

ACADEMIC OUTCOMES FOR STUDENTS WITH AUTISM IN MIDDLE AND
HIGH SCHOOL

by

Kayla Keith
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Committee:

_____ Director

_____ Department Chairperson

_____ Program Director

_____ Dean, College of Humanities
and Social Sciences

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by

Kayla Keith
Bachelor of Science
Virginia Tech, 2017

Director: Adam Winsler, Professor
Psychology

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Fairfax, VA

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ABSTRACT

ACADEMIC OUTCOMES FOR STUDENTS WITH AUTISM IN MIDDLE AND HIGH SCHOOL

Kayla Keith, M.A.

George Mason University, 2020

Thesis Director: Dr. Adam Winsler

There is debate over whether students with autism spectrum disorder (ASD) should be held to the same standards as typical children in testing. This has raised concerns regarding standards, test accommodations, and alternate assessments. The high-stakes testing policies for individuals with ASD are often not clear and more research is crucial in order to understand what and how they are doing. To address these gaps in the literature and inform debate and policies regarding the academic outcomes for children with ASD, I review the research regarding state policies and procedures, and explore Miami School Readiness Project (MSRP) data for secondary students (grades 6-12) with ASD: such as standardized test scores, GPA, retention, and school leaving. The goals are to address: (1) How are the children in grades 6-12 with ASD doing in terms of end-of-year grades (GPA)? (2) What percent of students with ASD are retained in grades 6-12? (3) What proportion of students with ASD in grades 6-12 take the high stakes FCAT and

how do they do? (4) How do students with ASD do on End of Course (EOC) exams and what percent take the EOC exams? (5) How are those that do and do not take the FCAT tests different in terms of GPA? (6) What kind of diploma, if any, do the students typically receive? and finally (7) Are there gender differences in any of the above? I hypothesized that the grades for students with ASD would be a B average in middle school, but would decline to a C in high school. I anticipated about 30% of the students would be retained, and I expected only about 33% to take the FCAT. Given earlier results in elementary school, I expected around 75% of the students to fail the reading and math portions, and those who take the FCAT to have higher GPA. I hypothesized that the students would struggle on the EOC exams, only about a third would take the EOC exams, and that only a few of the students would have received a standard diploma. Results contradicted my hypothesis because the results showed that as the students progressed through high school, mean grade (GPA) stayed stagnant through 10th grade, until 11th and 12th grade when mean GPA increased. Only 41% ($n = 42$) of the 103 students with G12 data were ever retained in grades 6-12, and 75% of the students who took the FCAT Math assessment in grades 6-8 failed the exam. The highest percentage of students who took the FCAT/FSA reading assessment was just 46% in 6th grade, but in grades 7-10 the percentage of students who took the FCAT/FSA exams stayed around 20-30%, which supported my hypothesis that about a third of the students would take the exams. Around 75% of students who took the FCAT reading and math assessments in grades 6-9 failed the exam, which also supported my hypothesis. The results for the EOC exam partially support my hypothesis that the students would be struggling on the exams;

the students scored about 30-40% on the EOC Algebra 1 exam in 9th grade and the EOC Biology exam in 10th grade, but in every other grade, 88% of the students passed. The hypothesis that more students would be receiving a certificate of completion than standard diplomas was not supported; 80% of the students who graduated received a standard diploma of some type and the remaining 20% received an accelerated or special diploma. The students who took the FCAT assessments did not have higher GPA's; instead they had lower GPA's when compared to those who did not take the FCAT. No differences were found between males and females in regards to the FCAT assessment. In 8th grade, males had a higher mean score on the EOC Algebra 1 exam when compared to the females, and the same happened in 9th grade on the EOC Biology exam. In 10th grade, however, females had a higher mean score on the EOC Biology exam. Future studies are needed to determine how secondary school age students with ASD are doing on the standardized tests, whether the tests and their IEP are individualized, appropriate and are setting the students up for success in the school system.

INTRODUCTION

The national prevalence of autism spectrum disorder (ASD) in children is 1 in 45 (Zablotsky, Black, Maenner, Schieve, & Blumberg, 2015). ASD is a term used to describe a variety of symptoms in children, which may include but not limited to: social communication deficits combined with repetitive movements, limited interests, and sensory abnormalities (Olsson et al., 2016). The outlook for those with ASD is a lot brighter than it was 50 years ago (Lord, Elsabbagh, Baird, & Veenstra-Vanderweele, 2018), however much more work is needed to fully understand how children with ASD are functioning in school settings.

