Expectations in 10th Grade English Language Arts						
Subgroup	% Failed 2019	% Failed 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	18	19	-2.684	0.0035	1	5.55%
African American/Black	16	16	0	0.5	0	0.00%
American Indian or Alaskan Native	5	13	-2.505	0.0062	8	160%
Asian	4	4	0	0.5	0	0.00%
Hispanic/Latino	19	22	-5.892	0.0001	3	15.79%
Multi-Race, Non-Hispanic/ Latino	5	6	-1.461	0.0721	1	20%
Native Hawaiian or Pacific Islander	15	13	0.289	0.3859	-2	-13.33%
White	4	5	-6.953	0.0001	1	25%
Non-Economically Disadvantaged	4	4	0	0.5	0	0.00%
EL and Former EL	34	41	-8.511	0.0001	7	20.59%
All students	8	9	-6.575	0.0001	1	12.5%

As seen in many of the other subjects, there was an increase in the number of students failing to meet expectations in 10th-grade English Language Arts between 2019 and 2021. All students had a 1 percentage point change, representing a statistically significant increase of 12.5%.

Regarding subgroups, the change in the percentage of students failing to meet expectations in 10th-grade English Language Arts between 2019 and 2021 varied. The subgroups that had an increase included Economically Disadvantaged students, American Indian or Alaskan Native students, Hispanic or Latino students, Multi-Race and Non-Hispanic or Latino students, White students, and English Learner or Former English Learner students with American Indian or Alaskan Native students having the highest increase of 160%. All of the

increases are statistically significant. The subgroup with a decrease was Native Hawaiian or Pacific Islander students, which is not statistically significant. Finally, the subgroups that had no change between 2019 and 2021 in the number of students failing to meet expectations in 10th-grade English Language Arts were African American or Black students, Asian students, and Non-Economically Disadvantaged students.

MCAS Results by Subgroups: Exceeding Expectations in 10th Grade English Language Arts

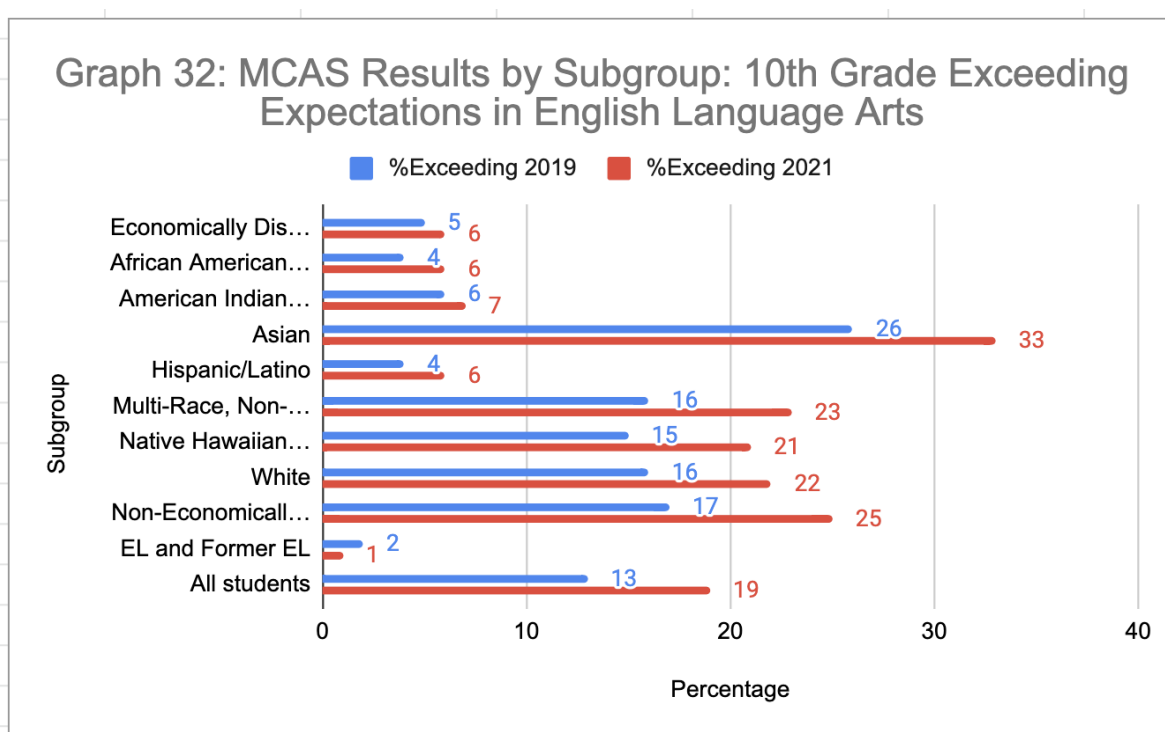


Table 32: Difference by Subgroup in Exceeding Expectations in 10th Grade English Language Arts						
Subgroup	% Exceeding 2019	% Exceeding 2021	Z-Score	P-Value	% Point Change	% Change
Economically Disadvantaged	5	6	-4.572	0.0001	1	20%
African American/Black	4	6	-5.007	0.0001	2	50%
American Indian or Alaskan Native	6	7	-0.364	0.3594	1	16.67%
Asian	26	33	-7.363	0.0001	7	26.92%
Hispanic/Latino	4	6	-7.268	0.0001	2	50%
Multi-Race, Non-Hispanic/Latino	16	23	-5.909	0.0001	7	43.75%
Native Hawaiian or Pacific Islander	15	21	-0.789	0.2148	6	40%
White	16	22	-22.094	0.0001	6	37.5%
Non-Economically Disadvantaged	17	25	-29.655	0.0001	8	47.06%
EL and Former EL	2	1	4.877	0.0001	-1	-50%
All students	13	19	-30.036	0.0001	6	46.15%

Unlike most other subjects, there was an increase in the number of students exceeding expectations in 10th-grade English Language Arts between 2019 and 2021. All students had a percentage point change of 6 and a statistically significant increase of 46.15%.

There was also an increase for every subgroup included except English Learner and Former English Learner students who had a decrease of 50% between 2019 and 2021. The decrease among English Learner and Former English Learner students is statistically significant, and all the increases are statistically significant except the increase for American Indian or Alaskan Native students and Native Hawaiian or Pacific Islander students.

Key Findings and What These Results Mean Long Term

Overall, from comparing MCAS scores from 2019 to 2021, it is evident that the Covid-19 pandemic impacted K-12 education. For all subjects, there was an increase in the number of students failing to meet expectations, and for almost all subjects, there was a decrease in the number of students exceeding expectations. While every subgroup appeared to be impacted, there appeared to be race-based disparities as more students of color were impacted than White Students. In regards to race, American Indian or Alaskan Native students, Asian students, and English Learner and Former English Learner students were impacted the most while White students appeared to be impacted the least. Based on MCAS test score differences between 2019 and 2021, there did not appear to be any notable class-based disparities. However, it is important to note that this data only shows increases and decreases and does not consider the fact that Economically Disadvantaged students were already previously behind Non-Economically Disadvantaged students and does not show the number of students in each subgroup exceeding expectations or failing to meet expectations. Additionally, these results showed that students struggled the most in Mathematics and that students in the younger grades were more academically impacted by the Covid-19 pandemic than students in the older grades.

The negative impact the Covid-19 pandemic has had on K-12 education will most likely have long-term consequences. As one teacher I interviewed said, "kids are 100% behind". Many teachers said that there has been a lot of regression and that students' skills are much weaker than they should be. The majority of teachers interviewed seemed to believe that this academic impact will last for years and that the longer the Covid-19 pandemic lasts, the greater the impact will be.

Chapter 4: Factors That Contributed to Changes in MCAS Scores

This section uses linear regressions to attempt to understand which factors contributed to the changes in average test scores, the percentage of students failing expectations, and the percentage of students exceeding expectations between 2019 and 2021 in 3rd, 6th, and 10th-grade Mathematics and English Language Arts. The factors looked at with each piece of data include the average percentage of students learning in person, the percentage of Economically Disadvantaged students, the percentage of African American students, the percentage of Asian students, the percentage of Hispanic students, the percentage of Native American students, the percentage of Native Hawaiian or Pacific Islander students, the percentage of Multi-Race and Non-Hispanic students, the percentage of English Language Learner students, the schools' equitable score, the school's expenditures per pupil, and the household income by district.

The data below shows that different factors contribute to the changes, but certain patterns stand out. The included covariates impacted Mathematics more than English Language Arts and impacted 6th grade more than the other grades. Additionally, Hispanic students were the most likely to lead to adverse changes while higher house household incomes were the most likely to lead to a positive change in average scores; Hispanic and African American students were most likely to lead to an increase while Asian students and students from higher household incomes were more likely to lead to a decrease in the percentage of students failing expectations; and English Language Learner students and Native Hawaiian or Pacific Islander students were the most likely to lead to a decrease in the number of students exceeding expectations while higher household incomes were the most likely to lead to an increase.