There is current debate about whether individuals with a “disability” should be referred to as “children with autism” (person-first) or “autistic individuals” (identity-first) (Dunn & Andrews, 2015). Some advocacy groups (i.e., the Autistic Self Advocacy Network) argue many of their members prefer terminology such as “autistic,” or an “autistic person,” because they see autism as part of their identity rather than a disability [similar to the distinction between Deaf (cultural identity) and deaf (person with disability) for those hard of hearing]. On the other hand, the American Psychological Association (APA) advocates person-first language for individuals with disabilities to promote human dignity.

Many professionals who work with and provide treatment for individuals with autism (especially nonverbal young children with ASD who don't have the privilege/ability to let others know their preference) prefer to use terminology such as "person with autism," or "individual with autism," and note the need for a disability classification in order to qualify for intervention services. Within this thesis, I will use person-first and identity-first language interchangeably as the debate is still evolving.

Children with autism show a variety of social and behavioral problems that can negatively affect their inclusion in instruction and testing. Witmer and Ferreri (2014) used teacher reports ($n = 191$), which showed that over 50% of the K-12 autistic students received their instruction outside of the general education classroom, and many were not expected to reach the standards for their grade-level (Witmer & Ferreri, 2014). This brings about questions about whether or not students with exceptionalities are being held accountable for reaching standards in the classroom and on high-stakes tests. High-stakes testing has become an increasingly popular assessment for schools to use in demonstrating individual academic performance of students, and providing accountability for school improvement (Agran, Alper, & Wehmeyer, 2002). Public schools, however, do not always support a practical, yet challenging curriculum tailored to each students' needs.

Current research on academic outcomes for children with ASD is unclear on whether students with ASD should be subject to the same standardized tests and curriculum, as well as whether they should be in general education with their typically developing peers or in special education with other students with disabilities (Agran et

al., 2002; Witmer & Ferreri, 2014). Studies typically compare special education students to their typical counterparts even though this comparison does not effectively measure academic achievement because special education populations are not a good comparison group due to the array of exceptionalities and differing levels of academic achievement (Hanushek, Kain, & Rivkin, 2002). Thus, more research on what students with ASD are doing, and how they are doing in the classroom is necessary first, in order to find a way to accommodate each autistic individual and their specific needs.

Equality and effective inclusion concerns have complicated matters as students with ASD may not participate or be included in measures of achievement or testing (Thurlow, Lazarus, Thompson, & Morse, 2005). Due to the variability of the disorder, the status of academic achievement in middle and high school is largely unknown for students with ASD; however, identifying policies, outcomes, predictors of outcomes and other factors that contribute to their school performance is of special interest.

Within this thesis, I explored the Miami School Readiness Project (MSRP) dataset, and I reported on the academic outcomes of a large and diverse group of students with autism in grades 6-12. I first reviewed the relevant literature pertaining to the history of how federal accountability policies regarding students with ASD have progressed over the years; then, I went over what is expected now of students in Florida and the policies they have in place. Then, I delved into the literature behind high-stakes testing, retention, and outcomes for autistic students in secondary school.

Policy

In the 1900's, many students with exceptionalities were excluded from education generally (McGrew, Thurlow, & Spiegel, 1993). The sole purpose of education was to teach students who were most intellectually capable. Therefore, schools were not required to modify their programs to meet the individual needs of any child. The U.S. Constitution states that the federal government has no role in education, because it is only the obligation of the states (Hardman & Dawson, 2008). Due to this statement in the Constitution, federal policy makers remained quiet while many states barred students with disabilities from public schools well into the 20th century (Hardman & Dawson, 2008). In 1975, however, U.S. Congress established access to public education under federal law with the passage of the Education for All Handicapped Children Act, which was later renamed as the Individuals with Disabilities Education Act (IDEA) of 2004 (Crane & Winsler, 2008). Another federal law that impacted students with exceptionalities is Section 504 of the 1973 Vocational Rehabilitation Act. Section 504 has broader criteria to define exceptionalities, and relies more on the functional impact of an individual's condition on major life activities rather than on exceptionality classifications (Ysseldyke et al., 2004). Definitions and classifications of exceptionalities in the IDEA differ somewhat from those in Section 504. The IDEA includes 13 specific exceptionality classifications, and requires that a student be identified as having one or more exceptionalities, and says that the exceptionality must negatively affect the students' ability to work (Ysseldyke et al., 2004). The No Child Left Behind Act (NCLB), which was passed in 2001, was crucial for strengthening the standards for U.S.