Table 33. Descriptive Statistics for Dependent Variables					
	Mean	Median	Standard Deviation	Minimum	Maximum
Change in 3rd grade English Language Arts Scores	-3.69	-4	5.14	-25.5	14.8
Change in % Failing Expectations in 3rd Grade English Language Arts	1.24	1	4.38	-16	16
Change in % Exceeding Expectations in 3rd Grade English Language Arts	-0.519	0	5.88	-32	26
Change in Average 6th Grade English Language Arts Score	-4.62	-4.3	6.02	-21.9	12.1
Change in % Failing Expectations in 6th Grade English Language Arts	7.97	7	6.98	-12	29
Change in % Exceeding Expectations in 6th Grade English Language Arts	-0.551	0	7.01	-31	21
Change in Average 10th Grade English Language Arts Score	0.683	1	4.66	-14.6	16.3
Change in % Failing Expectations in 10th Grade English Language Arts	1.18	1	4.44	-20	23
Change in % Exceeding Expectations in 10th Grade English Language Arts	4.54	4	8.31	-22	35
Change in Average 3rd Grade Mathematics Scores	-10.3	-10	6.49	-32.7	14.9
Change in % Failing Expectations in 3rd Grade Mathematics	11.8	10	10.2	-16	61
Change in % Exceeding Expectations in 3rd Grade Mathematics	-3.41	-3	4.98	-22	24
Change in Average 6th Grade Mathematics Scores	-10.4	-10.7	11.8	-49.6	21.6
Change in % Failing Expectations in 6th Grade Mathematics	11.3	9	12.7	-34	54
Change in % Exceeding Expectations in 6th Grade Mathematics	-5.75	-4.5	7.6	-36	20
Change in Average 10th Grade Mathematics Scores	-4.96	-4.5	4.27	-20.6	7.7
Change in % Failing Expectations in 10th Grade Mathematics	3.3	3	5.65	-12	26
Change in % Exceeding Expectations in 10th Grade Mathematics	-2.32	-2	4.94	12	-22

3rd Grade English Language Arts Regressions 2019 to 2021

Table 34. Regressions for Change in 3rd grade English Language Arts, 2019 to 2021.						
	Change in Average Score		Change in % Failing		Change in % Exceeding	
Intercept	-2.59382		1.353		3.18565	
Average Percentage of Students Learning In Person	0.04768	*	-0.0648	***	0.01626	
%Economically Disadvantaged 2019	-0.01779		0.0289		-0.00209	
%African American 2019	-0.03965		0.0517		-0.07304	
%Asian 2019	0.00173		-0.0167	***	0.00721	
%Hispanic 2019	-0.06608	**	0.0509	*	-0.03751	
%Native American 2019	-0.15789		0.9422	*	0.38576	
% Native Hawaiian or Pacific Islander 2019	-0.89463		-2.1177		-2.69481	
%Multi-Race and Non-Hispanic 2019	-0.13972	*	-0.0445		-0.19982	*
%English Language Learners 2019	0.01652		-0.0168		0.00178	
Equitable Score	-1.15e-4		-4.04e-4		-8.52E-05	
Expenditures Per Pupil	1.91E-06		-1.88e-5		-4.64E-05	
Household Income By District	-2.09e-6		6.75E-06		-1.54E-05	
R-square	0.103		0.167		0.0659	
Note: * p < .05, ** p < .01, *** p < .001						

Change in 3rd Grade English Language Arts Average Scores, 2019 to 2021

Several factors contributed to the changes in 3rd-grade English Language Arts scores between 2019 and 2021. When looking at the R-square value, it is apparent that this combination of independent variables contributed to 10.3% of the variation in changes in students' test scores in 3rd-grade English Language Arts. Students learning in person fared better than students who were learning remotely. Students who were learning in person had a statistically significant

increase in 3rd-grade English Language Arts test scores between 2019 and 2021; a one percentage point increase in the average percentage of students learning in person was correlated with 4.8 one-hundredths of a percentage point increase in average 3rd-grade English Language Arts scores. When looking at the demographics, the percentage of Hispanic students and the percentage of Multi-Race and Non-Hispanic students had a statistically significant effect on average 3rd-grade English Language Arts scores. Hispanic students had a negative effect on 3rd-grade English Language Arts test scores; for every one percentage point increase in Hispanic students, there was a 6.6 one-hundredths of a percentage decrease in 3rd-grade English Language Arts test scores. Multi-Race and Non-Hispanic students also had a negative effect on the change in average 3rd-grade English Language Arts test scores; for every one percentage point increase in the percentage of Multi-Race and Non-Hispanic students, there was a decrease of 13.97 one-hundredths of a percentage point. From these results, it is apparent that learning in person positively affected the change in 3rd-grade English Language Arts average scores, while Hispanic and Multi-Race and Non-Hispanic students had a negative effect on 3rd-grade English Language Arts average scores.

Change in 3rd Grade English Language Arts Failing Expectations, 2019 to 2021

Multiple circumstances changed the percentage of students failing expectations in 3rd-grade English Language Arts between 2019 and 2021. The R-square value shows that this combination of variables was responsible for 16.7% of the variation in changes in 3rd-grade English Language Arts failure rates between 2019 and 2021. Learning in-person contributed to a statistically significant decrease in the percentage of students failing expectations; a one percentage point increase in the number of students learning in person was associated with 6.5

one-hundredths of a percentage point decrease in failures. The only racial demographics that had a statistically significant effect on the change in the percentage of students failing expectations in 3rd-grade English Language Arts were the percentage of Asian, Hispanic, and Native American students. Asian students led to fewer failures, while Hispanic and Native American students increased failures. Every one percentage point increase in the average percentage of Asian students was associated with 1.7 one-hundredths of a percentage point decrease in failures; every one percentage point increase in the average percentage of Hispanic students in a school was associated with 5.1 one-hundredths of a percentage increase in failures; and every one percentage point increase in the average percentage of Native American students in a school contributed to nearly a 1 percent increase in failures. Overall, these results show that learning in person led to fewer failures and that Hispanic and Native American students were more likely to fail expectations in 3rd-grade English Language Arts than Asian students.

Change in 3rd Grade English Language Arts Exceeding Expectations, 2019 to 2021

When predicting changes in the number of students exceeding expectations in 3rd-grade English Language Arts between 2019 and 2021, the combination of variables contributed to 6.6% of the variation. The percentage of Multi-Race and Non-Hispanic students is the only independent variable that had a statistically significant effect on the change in the number of students exceeding expectations in 3rd-grade English Language Arts between 2019 and 2021; every one percentage point increase in the average percentage of Multi-Race and Non-Hispanic students in a school contributed to 20 one-hundredths of a percentage decrease in the percentage of students exceeding expectations. Therefore, from these results, we can only conclude that the

percentage of Multi-Race and Non-Hispanic students had a negative effect on the change in the number of students exceeding expectations in 3rd-grade English Language Arts.

6th Grade English Language Arts Regressions, 2019 to 2021

Table 35. Regressions for Change in 6th grade English Language Arts, 2019 to 2021.						
	Change in Average Score		Change in % Failing		Change in % Exceeding	
Intercept	-6.44107	**	12.17368	***	-1.39489	
Average Percentage of Students Learning In Person	0.05617		-0.02503		0.02424	
%Economically Disadvantaged 2019	0.04145		-0.02281		0.08506	*
%African American 2019	-0.08720		0.17253	**	-0.02971	
%Asian 2019	0.00938		-0.01570	*	0.00404	
%Hispanic 2019	-0.06280	*	0.11660	***	-0.03289	
%Native American 2019	-0.98437		1.12386		-0.17487	
% Native Hawaiian or Pacific Islander 2019	1.37556		-1.40503		-0.17593	
%Multi-Race and Non-Hispanic 2019	-0.02166		-0.04437		0.08957	
%English Language Learners 2019	-0.11300		-0.01747		-0.18233	*
Equitable Score	-9.32e-4		0.00283	**	-4.11e-4	
Expenditures Per Pupil	6.87e-5		-8.39e-5		7.11e-6	
Household Income By District	6.10e-6		-4.29e-5	***	-5.65e-6	
R-square	0.114		0.282		0.0471	
Note: * p < .05, ** p < .01, *** p < .001						

Change in 6th Grade English Language Arts Average Scores, 2019 to 2021

The included independent variables account for 11.4% of the difference in 6th-grade English Language Arts scores between 2019 and 2021. The only independent variable that had a

statistically significant effect on this change is the percentage of Hispanic students. For every one percentage point increase in the number of Hispanic students in a school district, there was a 6.3 one-hundredths of a percentage point decrease in average 6th-grade English Language Arts scores. From this data, the only conclusion that can be drawn is that schools with a lot of Hispanic students most likely had a decrease in 6th-grade English Language Arts test scores between 2019 and 2021.

Change in 6th Grade English Language Arts Failing Expectations, 2019 to 2021

The included covariates contributed to 28.2% of the variation in the percentage of students failing expectations in 6th-grade English Language Arts between 2019 and 2021. The percentage of African American students, Asian students, and Hispanic students had a statistically significant effect on the change in the percentage of students failing expectations in 6th-grade English Language Arts between 2019 and 2021. For every one percentage point increase in the number of African American students in a school, there was a 17.3 one-hundredths of a percentage increase in the number of students failing expectations; for every one percentage point increase in the number of Asian students in a school, there was a 1.6 one-hundredths of a percentage point decrease in the number of students failing expectations; and for every one percentage point increase in the number of Hispanic students in a school, there was an 11.7 one-hundredths of a percentage point increase in the number of students failing expectations. The equitable score and the household income by district also had a statistically significant effect on the change of the number of students failing expectations in 6th-grade English Language Arts between 2019 and 2021. For every point higher the equitable score was, there was a 0.3 one-hundredths of a percentage point increase in the number of students failing

expectations, and for every \$1000 increase in funding, there was a percentage decrease of 0.0000429 in the number of students failing expectations in 6th-grade English Language Arts between 2019 and 2021. These results demonstrate that schools with more African American students and more Hispanic students most likely had an increase, while schools with more Asian students most likely had a decrease in the number of students failing expectations in 6th-grade English Language Arts between 2019 and 2021. They also show that lower-rated schools most likely had an increase in the number of students failing expectations, and schools with higher household incomes most likely had a decrease in the number of students failing expectations in 6th-grade English Language Arts between 2019 and 2021.

Change in 6th Grade English Language Arts Exceeding Expectations, 2019 to 2021

Multiple factors explain 4.71% of the variation in the number of students exceeding expectations in 6th-grade English Language Arts between 2019 and 2021. The factors that had a statistically significant effect include the percentage of Economically Disadvantaged students who had a positive effect and the percentage of English Language Learner students who had a negative effect on the change in the number of students exceeding expectations in 6th-grade English Language Arts between 2019 and 2021. For every one percentage point increase in the number of Economically Disadvantaged students in a school, there was an 8.5 one-hundredths of a percentage point increase in the number of students exceeding expectations, and for every one percentage point increase in the number of English Language Learner students, there was an 18.2 one-hundredths of a percentage point decrease in the number of students exceeding expectations in 6th-grade English Language Arts between 2019 and 2021. From this information, it can be assumed that schools with more Economically Disadvantaged students had more students

exceeding expectations in 2021 than in 2019 and that schools with more English Language Learner students had a decrease in the percentage of students exceeding expectations in 6th-grade English Language Arts between 2019 and 2021.

10th Grade English Language Arts Regressions, 2019 to 2021

Table 36. Regressions for Change in 10th grade English Language Arts, 2019 to 2021.						
	Change in Average Score		Change in % Failing		Change in % Exceeding	
Intercept	-1.0524		0.64217		-0.67197	
Average Percentage of Students Learning In Person	0.01129		0.00266		-0.00101	
%Economically Disadvantaged 2019	0.02156		-0.02358		-0.09936	*
%African American 2019	0.00459		0.02831		-0.0822	
% Asian 2019	-0.00763		0.00532		0.00166	
%Hispanic 2019	-0.03928		0.05067	**	-0.09695	*
%Native American 2019	0.16772		0.19422		-0.6155	
% Native Hawaiian or Pacific Islander 2019	-2.98103		-0.12489		-6.46068	*
%Multi-Race and Non-Hispanic 2019	0.06972		-0.02258		0.03459	
%English Language Learners 2019	-0.01635		0.01147		0.14044	
Equitable Score	-9.17e-4		-6.29e-4		-0.00159	
Expenditures Per Pupil	3.41E-05		6.33E-06		1.97e-4	
Household Income By District	1.39E-05		-7.73e-7		6.97e-5	***
R-square	0.0903		0.0869		0.259	
Note: * p < .05, ** p < .01, *** p < .001						

Change in 10th Grade English Language Arts Average Scores, 2019 to 2021

When estimating differences in average 10th-grade English Language Arts scores between 2019 and 2021, the R-Square value is 0.0903, meaning that the combination of covariates accounts for 9% of the variation. None of the covariates had a statistically significant effect, so it can be understood that no variables contributed to the difference in 10th-grade English Language Arts average test scores between 2019 and 2021.

Change in 10th Grade English Language Arts Failing Expectations, 2019 to 2021

When estimating the difference in the percentage of students failing expectations in 10th-grade English Language Arts between 2019 and 2021, the combined independent variables contribute to 8.7% of the variation. The only included covariate that had a statistically significant effect on the change in the number of students failing expectations in 10th-grade English Language Arts between 2019 and 2021 is the percentage of Hispanic students; every one percentage point increase in the number of Hispanic students in a school contributed to 5.1 one-hundredths of a percentage increase in the percentage of students failing expectations in 10th grade English Language Arts. Overall, these results show that schools with a large percentage of Hispanic students are more likely to have an increase in the number of students failing expectations in 10th-grade English Language Arts between 2019 and 2021.

Change in 10th Grade English Language Arts Exceeding Expectations, 2019 to 2021

A variety of factors contributed to the change in the percentage of students exceeding expectations in 10th-grade English Language Arts between 2019 and 2021. The included independent variables account for 25.9%. Economically Disadvantaged students had a negative

impact on the number of students exceeding expectations in 10th-grade English Language Arts as every one percentage point increase in the percentage of Economically Disadvantaged students in a school contributed to a 9.9 one-hundredths of a percentage decrease in the number of students exceeding expectations. The racial demographics that affected the change in the percentage of students exceeding expectations in 10th-grade English Language Arts between 2019 and 2021 were the percentage of Hispanic students and the percentage of Native Hawaiian or Pacific Islander students; for every one percentage point increase in the percentage of Hispanic students in a school, there was a 9.7 one-hundredths of a percentage decrease in the number of students exceeding expectations, and for every one percentage point increase in the percentage of Native Hawaiian or Pacific Islander students in a school, there was a 6.46% decrease in the number of students exceeding expectations. Additionally, household income by district had a positive effect on the change in the percentage of students exceeding expectations in 10th-grade English Language Arts between 2019 and 2021; a \$1000 change in funding was associated with a 0.0697 percent increase in the number of students exceeding expectations. These results show that the percentage of Economically Disadvantaged students, Hispanic students, and Native Hawaiian or Pacific Islander students in a school had a negative impact on the change while higher household incomes had a positive impact on the change in the number of students exceeding expectations in 10th-grade English Language Arts between 2019 and 2021

3rd Grade Mathematics Regressions, 2019 to 2021

Table 37. Regressions for Change in 3rd grade Mathematics, 2019 to 2021.						
	Change in Average Score		Change in % Failing		Change in % Exceeding	
Intercept	-13.26344	***	18.59592	***	-3.5179	*
Average Percentage of Students Learning In Person	0.03551		-0.03167		0.05225	*
%Economically Disadvantaged 2019	-0.01383		0.00137		-0.00815	
%African American 2019	-0.10656		0.18383	*	-0.06447	
%Asian 2019	0.00613		-0.00836		0.00498	
%Hispanic 2019	-0.11439	***	0.2031	***	0.00538	
%Native American 2019	-0.02005		0.2908		0.19826	
% Native Hawaiian or Pacific Islander 2019	-1.75518		5.7964	*	-0.11236	
%Multi-Race and Non-Hispanic 2019	-0.06171		-0.0325		0.32744	***
%English Language Learners 2019	0.00378		-0.07121		-0.06279	
Equitable Score	-1.06E-04		-8.24e-4		-4.88E-04	
Expenditures Per Pupil	1.25e-4	**	-8.31e-5		3.03e-5	
Household Income By District	2.70e-5	*	-8.74e-5	***	-2.84E-05	**
R-square	0.236		0.376		0.160	
Note: * p < .05, ** p < .01, *** p < .001						

3rd Grade Mathematics Average Scores, 2019 to 2021 .

Multiple factors influenced the change in average 3rd-grade Mathematics test scores between 2019 and 2021. The included independent variables contributed to 23.6% of the variation. Hispanic students were the only racial demographic that had a statistically significant effect on changes in average 3rd-grade Mathematics test scores; for every one percent increase in the percentage of Hispanic students in a school, there was an 11.4 one-hundredths of a

percentage decrease in 3rd-grade Mathematics test scores. Additionally, expenditures per pupil and household income by district led to a positive difference in 3rd-grade mathematics test scores; every \$1000 change in funding going towards a student is associated with a percentage increase of 0.000125, and a \$1000 change in household income is correlated with a percentage increase of 0.0000270 in average 3rd-grade Mathematics test scores. It is evident from these results that the percentage of Hispanic students in a school contributed to an adverse change, while an increase in expenditures per pupil and household income contributed to a positive change in 3rd-grade Mathematics test scores between 2019 and 2021.

3rd Grade Mathematics Failing Expectations, 2019 to 2021

Disparate factors contributed to 37.6% of the variation in the percentage of students failing expectations in 3rd-grade Mathematics between 2019 and 2021. The racial demographics that had a statistically significant effect on this difference include the percentage of African American students, Hispanic students, and Native Hawaiian or Pacific Islander students in a school. Every one percent increase in the percentage of African American students in a school was associated with 18.4 one-hundredths of a percentage increase; every one percent increase in the percentage of Hispanic students in a school contributed to a 20 one-hundredths of percentage increase; and every one percent increase in the percentage of Native Hawaiian or Pacific Islander students in a school contributed to a 5.8% increase in the number of students failing expectations in 3rd-grade Mathematics between 2019 and 2021. Additionally, household income by district had a negative effect on the change in the number of students failing expectations in 3rd-grade Mathematics between 2019 and 2021; a \$1000 change in household income was correlated with a 0.0000874 percentage decrease in the number of students failing expectations in 3rd-grade

Mathematics. These results show that schools with more African American, Hispanic, and Native Hawaiian or Pacific Islander students most likely had an increase in the number of students failing expectations, and schools with higher household incomes most likely had a decrease in the number of students failing expectations in 3rd-grade Mathematics between 2019 and 2021.

3rd Grade Mathematics Exceeding Expectations, 2019 to 2021

Varied circumstances contributed to 16% of the variation in the percentage of students exceeding expectations in 3rd-grade Mathematics between 2019 and 2021. Learning in-person led to a positive change in the number of students exceeding expectations; for every one percent increase in the number of students learning in person, there was an increase of 5.2 one-hundredths of a percent in the number of students exceeding expectations. The percentage of Multi-Race and Non-Hispanic students in a school also contributed to a positive change in the number of students exceeding expectations in 3rd-grade Mathematics between 2019 and 2021; for every one percent increase in the percentage of Multi-Race and Non-Hispanic students in a school, there was an increase of 32.7 one-hundredths of a percent in the number of students exceeding expectations in 3rd-grade Mathematics. Additionally, an increase in household income by district led to an adverse change in the number of students exceeding expectations as a \$1000 change in household income was correlated with a 0.0000284 percent decrease in the number of students exceeding expectations in 3rd-grade Mathematics. It is apparent from these results that schools that had more students learning in person and schools that had more Multi-Race and Non-Hispanic students most likely had a positive change, while schools that had higher

household incomes most likely had an adverse change in the number of students exceeding expectations in 3rd-grade Mathematics between 2019 and 2021.