education. The NCLB enriched the federal government's role in assisting the states, which ranged from helping states set standards and implementing action for the states and schools that fail to meet the guidelines (Hardman & Dawson, 2008). There are four major goals that guide federal laws and policies pertaining to children with disabilities: (a) equality of opportunity, which includes individualization, integration, or inclusion, (b) full participation, (c) economic self-sufficiency, and (d) independent living (McLaughlin & Rhim, 2007). All of these goals are expressed throughout the IDEA and Section 504 of the Rehabilitation Act of 1973. In 2007, the NCLB was scheduled for revision after recognition that the NCLB's requirements were not feasible. In 2015, the Obama administration signed the Every Student Succeeds Act (ESSA), which includes provisions that are more focused on fully preparing students for success in college and careers ("Every Student Succeeds Act (ESSA)"). For example, it states that there will be accountability and action in the lowest performing schools where groups of students are not making progress and where graduation rates are low. The ESSA also states that it will ensure that information is provided to the educators, parents, and students about the statewide assessments that measure their progress towards the standards ("Every Student Succeeds Act (ESSA)").

The standards-based reform movement began with the government giving money to the states for the invention of academic standards, improved teacher standards, as well as increased school liability. Under these new laws, all students, even students with disabilities, must have access to all standard assessments and be included in the report that determines if schools, districts, and states are meeting the performance criteria

(Hardman & Dawson, 2008). Today, law requires that all students, including students with ASD, be included to ensure that they have access to the same intended benefits of education, namely, appropriate instruction and learning opportunities (Crane & Winsler, 2008; No Child Left Behind Act [NCLB] of 2001; U.S. Department of Education, 2002), yet the legislation underscores explicit expectations for the growth of students with disabilities who are considered a subgroup. Now the government must ensure access to the curriculum on which all children, regardless of exceptionality, are to follow universal standards (Witmer & Ferreri, 2014).

The accountability system is the set of standards that a state uses to hold school districts responsible for maintaining student achievement, and to implement improvements when needed (Trust, 2016). Over the years, all 50 states have set policies and procedures in place that require each child to be held to the same standards in regards to curriculum and standardized tests, regardless of their developmental impairments (Thurlow et al., 2005). Legislation mandates that students with disabilities be included in achievement testing for accountability purposes, with only a few participating in an alternate assessment (Witmer & Ferreri, 2014). In order to prevent the alternate assessment option from lowering educational standards for students with disabilities, within each state, up to 1% may take alternate assessments that are based on alternate achievement standards (Code of Federal Regulations, 2007).

The cap on the percentage of students who may be assessed with an alternate assessment was considered due to a variety of factors. First, including students with disabilities in assessments when they are not participating in the general education

classroom may not be suitable. In other words, some students with ASD were excluded from the general education curriculum because of their inability to take a test, or their general lack of knowledge on the subject. Tests were often made in a way that did not promote success for students with disabilities. Students with ASD, for example, may not be able to read or write answers to test questions without the help of an aide; thus, in this situation, the student would be excluded from testing in a general education classroom. It is also very common for schools to fear that the grades and test scores of students with disabilities will pull the schools' average scores down (Witmer & Ferreri, 2014). As mentioned earlier, historically, many schools decided to ban students with disabilities from taking the standardized tests in order to raise their school averages. Lastly, there is the concern that making students with disabilities take standardized tests would cause them excessive anxiety (Witmer & Ferreri, 2014).

Witmer and Ferreri (2014) collected a sample of middle and high school autistic students and reported whether or not they received access to the general education classroom and if they participated in taking high-stakes tests. Their results show that the students with ASD within that district were not expected to meet any academic standards, and only 56% of students had an academically focused individualized education program (IEP) (Witmer & Ferreri, 2014). An IEP allows children with disabilities to define their own annual goals, based on their particular exceptionality that still allows them access to the general curriculum (Hardman & Dawson, 2008). School districts have to follow up with the child's IEP team to be sure they are continually documenting any lack of, or growth, in progress of the general curriculum (Hardman & Dawson, 2008). Additionally,

as interpreted in the IDEA, the four major goals that guide all federal laws should be reflected in the provisions that govern the IEP process and content (McLaughlin & Rhim, 2007). It is important to mention that members who sit on the IEP team have the opportunity to use their own decision-making and can reconsider the appropriateness of the high-stakes exam participation and be able to reflect those standards in the development of each child's IEP (McLaughlin, 2010). There is an assumption that all students with exceptionalities will benefit from the same educational outcomes and the IEP team is supposed to determine what resources the student may need to reach the common outcomes. From an IDEA perspective, however, IEPs seem to counter the principle of individualization and contradict what a free, appropriate education means for a student (McLaughlin & Rhim, 2007). Some special education teachers have even expressed their concerns about unrealistic performance targets and that each student is entitled to individual consideration under the IDEA and that some children should just be exempt from some standards (Ysseldyke et al., 2004). This conflict between the universal standards and how the students are actually performing conflicts with the IDEA's claim of individualized education has yet to be figured out and makes finding an appropriate education quite difficult.

One of the major challenges policy makers face in helping students with disabilities like ASD is making instruction according to the general curriculum more accessible. For many years, functional skills rather than academic skills were the teacher's intended focus for students with disabilities (Meyer, Eichinger, & Park-Lee, 1987), and the potential academic needs of such students were ignored in the design and

delivery of instruction according to the general curriculum. Even now, questions remain about the extent to which instruction for students with ASD should focus on functional versus academic skills, with teachers often questioning the relevance of the general curriculum for students with more severe disabilities (Ryndak, Alper, Hughes, & McDonnell, 2012). Some experts have argued that a focus on the general curriculum can actually include functional skills for autistic students (Browder & Spooner, 2011; Collins, Hager, & Galloway, 2011). They have focused their efforts on identifying strategies for modifying general education instructional activities to allow students with severe disabilities to have access to instruction in the same content as those without disabilities. They also emphasize the need for all students with disabilities to access the general curriculum, and indicate that accommodations and modifications should be provided as deemed appropriate to facilitate that access (Browder & Spooner, 2011; Collins et al., 2011). However, the extent to which this actually happens in educational settings remains somewhat unclear.

The rise in the acknowledgement that children with ASD have different needs regarding the accountability system has resulted in lowered expectations and exclusion from national and state assessments and in some circumstances, receiving a diploma (Hardman & Dawson, 2008). A literature review by Lai and Berkeley (2012) found that large variability remains among states regarding test accommodations, and, although there has been an increase in research conducted related to this topic, empirical findings are often inconclusive. Some states allow all students access to all test accommodations (e.g., Oregon), whereas other states require them to have IEPs or 504 plans to be eligible

to receive accommodations (e.g., Minnesota). For this study in particular, we do not have access to their IEP's, which is a limitation because, for example, we do not know if their IEP called for having teacher-assigned grades of high stakes tests for each year. States like California allow all students access to some accommodations, and provide students with disabilities access to all allowable accommodations, such as extended time, alternative options for responding, testing in a secluded area, the use of additional devices, like a calculator, or having someone read the test aloud, for high-stakes testing (Lai & Berkeley, 2012). Although all states allow test accommodations, such as extended time, testing in a private room, use of calculators, and reading the test aloud, for students with disabilities, there is a lack of general consensus about which specific ones to allow. As a result, students with disabilities do not necessarily have access to the same types of accommodations from state to state (Lai & Berkeley, 2012).

Most accommodation policies and associated studies have focused on accommodating students' academic difficulties (e.g., providing reading assistance, writing assistance, calculators, extended time) (Lai & Berkeley, 2012), and have not necessarily focused on the unique behavioral challenges of students with ASD. Current policies intended to inform participation in alternate assessments versus regular assessments vary by state. An alternate assessment is intended for those with cognitive impairments whose Individual Education Plan (IEP) team has decided that the student cannot appropriately participate in the regular assessment even with accommodations (Lai & Berkeley, 2012). It is possible that students with ASD may have concurrent cognitive impairments and it therefore may be questionable to allow or require students

with ASD to participate in the alternate assessment. Permitting many students to participate in the alternate assessment may in fact reduce the expectations placed on those students, and the corresponding nature of instruction teachers provide. Recent research has pointed to the fact that more flexible accommodation policies that permit a wider range of accommodations are associated with a lesser need for the alternate assessment (Lazarus, Cormier, & Thurlow, 2011). In other words, if school districts were consistent and made all of the accommodation services available to all children with disabilities, then there would be a reduced need for the alternate assessment.