6th Grade Mathematics Regressions, 2019 to 2021

Table 38. Regressions for Change in 6th grade Mathematics, 2019 to 2021.						
	Change in Average Score		Change in % Failing		Change in % Exceeding	
Intercept	-20.06275	***	15.94893	***	2.85667	
Average Percentage of Students Learning In Person	-0.04950		0.08978		0.01286	
%Economically Disadvantaged 2019	0.24746	***	-0.15724	**	0.07371	
%African American 2019	-0.18928		0.28485	*	0.05220	
%Asian 2019	0.00635		-0.02142		-0.00585	
%Hispanic 2019	-0.21698	***	0.31385	***	-0.01554	
%Native American 2019	1.64280		-1.97167		-0.21575	
% Native Hawaiian or Pacific Islander 2019	4.73974		-2.50387		1.37691	
%Multi-Race and Non-Hispanic 2019	0.34152	*	-0.35014	*	0.00763	
%English Language Learners 2019	-0.13328		-0.02234		-0.26362	***
Equitable Score	-0.00172		0.00333		-2.03e-4	
Expenditures Per Pupil	7.52e-5		-1.24e-4		1.26e-5	
Household Income By District	6.26e-5	**	-4.43e5		-1.02e-4	***
R-square	0.228		0.262		0.223	
Note: * p < .05, ** p < .01, *** p < .001						

6th Grade Mathematics Average Scores, 2019 to 2021

Numerous factors accounted for 22.8% of the variation in average 6th-grade Mathematics test scores between 2019 and 2021. Schools that had more Economically Disadvantaged students were more likely to have a positive change in 6th-grade Mathematics test scores between 2019 and 2021; for every one percentage point increase in the number of Economically Disadvantaged students in a school, there was a 24.7 one-hundredths of a percentage increase in average 6th-grade Mathematics scores. As for the racial demographics, Hispanic students had a negative impact while Multi-Race and Non-Hispanic students had a positive impact on the difference in average 6th-grade Mathematics scores between 2019 and 2021; for every one percentage point increase in the number of Hispanic students in a school, there was a 21.7 one-hundredths of a percentage decrease, and for every one percentage point increase in the number of Multi-Race and Non-Hispanic students in a school, there was a 34.2 one-hundredths of a percentage increase in average 6th-grade Mathematics test scores. Household income by district also had a statistically significant impact on the change; a \$1000 increase in household income was correlated with a 0.0000626 percentage increase in average 6th-grade Mathematics test scores between 2019 and 2021. From these results, it can be understood that schools with more Economically Disadvantaged students, Multi-Race and Non-Hispanic students, and higher household incomes most likely had a positive change in 6th-grade Mathematics test scores, while schools with more Hispanic students most likely had an adverse change in 6th-grade Mathematics scores between 2019 and 2021.

6th Grade Mathematics Failing Expectations, 2019 to 2021

The included independent variables account for 26.2% of the variation in the number of students failing expectations in 6th-grade Mathematics between 2019 and 2021. The percentage of Economically Disadvantaged students in a school had a negative correlation on the change in the percentage of students failing expectations in 6th-grade Mathematics; for every one percentage point increase in the number of Economically Disadvantaged students in a school, there was a 15.7 one-hundredths of percent decrease. The racial demographics that had a statistically significant effect include the percentage of African American students, Hispanic students, and Multi-Race and Non-Hispanic students. Every one percentage point increase in the number of African American students in a school contributed to 28.5 one-hundredths of a percentage increase in the number of students failing expectations; every one percentage point increase in the number of Hispanic students in a school was correlated with 31.4 one-hundredths of a percentage point increase in the number of students failing expectations; and every one percentage point increase in the number of Multi-Race and Non-Hispanic students in a school was correlated with 35 one-hundredths of a percentage decrease in the number of students failing expectations in 6th-grade Mathematics. From these results, we can understand that schools with more Economically Disadvantaged students and more Multi-Race and Non-Hispanic students most likely had a decrease in the number of students failing expectations in 6th-grade Mathematics between 2019 and 2021, and schools with more African American and Hispanic students most likely had an increase.

6th Grade Mathematics Exceeding Expectations, 2019 to 2021

The included independent variables account for 22.3% of the variation in the change in the number of students exceeding expectations in 6th-grade Mathematics between 2019 and 2021. The factors that had a statistically significant effect on the number of students exceeding expectations include the percentage of English Language Learners and the household income by district, which both led to an adverse change; for every one percentage point increase in the number of English Language Learners in a school, there was a 26.4 one-hundredths of a percentage point decrease and every \$1000 increase in household income was correlated with a 0.000102 percentage decrease in the number of students exceeding expectations in 6th-grade Mathematics between 2019 and 2021. From these results, it can be inferred that schools with more English Language Learners and higher household incomes most likely had a decrease in the number of students exceeding expectations in 6th-grade Mathematics between 2019 and 2021.

10th Grade Mathematics Regressions, 2019 to 2021

Table 39. Regressions for Change in 10th-grade Mathematics, 2019 to 2021.						
	Change in Average Score		Change in % Failing		Change in % Exceeding	
Intercept	-9.4463	***	5.6231	*	-4.55665	
Average Percentage of Students Learning In-Person	-0.0132		0.029		-0.01254	
%Economically Disadvantaged 2019	0.0105		-0.0169		0.00546	
%African American 2019	0.0367		0.0204		0.02621	
%Asian 2019	-0.0121	**	0.0151	*	-0.00107	
%Hispanic 2019	-0.0218		0.0632	*	4.29e-5	
%Native American 2019	0.6378		-0.1983		0.24897	
% Native Hawaiian or Pacific Islander 2019	-4.3903	**	0.0758		-3.8938	*
%Multi-Race and Non-Hispanic 2019	-0.0218		-0.0586		0.09922	
%English Language Learners 2019	-0.0243		0.0379		-1.45E-02	
Equitable Score	-5.48e-4		1.07E-04		-5.00E-04	
Expenditures Per Pupil	1.80E-04		-2.17e-4		1.53e-4	
Household Income By District	2.64E-05	**	-3.02e-6		-1.43E-06	
R-square	0.161		0.0992		0.0482	
Note: * p < .05, ** p < .01, *** p < .001						

10th Grade Mathematics Average Scores, 2019 to 2021

Multiple factors contributed to a 16.1% change in average 10th-grade Mathematics scores between 2019 and 2021. The racial demographics that had a statistically significant effect on this change are the percentage of Asian students and Native Hawaiian or Pacific Islander students; these changes are negative. For every one percentage point increase in the number of Asian students in a school, there was a 1.21 one-hundredths of a percentage decrease in average

10th-grade Mathematics scores, and for every one percentage point increase in the number of Native Hawaiian or Pacific Islander students in a school, there was a 4.4% decrease in students' test scores. Additionally, household income by district led to a positive change in students' test scores in 10th-grade Mathematics between 2019 and 2021; a \$1000 change in household income led to a test score percentage increase of 0.0000264. From these results, it is apparent that schools with a lot of Asian students and a lot of Native Hawaiian or Pacific Islander students most likely had a decrease in average test scores, and schools with higher household incomes most likely had an increase in 10th-grade Mathematics test scores between 2019 and 2021.

10th Grade Mathematics Failing Expectations, 2019 to 2021

The included covariates contributed to 9.9% of the changes in the number of students failing expectations in 10th-grade Mathematics between 2019 and 2021. The factors that had a statistically significant effect include the percentage of Asian students and Hispanic students. For every one percentage point increase in the number of Asian students in a school, there was 1.5 one-hundredths of a percentage point increase in the number of students failing expectations in 10th-grade Mathematics and for every one percentage point increase in the number of Hispanic students in a school, there was a 6.3 one-hundredths of a percentage point increase. These results show that schools with more Asian and Hispanic students most likely had more students failing expectations in 10th-grade Mathematics in 2021 than in 2019.

10th Grade Mathematics Exceeding Expectations, 2019 to 2021

The covariates included account for 4.82% of the variation in students exceeding expectations in 10th-grade Mathematics between 2019 and 2021. The only covariate that had a

statistically significant impact on the change is the percentage of Native Hawaiian or Pacific Islander students. For every one percentage point increase in the number of Native Hawaiian or Pacific Islander students in a school, there is a percentage point decrease of 3.89% in the number of students exceeding expectations in 10th-grade Mathematics between 2019 and 2021. From these results, the only thing that can be understood is that schools with many Native Hawaiian or Pacific Islander students most likely had a decrease in the number of students exceeding expectations in 10th-grade Mathematics between 2019 and 2021.

Key Findings and What these Results Mean

Overall, from these results, it can be understood that Mathematics was more influenced than English Language Arts and 6th grade was more influenced than 3rd or 10th grade. It can also be understood that Hispanic students were more likely to lead to an adverse change and higher household incomes were more likely to lead to a positive change in average test scores; that Hispanic students and African American students were the most likely to fail expectations while Asian students and students from higher household incomes were the least likely to fail expectations; and students from higher household incomes were the most likely to exceed expectations between 2019 and 2021 while English Language Learner and Native Hawaiian or Pacific Islander students were the least likely to exceed expectations. More specifically, across all included changes, higher household income students were the most likely to have had academic success throughout the Covid-19 pandemic, while Hispanic students were the most likely to have suffered academically due to the Covid-19 pandemic.

These results show evident class-based disparities as students from higher household incomes are the most likely to have been successful during the Covid-19 pandemic. These results

also show race-based disparities as Hispanic students were the most likely to have worsened academic success due to the Covid-19 pandemic. These disparities will most likely have a long-term impact on students' success. In general, even before the pandemic, once students are behind, in order to catch up, they have to learn faster than their peers who are on track. If students who are behind are not learning faster than their peers who are on track, they will continue to fall further behind (Brown 2016). In order for students to successfully catch up, schools need to be prepared for these learning needs and provide additional resources for these students (Brown 2016). The reason there were class and race-based disparities was most likely because the schools these students were in lacked the resources to help students stay on track in school during the Covid-19 pandemic. Since these schools most likely did not have the necessary resources to help their students stay on track during the pandemic, they also most likely do not have the necessary resources to help students catch up, which will make it so their students continue to be academically behind.

Chapter 5: Findings From Interviews

A variety of educators in Massachusetts schools were interviewed to further understand how the Covid-19 pandemic has impacted K-12 education. In total, 32 people were interviewed, and the sample included 7 elementary school teachers, 2 elementary school principals, 1 elementary school speech pathologist, 5 middle school teachers, 1 middle school principal, 1 middle school dean of diversity, 10 high school teachers, 3 high school principals, a town's METCO director, and a school social worker for students in k-12 schools. Additionally, 31 of the 32 people interviewed work directly in schools; 5 of the people interviewed work in lower-income public schools, 14 work in middle-class public schools, 5 work in high-income public schools, 5 work in private schools, and 2 work in charter schools.

A series of questions were asked, as detailed below. In reporting the answers, I focus on the predominant patterns and notable variations.

Do you know if most students in your school had the necessary technology to do school online? If not, how did your school support students who did not have those resources?

From the interviews, it was evident that not all students had the necessary technology to do school remotely, but most schools could help their students gain access to a device. However, not all schools could easily provide a device to students. As one teacher said, “it was a lot of work...the school had to call every family to find out what devices they had at home and find out what they needed and our school was mailing hotspots and Chromebooks to families”.

Additionally, a teacher from a different school district said, “it was a struggle. If they didn't have the technology, the district scrambled and purchased hundreds of thousands of Chromebooks. I believe the Chromebooks first went to high school and middle school and then they came down

to elementary school”. Furthermore, even in the schools that were easily able to provide students with a device, Wi-Fi was still an issue. One teacher said that “the real thing came with equity and Wi-Fi connection...some kids had perfect access and others did not have access and some could not talk without turning off their camera--it really discouraged kids who were impacted from speaking”.

Many schools that could afford to be were already 1-to-1 schools, meaning that all students in those schools were provided with a Chromebook, making the greatest technology challenge Wi-Fi access in students' homes. Wi-Fi access was dealt with in a variety of ways; some schools had advisors check in with students about their internet access and worked with students to get them connected, and one school delivered packets of paper to students in the spring of 2020 to meet their student's needs.

The schools that were not already 1-to-1 schools had more challenges as their first priority was getting students the necessary technology. The teachers who worked in these school districts said their districts were rushing to purchase enough Chromebooks for the students who needed them. This was a lot of work for the schools as they had to determine which students needed support and which ones did not while providing necessary support to students. Many of these school districts also struggled to allocate enough devices and prioritized high school students before middle school or elementary school students.

Regarding technology access, even the kids who had access appeared to struggle. Many teachers believed that their students were not developmentally ready to learn remotely, which they felt impacted their students' learning and academic achievement.

Have you noticed any disparities in education in your school? If so, in what ways have you noticed these disparities, and are they worse since the Covid-19 pandemic began?

When asked this question, there were different interpretations. Some people addressed the disparities in education, while others discussed the general impact. However, from the interviews, it is very clear that the Covid-19 pandemic has profoundly impacted students' academic performance.

Disparities

It is apparent that educators are aware that students from lower-income backgrounds were much more impacted than students from higher-income backgrounds. As one teacher said, there was a "huge class disparity between classes". Additionally, many teachers, especially elementary school teachers, said that the kids whose parents had resources and availability could stay ahead while students whose parents worked long hours and had fewer resources were further behind. One teacher said, "the biggest disparities fall across economic lines. The kids who had the means and support at home to be successful were largely successful throughout the pandemic. Kids who struggled with internet access, who didn't have parents around supporting them, parents who had to work out of the house, those kids struggled a lot and are still struggling". Another teacher said, "for some students their families' employment is spotty. Many have lost homes or have become homeless. Those disparities already existed but have been amplified". Educators also discussed that for many parents, especially those working multiple jobs to feed their children, their kids' homework was not a priority which led them to fall further behind while learning remotely.

It is important to emphasize that the class disparities were also prevalent in high-income school districts and private schools, not just low-income schools. A teacher who works at a private school said that while they were remote, one of his students said to him, "if I leave the

zoom call it is not because I'm ditching, it's because I have to cook lunch for my younger siblings." Both private schools and high-income public schools with a few lower-income students have noticed that low-income students are struggling the most. In many of these schools, most students had tutors during the lockdown, but the students who did not have access to tutors ended up being much farther behind. A teacher who works at a private high school talked about how, in his class, most students had access to tutors, but a few students could not afford tutors and were less successful, which he felt led to a very significant class disparity in his school. Many teachers also noticed that their students who had more money could have a more private and quiet place to do their schoolwork and zoom classes which gave them a huge advantage over students who were doing school in the same room as many family members.

While class disparities seemed to be the most prevalent, a few teachers who work with English Learner students talked about how these students have been impacted more than most students. One teacher who works in one of the poorest school districts in Massachusetts, with 50% of the students being English Learner students, said that most of her students came into 6th-grade at a 3rd-grade reading level, and that most of her students' math skills are very far behind. Other teachers also discussed that English Learner students appear to be further behind and are struggling more than other students.

Academic Impacts

As one teacher responded, "100%. They are 100% behind". There seemed to be a significant academic impact from the Covid-19 pandemic. It appears that many students missed out on important skills, which teachers think is why many of their students now have delayed academic skills. Teachers also mentioned that many of their students are struggling with

test-taking skills, and many teachers continue to be concerned about how much kids are struggling with completing in-person exams and school work as many of them have lost study skills and note-taking skills. Additionally, most teachers said that the kids who struggled to learn through zoom are struggling even more now that they are back in person. Teachers also discussed that many students have lost motivation and believe that just getting their work done is enough.

How has your school been addressing the disparities in education?

While some teachers said their school has not been doing anything to address the new disparities and academic impacts of the Covid-19 pandemic, most schools appear to be working hard to address these issues. Many schools acknowledge that students may not be ready to learn in person again and have accepted that academic issues may need to be put on hold this school year to effectively address the more critical social and emotional issues that have come out of the pandemic. One teacher said, “we can’t just race to normal or what we perceive as normal before the pandemic. Kids are socially and emotionally struggling and we want to keep that on our radar,” and another teacher said, “my goal this year is to teach kids to be kind. I care less about the academic component because that is what they need this year”.

Different schools have been doing different things to address the new disparities and academic impacts of the Covid-19 pandemic. Some strategies schools have been using include keeping an eye on students entering the school for the first time and identifying where kids are struggling. In addition, many schools are using school adjustment counselors who are helping to reintegrate students into the school and working with teachers to address difficult subject matters in more effective ways. The schools that can afford to do so have been hiring additional school

staff to implement essential academic intervention strategies and have been hiring more reading specialists to help elementary school students catch up on reading. Schools have also been holding more professional development meetings for teachers to address the academic issues and have been holding extra study sessions and tutoring sessions for students. Teachers have also been individually reteaching concepts that they would have previously expected students to be proficient in and are limiting exams until they feel that their students can handle them. Additionally, many teachers interviewed said they are focusing on building stronger relationships with students and parents as they feel that will help students catch up.

Do you notice a change in students' behavior since the Covid-19 pandemic began? If so, why do you think it has changed?

Many teachers had a lot to say about the behavioral question, and it is very evident that behavior is something that the pandemic has greatly impacted. No matter what grade a teacher taught or what school they worked in, they noticed behavioral issues among their students. One teacher said, “students are bananas right now”, a different teacher said, “they are like animals or untamed bear cubs”, and another teacher said, “this is my 20th year teaching and it is worse than my first year. Even last year doing hybrid was not as hard but this year is so much worse trying to teach kids who are in crisis”.

A pattern across all the interviews was that kids do not know how to be in school anymore and behave in a classroom. One teacher said, “it is astounding the difference in behavior. They have forgotten how to be students”. Many teachers mentioned that kids expect to have their needs met at all times and no longer know how to wait their turn or even understand why they have to do so. Teachers also talked about how kids are a lot more comfortable in the

classroom than before and do not have the same respect towards their teachers that they had in the past.

Another trend found from interviews is an increase in aggression and lashing out among students. One teacher said that “students are so rough and mean now. A lot of the boys have only communicated through video games so now they struggle to communicate”. In addition, there have been many fights amongst students, especially middle school students, which teachers believe is due to the anger they have built up during the pandemic. Teachers also mentioned that students have been reacting a lot more to each other and to more minor things. Kids are also bringing weapons into school, which teachers said had not happened in the past.

Students’ mental health has also been impacted, and students appear to be struggling with anxiety and depression more than before. One teacher said that “kids are emotionally struggling and in our community it wasn’t something we saw before.” Many teachers also addressed that many students have lost a lot of social and emotional development.

Students also appear to be a lot more dependent on technology than before. One teacher said it “is literally emotionally painful for some students to put their phones away. Many of my students tell me that they spend hours on TikTok and go to bed very late because they are on their phones. When given the chance to socialize at the beginning or end of class many students choose instead to be on their phones. It is a disturbing trend”. Educators believe that students’ dependence on technology is due to how much time they spent using technology when remote. Kids are also struggling to focus more in school, and teachers have noticed a lot of distractions and inattentiveness.

Students are also struggling to interact with each other. A trend across interviews was that students are struggling socially and talk to each other as if they are texting. One teacher said,

“they do not know how to be kids anymore and are behind 100% socially”. Teachers also talked about how there appear to be more cliques than before and a lot less empathy and kindness towards each other.

How has your school been addressing the behavioral issues?

Schools were very shocked by the behavioral issues, and most schools did their best to address them. However, most teachers did say that they feel like their schools should be doing more and that schools should not just be going about business as usual. Some of the things schools have been doing to address behavioral issues include relying on counseling to support students and changing the entire behavioral system during the pandemic to make the system more equitable and student-centered; attempting to resocialize kids by hiring more counselors, paraprofessionals, and psychologists; hiring more adjustment counselor to support students; having more faculty discussions on how best to support students; doing a lot of restorative work and restorative practices; working on relationship building; having discussions about changing homework policies; and some schools have students meet in advisories to work on different group activities.

While most schools have been working to help students, not all schools have been, and some teachers have expressed the need for more support. Some teachers also feel that their school thought that going back to business as usual would be the most beneficial thing but has instead caused more harm. One teacher said, “they should have come back this year and dealt with the social-emotional needs of students and it feels like they did a disservice to everyone”. Some teachers believe that more needs to be done to engage parents and families. Additionally, some teachers feel that their school not addressing the issues has caused more burnout for

teachers. One teacher said, “the school is not addressing them very effectively so teachers are really maxed out right now and I have never seen teachers so burnt out and stressed”.

Is there anything else you would like to add?