It is also important to mention that sometimes students are not included in assessments because the staff and administrators are worried about losing fiscal support (Ysseldyke et al., 2004). Even though the trend is moving toward including high stakes tests as a graduation requirement, a few states are stepping back from the standardized tests, and are instead requiring students to pass end of course (EOC) exams in order to reflect more of what was taught in the classroom (McLaughlin, 2010; Olson, 2001). Perhaps if more accommodations were considered permissible, and teachers were willing to provide those accommodations, the regular assessment might be considered a more appropriate option for students with ASD (Lazarus et al., 2011).

The wide range of functioning for autistic students makes it difficult for policy makers to determine appropriate procedures and policies regarding high-stakes tests, alternate assessments, and accommodations. Some ASD students may benefit from taking an alternate assessment, whereas others may benefit from taking the general assessment with accommodations; thus, testing and accommodations may be appropriate for some,

but not for others. It is essential that each student with ASD have separate educational aims, especially on standardized tests, which must be decided separately (Taylor, 2018). These assessments continue to evolve as federal requirements change and more students are included in the assessment systems. As stated by Thurlow et al. (2005), participation and accommodation policies are not as dramatic as they were in the past, as most states have increased the number of allowed accommodations, such as extended time and secluded testing location, but have been more hesitant to include the controversial calculator, scribe, and read-aloud accommodations (Lazarus et al., 2011). Findings have supported the notion that participation rates for the statewide assessment have increased in states that changed their accommodation policies to allow for certain accommodations (Harr, Perez, McLaughlin, & Blankenship, 2005). A similar study by Cox, Herner, Demczyk, and Nieberding (2006) found that states with more than 20 unrestricted accommodations (an accommodation for a student with a disability that can be used without any constraints) had a more than 30% participation rate for students with disabilities on state reading and math tests in elementary school. There seems to be a positive relation between the rate of students with disability's participation in testing and the number of accommodations available to them.

Florida

In 1998, Florida's standardized assessment, the Florida Comprehensive Assessment Test (FCAT), became part of Florida's overall plan to increase student achievement by implementing higher standards (Florida Department of Education, "FCAT Historical," 2019). Once it was fully implemented, the test was administered to

grades 3-11, and it consisted of assessments in mathematics, reading, science, and writing, which helped the students progress toward the Sunshine State Standards (SSS) benchmarks. In the 2010 school year, Florida transitioned from the FCAT to the FCAT 2.0, and Florida End-of-Course (EOC) Assessments (Florida Department Of Education, “FCAT Historical”, 2019). The FCAT 2.0 was used to measure student achievement of the Next Generation Sunshine State Standards (NGSSS) in reading, mathematics, and writing from the years 2011-2014 (Florida Department of Education, “FCAT 2.0 Historical”, 2019). In spring of 2015, the Florida Standards Assessment eventually replaced the FCAT 2.0 in English language arts and mathematics (Florida Department of Education, “FCAT 2.0 Historical”, 2019). Additionally, the Statewide Science Assessment, for 5th and 8th grade, and NGSSS End of Course (EOC) assessments are still being given. The EOC assessments are completed on a computer and measure the Next Generation Sunshine State Standards (NGSS) for specific courses (Florida Department of Education, “End-of-Course (EOC) Assessments”. 2019). Algebra 1 was the first course to be implemented as a statewide EOC assessment under the NGSS standards, which was followed by Biology 1, Geometry, U.S. History, and Civics. Then in 2014-2015, the assessments that were aligned to the Florida Standards replaced the assessments aligned to the NGSS standards in math and English language arts. Now the Florida Standards Assessments (FSA) is comprised of Algebra 1 and Geometry, and the NGSS is comprised of Biology 1, Civics, and U.S. History (Florida Department of Education, “End-of-Course (EOC) Assessments”. 2019). The EOC assessments are scored on a scale of 1-5 where the score of Level 3 is the passing score for each grade level and subject. Anything

below the lowest score in Level 3 is not satisfactory and is indicative that the child will need substantial support for the next grade (Florida Department of Education, “2019-20 Florida Standards Assessment End-of-Course Assessments Fact Sheet”, 2019). Scoring a Level 4 on the EOC assessment means that the student is likely to excel in the next grade and Level 5 is highly likely to excel in the next grade (Florida Department of Education, “2019-20 Florida Standards Assessment End-of-Course Assessments Fact Sheet”, 2019).

All students are required to participate in the state’s assessment and accountability system. The Florida Standards Alternate Assessment (FSAA) is designed for students whose participation in the general assessment would not be suitable due to their exceptionality, even if accommodations were provided (Florida Department of Education, “Florida Standards Alternate Assessment”, 2019). The FSAA measures student academic ability in Language Arts, Mathematics, Science, and Social Studies by using Access Points (FS-AP); Access Points are expectancies that are individualized to each child based off of their specific exceptionality (Florida Department of Education, “Florida Standards Alternate Assessment”, 2019). Although the grading system and expectations are different from those for typically developing children, the standard still reflects the same underlying standards as students in the same grade—it is just at a reduced level of complexity. It is important to mention that this does not necessarily mean that students taking these courses must be in a separate classroom with other children who have disabilities; the access courses can be taught in general education classroom settings, with the support of an ESE teacher, allowing students to spend time

with their typical peers (Florida Department of Education, “Florida Standards Alternate Assessment”, 2019).

The FSAA program then began to include two assessment components: the FSAA—Performance Task (FSAA—PT) and the FSAA—Datafolio. The performance task is designed to evaluate students at three levels of difficulty and results are described as achievement levels. The FSAA—Datafolio is an assessment that is designed to specifically address the needs of students who do not have a way to communicate and may be scoring low academically based on the standards (Florida Department Of Education, “ Florida Standards Alternate Assessment”, 2019). The work students do each semester coincides with the statewide standards, and the work is submitted via an online portfolio system three collection times in a school year. The scores are designed to show growth longitudinally, with documentation of reduced levels of assistance and overall more accuracy. Nevertheless, it is anticipated that only students with the most severe disabilities will be permitted to participate in the FSAA program (Florida Department Of Education, “Florida Standards Alternate Assessment”, 2019). The MSRP dataset, however, does not provide us with this specific information.

The law in Florida also states that students have to meet certain requirements in order to earn a basic high school diploma (Florida Department of Education, 2019). Like most schools, students have to pass certain courses (a total of 24), such as algebra 1, geometry, biology and U.S. history, take a certain number of credits, maintain a 2.0 out of a 4.0 GPA, as well as pass the FCATs and participate in and receive a passing grade of a 3 in all End of Course (EOC) exams (Miami Dade County Public School [MDCPS]

Curriculum Bulletin, 2019). According to the State Board of Education, even if students meet all of the requirements but do not pass the high stakes tests, they will not receive a standard diploma but a “certificate of completion” instead (Florida Department Of Education, “Graduation Requirements for Florida’s Statewide Assessments”, 2019). It is important to mention that anecdotal reports indicate that some parents make their child with ASD take the FCAT even when they are excused from it because they want their child to have a chance to get a standard diploma. What is important to note here is that one cannot get a standard diploma unless one passes the FCAT Reading and Math assessments in 10th grade. (Florida Department Of Education, “Graduation Requirements for Florida’s Statewide Assessments,” 2019).

Testing

Holding schools accountable for academic achievement, as well as the inclusion of all students in large-scale assessment and accountability systems are relatively new concepts. It is important to acknowledge that some students with a disability may be unable to participate in general statewide accountability tests even with accommodations that target their needs (Agran et al., 2002). Alternate assessments, which measure progress according to alternate achievement standards, are typically created to handle this concern. These assessments differ from general statewide accountability tests in that they tend to assess less content, require less depth of knowledge for students to score high, and generally are of lower difficulty levels than the general statewide tests (Agran et al., 2002).

Chamberlain and Witmer (2017) set out to examine the educational factors that predicted participation of students with disabilities, such as autism, in general statewide accountability tests from the Special Education Elementary Longitudinal (SEELS) dataset. They collected a sample of 600 students who ranged in age from 10 to 17 years old, 59% were male and white, 25% were African American and 50% were reported to live in suburban communities. They found that educational placement was a significant predictor of test participation, meaning that the more time the students spend in general education, the higher the chance they participate in high-stakes tests (Chamberlain & Witmer, 2017). It was also concluded that students with special needs are more vulnerable to failing such exams. The results showed that only 34% of students with an intellectual disability (presumably including those with ASD but it was unclear) participated in the statewide test, which means that a significantly higher percentage of students were taking either the alternate assessment or no assessment at all (Chamberlain & Witmer, 2017).