The final question participants were asked was, “Is there anything else you would like to add?”. A big trend was how much harder this year seems than last year, which teachers believe is due to schools acting like everything is fine and normal when that is not the case. Many students and teachers have trauma from the Covid-19 pandemic, and doing school like it is pre-pandemic has made issues worse. One teacher said, “as education in general, the minute they had the opportunity to come back to what was normal they did. They never stopped to think about whether or not students could handle it”. Some teachers said that wearing masks makes school more challenging for everyone and more exhausting for kids than in the past. Teachers have also mentioned that there appears to be less trust and respect between teachers and parents than before. Finally, while this year has been challenging, most teachers said that it is very clear that students are very happy to be back in school and see their friends every day.

Key Findings and What The Results Mean

Overall, these results show that the Covid-19 pandemic has impacted K-12 education in Massachusetts. The current school year, the 2021-2022 school year, appears to be a lot more challenging for both students and teachers than the 2020-2021 school year was. All students appear to be very far behind, but lower-income and English Learner students seem to have been the most impacted by the Covid-19 pandemic. Part of the reason for these disparities was due to the technology access, particularly Wi-Fi access since many students struggled to have access to

Wi-Fi even after being provided a Chromebook through their school. Additionally, while most schools provided Chromebooks to students, some districts struggled to, and the districts that struggled to usually provided resources to the older grades before the younger ones.

While students appear to be struggling academically due to the pandemic, students are also struggling with their mental health, which has caused behavioral issues and social issues among students. These issues were very shocking to educators, which has made them more challenging for schools to address. Teachers feel that their schools should be doing more to address the new social and behavioral issues, and many teachers feel that starting the year as if nothing has happened made the issues worse and is leading students and teachers to be very burnt out.

These results demonstrate that the impact the Covid-19 pandemic has had on K-12 education is very evident in schools across Massachusetts and that a lot needs to be done to address these issues. These results also show that with the Covid-19 pandemic and any other issue, going back to normal and not addressing the issues causes more harm to students' academics and mental health in the long run. Finally, these results show that all students handle trauma differently and that adults in a school do not fully understand how their students were impacted, so they should consider that when working with their students.

Overall, the main purpose of the interviews was to add to the quantitative sections and to understand what the impact of the Covid-19 pandemic on K-12 students looks like in schools. The interviews add to the quantitative sections by showing that the academic impact is seen by teachers in classrooms, not just through numbers, and also further emphasizes the class-based disparities that are seen in the quantitative section that looks at the factors that contributed to changes in Massachusetts Comprehensive Assessment System (MCAS) scores between 2019 and

2021. Additionally, the interviews help explain why the younger grades were more impacted than the older grades; since it was found from the interviews that the older grades were prioritized when schools were distributing necessary technology, the younger students may have been disconnected longer, leading them to fall further behind in school. Furthermore, since it is harder to understand the impact of the Covid-19 pandemic on behavior and mental health through numbers, the interviews allow us to understand how the Covid-19 pandemic is impacting K-12 students' well-being as well as academics.

Chapter 6: Discussion

This section looks at the findings from this study and what they mean. It does this first by looking at the key findings from the changes in Massachusetts Comprehensive Assessment System (MCAS) scores by subgroup between 2019 and 2021; the factors that contributed to the changes in MCAS scores in 3rd, 6th, and 10th grade English Language Arts and Mathematics between 2019 and 2021; and the findings on what the Covid-19 pandemic's impact on academics, mental health, and behavior looks like in schools currently. It also looks at the interpretations of how K-12 education was impacted during the pandemic based on the data gathered, whether the results found support the hypothesis, the unexpected findings, whether or not this data agrees with previous research and what it adds to it, the limitations of this study, and how future studies can follow this one.

Key Findings

Quantitative: Changes in MCAS Results By Subgroup

At the elementary school level, there was a broad increase in the proportion of students failing Mathematics, English Language Arts, and Science and Technical Engineering. While there are a few exceptions to this, most subgroups showed more students failing and fewer students excelling in these areas. However, these differences were the largest for Asian students, American Indian or Alaskan Native students, Hispanic students, English Learner and Former English Learner students, African American or Black students, and Economically Disadvantaged students.

Similarly, there was a broad increase in the number of students not succeeding in Mathematics, English Language Arts, and Science and Technical Engineering at the secondary

school level. Except for a few exceptions, most subgroups had an increase in students failing expectations and a decrease in students exceeding expectations. The most impacted subgroups include Asian students, White students, English Learner and Former English Learner students, and Non-Economically Disadvantaged students.

From looking at this data, it is evident that the Covid-19 pandemic has negatively impacted students in all grades and subjects. More specifically, across all included grades and subjects, there was an increase in the number of students failing to meet expectations and a decrease in students exceeding expectations for almost all grades and subjects. Additionally, across all grades and subjects, there were evident racial disparities as more students of color appeared to be impacted than White students; the most impacted demographics include American Indian or Alaskan Native students, Asian students, and English Learner or Former students, while White students appeared to be the least impacted. These racial disparities are not surprising to me as I expected students of color to be more negatively impacted than White students as a lot of previous literature on the Covid-19 pandemic's impact on education showed many race-based disparities. Regarding class-based disparities, there were no clear class-based disparities. This was very surprising to me as I had expected Economically Disadvantaged students to be more affected than Non-Economically Disadvantaged students. However, the lack of clear class-based disparities may be because Economically Disadvantaged students were already further behind Non-Economically Disadvantaged students.

Quantitative Data: Factors that Contributed to Changes in MCAS Scores

These results showed that certain factors contributed to the change across all grades and subjects more than others. Schools with more Hispanic students were more likely to lead to a

decrease in average test scores than other schools, while schools with higher average household incomes were more likely to contribute to an increase in test scores; these results were expected because previous research had shown that Hispanic students were impacted academically during the Covid-19 pandemic and that students from higher household incomes fared better than students from lower household incomes. Additionally, schools with a large number of Hispanic students and African American students were more likely to have an increase in students failing expectations, while schools with higher average household incomes were more likely to have a decrease in students failing expectations; these results were not surprising to me because previous literature found that students with more money did better academically during the Covid-19 pandemic and that African American students and Hispanic students were more likely to struggle academically. Finally, school districts with higher household incomes were the most likely to have an increase in students exceeding expectations while schools with more English Language Learner and Native Hawaiian or Pacific Islander students were the most likely to have a decrease in students exceeding expectations; these findings were not surprising to me as previous literature had found that students from higher household incomes fared well academically during the pandemic and that English Language Learners were negatively impacted.

Overall, when looking at these results, it did appear that the factors that contributed to the changes in average test scores, percentage of students failing expectations, and percentage of students exceeding expectations varied. However, higher household income students were the most likely to have academic success during the Covid-19 pandemic, while Hispanic students most likely suffered the most academically. From this data, it is also evident that 6th grade had

more variation than 3rd and 10th grade and that there was more variance in Mathematics than English Language Arts.

Qualitative Data: Interviews With Massachusetts K-12 Educators

Regarding technology access, not all students in K-12 schools had the necessary technology to do school remotely successfully. However, most schools could help students gain access to a device, but not all schools could easily provide the device. For some schools, providing the necessary technology was more of a challenge. Additionally, even students who had access to technology struggled with Wi-Fi access, and educators felt that Wi-Fi access disparities led to greater disparities in education. Furthermore, even the students who had access to a device and Wi-Fi appeared to struggle as many students were not developmentally ready to be learning remotely. These results were expected as I know that many Massachusetts schools already provided devices to students, but since Wi-Fi access is usually based on individual households, it makes sense that some students had better access than others.

When looking at disparities, it appears that there were substantial class disparities, with students from lower-income backgrounds being more impacted than students from higher-income backgrounds. English Learner students also appeared to be disproportionately impacted as it was found that they are further behind most students and are struggling more to catch up. These results were expected as previous literature had shown that the Covid-19 pandemic disproportionately impacted students from lower-income backgrounds and English Learner students. However, I did expect more race-based disparities as previous literature found that students of color were more impacted than White students. A reason why race-based

disparities were not mentioned could be that many of the educators interviewed worked in homogenous schools and seemed hesitant to discuss race.

There appeared to be general academic impacts as well. Students appeared to be very behind as they missed critical skills when learning remotely. Students also appeared to be behind in skills, struggling with test-taking, and less motivated than before the Covid-19 pandemic. These results were expected as the quantitative data did show a general decline in students' test scores between 2019 and 2021. Previous research also showed a mental health impact from the Covid-19 pandemic, which could explain why students have less motivation than before the Covid-19 pandemic.

Most schools are addressing the new disparities and academic impacts in different ways. This has been done by acknowledging that students may not be ready to learn in person again; by hiring school adjustment counselors and other school staff; having more professional development meetings; reteaching concepts; and attempting to build stronger relationships with students and parents. I had expected and hoped that schools would be making an effort to address the disparities and academic impacts. By incorporating these resources, I feel that students will be able to catch up while also gaining back the support they lost during remote learning.

Students' behavior appeared to be significantly impacted by the Covid-19 pandemic, and from the interviews, it is evident that kids do not know how to behave in school anymore. Students appeared to be a lot more aggressive and angrier and are getting into more fights than before the pandemic. Students are also struggling more socially and are more dependent on technology than in the past. There are also higher levels of anxiety and depression among students than before the Covid-19 pandemic. These findings are expected as much previous

literature found that students are struggling more socially, are more aggressive, and have increased levels of depression and anxiety than before the Covid-19 pandemic.

Most schools have been addressing the new behavioral and mental health issues from the Covid-19 pandemic, but not all schools are. The teachers working in schools that are not addressing the issues believe that going back to business as usual has caused more harm for everyone involved. The schools that are addressing the new behavioral issues appear to be very shocked by them. The ways these issues are being addressed include relying on counseling to support students; attempting to resocialize students; hiring more adjustment counselors; having an increased number of faculty discussions; doing more restorative work and incorporating restorative practices; working on relationship building; changing homework policies; and having advisory sessions where students work in small groups on different activities. I had expected all schools to address the behavioral and mental health issues, but these new issues did seem like a shock to many people, which could be why the issues are not being addressed right away. I think the ways these issues are being addressed can be beneficial. However, I do worry that it will add to the current academic impact and put students further behind, leading to more stress and increased levels of anxiety and depression.

Other information that I gathered from the interviews was that this school year seems to be a lot more challenging than the 2020-2021 school year, which is believed to be due to schools going back to in-person learning and "normal" learning too quickly; many people have trauma from the Covid-19 pandemic and doing school as if the pandemic did not happen has made issues worse. There also appears to be less trust between teachers and parents than before. I understand how going back to "normal" too early can be challenging, especially since the Covid-19 pandemic continues to be relevant; I would assume that for many, going back to

normal invalidates the way they are feeling and makes it so they no longer have the time to process and feel the way they are feeling. I am also not surprised that there is less trust between teachers and parents than before; throughout the Covid-19 pandemic, people have tried to blame other people for things going on in their lives, so with education, I feel like parents are blaming the teachers for their kid's academic struggles when it is not necessarily the teacher's fault.

Interpretations

Overall Impact on K-12 Education From the Covid-19 Pandemic

Overall, it is evident that the Covid-19 pandemic has negatively impacted K-12 education. With few exceptions, it is also apparent that people of color and English Language Learner students were impacted more than White students and that Economically Disadvantaged students were impacted more than Non-Economically Disadvantaged students. It is also very clear that the Covid-19 pandemic greatly impacted students' behavior and mental health and that students have been struggling a lot more since the Covid-19 pandemic began. Additionally, younger grades seem to have been more impacted than the older were, and Mathematics appears to be the most impacted subject.

Support of My Hypothesis

I expected the Covid-19 pandemic to impact K-12 education, and I expected English Language Learner students, students of color, and Economically Disadvantaged students to be the most impacted. For the most part, the results from this study are consistent with my hypothesis. Furthermore, regarding the behavioral and mental health impact of the Covid-19 pandemic, I expected behavior and mental health among students to be significantly impacted,

which is supported by the results. Finally, I expected students to be impacted the most in Mathematics which is also seen in the results from this study.

Unexpected Results

While most of the data supported my hypothesis, there were some unexpected results. Regarding the differences in the percentage of students failing and exceeding expectations between 2019 and 2021, there did not appear to be any class disparities, and Non-Economically Disadvantaged students appeared to be slightly more impacted than Economically Disadvantaged students. While this finding is unexpected, a reason for it could be that Economically Disadvantaged students were already further behind Non-Economically Disadvantaged students; since they were already further behind, there is a high possibility that Economically Disadvantaged students are still behind Non-Economically Disadvantaged students but were just less academically impacted by the Covid-19 pandemic.

There were also results related to the factors contributing to changes in MCAS scores that were surprising. I was surprised that Economically Disadvantaged students led to an increase in students exceeding expectations in 6th-grade English Language Arts between 2019 and 2021 as I had expected Economically Disadvantaged students to lead to a decrease in the number of students exceeding expectations. I was also surprised that higher household incomes contributed to a decrease in students exceeding expectations in 3rd-grade Mathematics between 2019 and 2021 because previous research found that students from higher household incomes were academically successful during the Covid-19 pandemic. Additionally, I was surprised that Economically Disadvantaged students and Multi-Race and Non-Hispanic students led to an increase in 6th-grade Mathematics test scores between 2019 and 2021; based on previous

research and changes in MCAS scores by subgroup, I would have expected Economically Disadvantaged students and Multi-Race and Non-Hispanic students to have led to a decrease in average 6th-grade Mathematics test scores. Finally, I was surprised that Multi-Race and Non-Hispanic students and Economically Disadvantaged students led to a decrease in the number of students failing expectations in 6th-grade Mathematics between 2019 and 2021 as I would have expected them to lead to an increase in the number of students failing expectations. While these results are unexpected, an explanation for them may be that many schools in Massachusetts are homogenous in terms of either race or class, so the results are based more on how a specific school district is doing academically throughout the Covid-19 pandemic rather than a particular race or class. Another explanation may be that other factors may have contributed to these changes as many students in a school have intersecting identities.

Implications

Do Results Agree With Previous Research?

For the most part, the results agree with previous research. Simon (2021) found that White students had an increase in academic achievement while students of color had a decrease in achievement. Additionally, Dorn et al. (2021) found that students of color were impacted more than White students as Black students finished the 2019-2020 school year with six months of unfinished learning in Mathematics and Reading and that Latinx students ended the 2019-2020 school year six months behind in Mathematics and five months behind in Reading while White students ended the 2019-2020 school year four months behind in Mathematics and three months behind in Reading. Furthermore, McKinsey and Co. believe that schools becoming virtual in the spring of 2020 put White students one to three months behind in Mathematics and students of

color three to five months behind (Meckler and Natanson 2020). Similarly, the current study found that while the Covid-19 pandemic has academically impacted all students, students of color were more impacted than White students were as students of color were more likely to have an increase in students failing to meet expectations and a decrease in students exceeding expectations in all included subjects.

In regards to English Learners, Darmody et al. (2021) found that doing school remotely may have been more challenging for English Learner students, and the United States Department of Education (2021) argued that in-person learning may have impacted English Learner students the most because they no longer had the opportunity to practice their English and receive language teaching. Similarly, the current study found that the Covid-19 pandemic impacted English Learners very much because they did not have the opportunity to practice their English as much when remote and did not have English learning support.

Regarding class-based inequalities, Ali et al. (2020) found that the digital divide may have led disconnected students to lose seven to fourteen months of learning and that the students who are more likely to be impacted by the digital divide are students from lower-income families. Similarly, this study found that not all students had the necessary technology to do school remotely successfully and that the wealthier school districts were more likely to be able to provide the necessary resources to those students. However, from the current study, the most prominent digital divide was related to Wi-Fi issues as not all students have adequate internet access; the students who had better access appeared to be more successful with online learning. Additionally, Darmody et al. (2021) found that students from more affluent households had more support through virtual learning than less-affluent households. Equivalently, the current study

found that students from higher-income households had more support and resources than students from lower-income families, which put them at a significant advantage academically.

Concerning the mental health impact of the Covid-19 pandemic on children and adolescents, the Child and Adolescent Behavioral Health (2022) found that societal and school shutdowns have led many students to be very anxious because of all the unknowns and have caused some students to struggle to concentrate, sleep, and do what they enjoy. Additionally, the University of Washington SMART Center et al. (2021) found that for those under 27 years old, there has been a 30% increase between 2019 and 2021 in the number of people getting diagnosed with depression and a 50% increase in the number of people getting anxiety diagnoses and that going back to in-person learning has caused a lot of stress in students. Similarly, the current study found that students are struggling a lot more with anxiety than in the past and do not seem ready to be returning to in-person learning so quickly; the Covid-19 pandemic led students to have more mental health challenges before and returning to “normal” while still in the pandemic has added more stress to students lives.

In terms of behavior, Vestal (2021) found that many young kids are crying and are disruptive, while the older kids have become violent and are bullying other students more than in the past. Additionally, Chapman (2021) found that the increase in misbehavior in schools includes students talking in class, having more fights, and carrying weapons. Similarly, the current study found that students no longer know how to behave in school and are a lot more aggressive than before, leading them to start fights over minor inconveniences. Additionally, Cross Country Education (2021) found that students have become a lot more clingy since the pandemic began, including clinging to their friends, teachers, phone, parents, or other people or inanimate objects. Similarly, the current study found that students are more attached to their

friends and phones than before; students are bullying other students to keep their friends closer to them and are struggling to put their phones down.

With social and emotional development, Belsha (2021) found that students are very behind socially, especially elementary school students; many of these students struggle to share and interact with their classmates and struggle to walk through the hallways. Additionally, Campbell (2021) discussed that many young kids are self-centered and unaware of others. Similarly, the current study found that kids are struggling socially and behaving in school and that many of the younger kids no longer understand why they have to wait their turn and are expecting to have their needs met at all times. Regarding the older kids, Green et al. (2021) found that the pandemic impacted them socially as they could not form the same social relationships remotely as they do in person. Likewise, the current study found that students are struggling to interact with each other, are talking like they are texting, and are in more cliques than they were in the past.

In terms of most impacted subjects, EmpowerK12 (2020) found that students in grades 3-8 in the fall of 2020 lost four months of Mathematics learning and one month of Reading. Additionally, Kuhfeld et al. (2020) found that students did not have a change in Reading scores between the fall of 2019 and the fall of 2020, but students' achievement in Mathematics dropped 5 to 10 percentile points. Furthermore, the United States Department of Education (2021) reported that students are more behind in Mathematics than Reading. Comparably, the current study found that the Covid-19 pandemic impacted Mathematics more than English Language Arts or Science and Technical Engineering.

Finally, unlike what previous research has found, learning in person did not appear to have a significant impact on students' academic performance. However, it did appear to impact

how students are socially and emotionally and how they behave in the 2021-2022 school year. The current study found that student's mental health, behavior, and social skills were significantly impacted by learning remotely, so it can be understood that the students who were learning in person for the majority of the 2020-2021 school year fared better socially and emotionally in the 2021-2022 school year.

What Do The Results Add to the Topic?

The Covid-19 pandemic has been an ongoing issue in our society for two years, and due to how long it has been occurring, it has had an impact on K-12 education, and the impact is expected to be exacerbated as time goes on. Since the Covid-19 pandemic is still occurring, there is minimal research on its effect, so the fact that this study looks at the changes in test scores among subgroups, the factors that contributed to changes in test scores, and educators' perspectives on the disparities and behavioral impacts of the Covid-19 pandemic makes this study very informative when trying to understand the impact the pandemic continues to have on K-12 education. This study can also help prepare future teachers for the issues that may arise when they start teaching in the coming years and how to best address those issues when they arise. Additionally, these results can further inform teacher preparation programs on how best to prepare their students for teaching.

This study is also very beneficial when looking at how the Covid-19 pandemic has impacted K-12 education because it looks at the topic differently from most studies. The majority of studies on this topic did not look at the changes in standardized scores by subgroup between 2019 and 2021 and what specific factors contributed to the change in test scores, and most did not include interviews to get educators' perspectives. The fact that this study looks at the effect in

different ways helps us to understand which groups were most affected, the types of schools that were most likely the most impacted, and how the effect is playing out in schools; by looking at it this way, we can better understand which groups and which schools need the most support during and after the Covid-19 pandemic and what type of support they need.

This study also helps us understand which grades and subjects were most impacted. Most studies looked at the overall impact or the specific impact by grades and subjects but did not look at which grades and subjects were most impacted. The fact that this study found the grades and subjects most impacted by the Covid-19 pandemic is very beneficial as it will allow the support and resources to be allocated more effectively.

Limitations

While this study is very beneficial when understanding how the Covid-19 pandemic has impacted K-12 education, like all studies, it does have limitations. One limitation is that it just focuses on data from Massachusetts, which makes it more challenging to understand the impact the Covid-19 pandemic has had on K-12 education on a national level. Additionally, since the pandemic is still occurring, there was minimal data. With the available data, we can still not see the long-term impact of the Covid-19 pandemic on K-12 academics, behavior, and mental health. Moreover, when looking at the factors that contributed to the changes in test scores, it does not consider people's intersecting identities, making it more challenging to determine which students were most impacted by the Covid-19 pandemic. Furthermore, the changes in test scores do not consider that some groups were most likely already ahead of other groups, and even if those groups looked like they were impacted more than others, they might still be ahead. Finally, the people interviewed mostly worked in homogenous schools, so it was harder to understand the

visible racial disparities from the interviews fully. The interviewed educators also seemed uncomfortable talking about race and were less willing to discuss it, so even if there were racial disparities in their school, they might not have shared them.

How Future Studies Can Follow

Since the topic of how the pandemic has impacted students' academics and behavior is very complex and is evolving as the Covid-19 pandemic continues, future studies are necessary to fully understand the impact. It would be beneficial for future studies to continue looking at test score trends and changes to see how long the pandemic impacts test scores and if some groups are struggling more than others. It would also be useful for studies to look at the groups impacted the most by the pandemic to see if they are further ahead or behind the groups that appear to have more minor changes in test scores. Additionally, to better understand how the impact is seen in schools, it would be helpful for future studies to interview people from a greater variety of school districts to better understand the race-based and class-based disparities in schools as well as how the behavioral and mental health impact is different in different types of schools. Finally, to understand the long-term impact on students, it would be helpful for future studies to look at students who were in high school during the pandemic and see what their lives look like post-high school and to also look at the mental health and behavior of current students to see how it changes as the pandemic continues and after the pandemic is over.

Chapter 7: Conclusion

This is the final section of the study. It looks at and answers the research question and reflects on the findings. This section also includes recommendations for K-12 schools, teachers, parents, and colleges and universities to help support students whom the Covid-19 pandemic has negatively impacted.

Research Question

The question this study was attempting to answer was "How has the Covid-19 pandemic impacted student's academics and behavior in K-12 schools and how has it impacted people differently depending on their race and social class?". This research and prior research show that the Covid-19 pandemic has negatively impacted students' test scores and has contributed to declining mental health and worsened behavior in K-12 students. While all students were impacted, class-based disparities were seen in the factors that contributed to changes in test scores between 2019 and 2021 and have been noticed by teachers in the classroom, and the changes in the percentage of students failing and exceeding expectations between 2019 and 2021 and the factors that contributed to test score changes between 2019 and 2021 have shown race-based disparities. In terms of behavior, while all students seemed to have been impacted, a reason believed for why behavior has shifted is due to the amount of time students spent learning remotely and not around their peers, so it can be understood that students who spent more time learning remotely most likely struggled more socially than students who spent less time learning remotely. Additionally, in Massachusetts schools, the younger grades were impacted more than the older grades, and Mathematics was more impacted than the other subjects.

Reflection on the Research

Since the Covid-19 pandemic is still occurring, the results will most likely change over time, and the impact of the pandemic on education and behavior may become more severe as time goes on. From this research and prior research, it is evident that every students' education has been impacted in some way by the Covid-19 pandemic. The experiences of education in K-12 schools are often what determine people's life paths; impacted academics can make it so students are less likely to go to college and are less likely to have a high-paying job in the future. Additionally, since the social part of K-12 schools, both with students and teachers, allows students to create an identity for themselves and learn from others, many students may struggle to form an identity for themselves and fully understand the world around them.

Regarding the increases in students failing to meet expectations and decreases in students exceeding expectations, I worry that students will be hard on themselves and lose motivation over low test scores, potentially leading to even lower test scores and increased mental health challenges.

Policy Recommendations

It is very evident that the Covid-19 pandemic has impacted K-12 students, so it is necessary for K-12 schools, teachers, parents, and even colleges and universities to be aware of the impact and put things in place to support impacted students.

K-12 Schools

Now that schools are back in person and appear to be staying in person, schools need to have more opportunities for students to get to know each other throughout the school year. The

Covid-19 pandemic has impacted students socially, which will impact students academically; if students know their peers better, they will feel like they have more support at school, which will help them mentally and allow them to do academic work with their peers.

It is also necessary for schools to offer free tutoring and extra help sessions for students who seem to be struggling academically and for anyone who feels like they need academic support. The Covid-19 pandemic has impacted students' academics, which is most likely very stressful since most students are taught from a young age that their academic achievements impact their future. Having available tutoring and extra help can help students get caught up and feel more confident with the material they are learning in school.

Due to the mental health and behavioral impact of the Covid-19 pandemic on students, more available counseling and mental health support will be helpful. Mental health struggles often impact many aspects of students' life, and if mental health issues are left untreated, they can get worse over time. By offering more counseling and mental health support to students, students will most likely feel more supported and have less severe long-term mental health impacts.

Teachers

Since students in K-12 schools interact with their teachers a lot throughout the day, there are many things teachers can do to support their students and address the impact the Covid-19 pandemic has had on education, behavior, and mental health.

In terms of the academic impact, teachers must understand that students may be coming in with less knowledge than expected and should understand that they may have to teach concepts more slowly than in previous years. This understanding will allow more students to be

successful in school as they will feel less behind, and teachers will also most likely be less frustrated when their students struggle. I think it would also be helpful for teachers to incorporate test-taking skills and study strategies into their curriculum; from the interviews conducted, I understood that students had lost study skills and test-taking strategies during the pandemic, and I feel that incorporating these skills into the curriculum will significantly benefit students' academics.

In addressing the mental health and behavioral impact of the Covid-19 pandemic, teachers must make an effort to connect with their students and get to know their students; I feel like this will help students with both their mental health and academics. It will also allow students to feel supported, which is something many lost during the Covid-19 pandemic. If teachers get to know their students, they will also be more likely to be aware of mental health declines across the school year, making it so their students get mental health support sooner rather than later. Additionally, if students appear to be struggling with behavioral issues, rather than getting upset with them, I think it would be beneficial for teachers to try to figure out the reasoning for the change in behavior and work with their students to try to improve their behavior and mental health. If teachers make an effort to figure out why students are behaving the way they are, the student may begin to behave better, and if there is an underlying issue leading the student to act this way, that issue can be addressed more effectively. Teachers approaching behavior this way may also lead students to feel like they have more support and that their teachers are on their side rather than against them, which can also improve students' overall mental health and well-being.

Parents

While this study focuses on the academic and behavioral impacts of students in K-12 schools from the Covid-19 pandemic, parents can still do things to help and support their children. First, parents should do their best to be aware of their children's mental health and behavior and note any changes. With both mental health and behavioral issues, the sooner they are addressed, the better; if parents are more aware of their children's behavior and mental health, they are more likely to notice any differences in how their children are doing, which could make it so their children can get support sooner rather than later.

It is also crucial for parents to understand that their children may be struggling right now and may struggle more as the pandemic continues, so parents should be more lenient on their children and not react as harshly when their children misbehave. From my experience working with children in different settings, when the authority figure reacts negatively to a kid acting out, the child often shuts down or reacts more negatively. If a child's parents are more lenient and do not instantly react negatively to a child's behavior, the parents and child may effectively address the child's behavior and find solutions for it. If parents avoid reacting negatively, it may also help them trust their parents more and understand that their parents are on their side.

I feel that it is also vital for parents to try to connect with their children to the best of their ability and get to know them; this can range from going to activities and events with their children to just simply asking their children about their day and making it clear that they are listening. If parents make an effort to get to know their children, their children may feel more comfortable coming to them and feel supported.

In terms of addressing the academic issues, I think it would be beneficial for parents who have the time and ability to help their children with their academics. Many children got very

behind academically during the Covid-19 pandemic. Since many children are at home when they are not at school, having academic support at home will most likely greatly benefit children. However, many parents do not have the time or ability to do so, which teachers should be aware of. For the parents who do not have the time and ability to academically help their children, being supportive will go a long way as well as making sure their children know they believe in them; many students feel a lot of pressure from home to do well academically and feel like they are letting their parents down when they are not successful. If parents show their kids that they support them, it will most likely motivate them to work hard and eliminate the guilt that many students have surrounding bad grades.

Colleges and Universities

While colleges and universities do not serve K-12 students, students who were in K-12 schools during the Covid-19 pandemic are now entering colleges and universities. These students are most likely entering colleges and universities at a different academic and social level than those entering before the Covid-19 pandemic. Due to this, professors need to understand that first-year students may be coming into college at a lower academic level than first-years who came into college before the pandemic. Since many first-year students may be coming into college at a lower academic level than first-year students from past years, it would also be helpful for colleges to provide more free academic resources to first-year students to help them catch up to where first-year students are expected to be; if first-year students have these resources, I would expect there to be a lower drop-out rate, a lower number of students failing classes, and better mental health among first-year students.

In terms of the social impact of the Covid-19 pandemic, since many incoming first-year students most likely missed out on a lot of the social aspects of high school and may not have the same social support from home that previous first-year students had, I think it would be helpful to give first-year students more opportunities to get to know each other at the start of the school year. If students have these opportunities to get to know each other, they will adjust to college more easily, feel like they have social support, and have improved mental health.

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