According to the U.S. Department of Education (2005), the National Longitudinal Transition Study-2 (NTLS-2) indicates that there was a 17% increase in the number of students with disabilities finishing high school, a 32% increase in the number of students participating in postsecondary education, and, from 1987 to 2003, there was a 15% increase in the number of students with disabilities having paying jobs after being out of school for up to 2 years (Katsiyannis, Zhang, Ryan, & Jones, 2007). Although the trends are encouraging, the authors believe that the gains may be due to the increased trend of states using retention as a consequence of poor performance on high-stakes testing

(Katsiyannis et al., 2007). In other words, the students might only be “improving” because they have been repeatedly held back in one or more grade levels. This then begs the question of whether or not retaining the children is beneficial to their overall academic and social growth as a student.

The same research team also published a four-year analysis that examined the results of students with ASD, including participation in statewide exams reported by public schools in North Carolina (Zhang, Katsiyannis, & Kortering, 2007). They concluded that students without disabilities outperformed their peers with disabilities in all content areas: English, Algebra, Biology, and Physical Science (Zhang et al., 2007). Researchers have found that most secondary students with ASD participated in alternate assessments and that there were low rates of accommodations provided on these assessments, which suggests a relationship between a student’s time in general education and his or her functional skills and type of participation in the accountability system (Bouck, 2017). These analyses conducted by Bouck (2017) consist of a sample size of 16,007 students with ASD who had to be between the ages of 13-16. Of the 16,007 students with ASD, 50% took an alternate assessment, 36% took the general assessment with accommodations, 8.5% did not participate, and 7.5% participated in the general assessment without accommodations (Bouck, 2017). In regards to the students who spent time in both general and special education classrooms, those who spent 80% of their time in general education classrooms were more likely to take the general large-scale test with accommodations. Those who were in a general education setting less than 40% of the time were more likely to take the alternate assessment. Over 50% of students indicated

that they were provided with additional time (50.8%) and a different format for responding (61.9%) on the high stakes tests (Bouck, 2017). The most important finding of this study was that participation in these high-stakes tests is associated with educational as well as individual factors, meaning that each child's exceptionality and previous educational and individual experiences will impact their ability, or decision, to take the standard or alternate assessment (Bouck, 2017).

Other researchers also discovered that autistic students were reported to spend the majority (over 50%) of their school time receiving special education services, and many participated in an alternate assessment (Witmer & Ferreri, 2014). Witmer and Ferreri (2014), for example, found that 46 out of the 179 students with ASD had regular access to the curriculum that was actually used by students in the general education program who then participated in the alternate assessment. In addition, 20% of the students were expected to reach grade-level achievement on a few, or all, of the content standards and they participated fully in the alternate assessment. Six percent of the students were not expected to reach grade-level achievement, and were tested using the regular assessment anyway (Witmer & Ferreri, 2014). Therefore, based on the surveys by the teachers themselves, many students with ASD are not expected to reach their grade's standards and they receive most of their instruction outside of the general education classroom. It is important to mention that this particular study is not generalizable to the entire ASD population, because their study is situated in the Midwest of the United States and their data are based off of teacher, paraprofessional and educational specialist reports of the

child with autism they work with; therefore, these results may not hold true for other samples.

Bouck and Joshi (2015) wanted to know more about students with ASD and their predicted post-school outcomes with regards to their employment and independent living. So they used data from the National Longitudinal Transition Study-2 (NLTS2) and collected a sample of almost 5,000 students with autism as their primary disability on their IEP. The results suggest that curriculum is not related to post-school outcomes for students with ASD but functional skills and income were significant factors (Bouck & Joshi, 2015). From this analysis, only 25% of students with ASD received functional curriculum in their special education program and that is less than the 35.4% found by Wagner, Newman, Cameto, Levine, and Marder (2003). Perhaps focusing on a balance between functional and academic skills of children with ASD is best, in order to prevent negative outcomes such as retention, dropout, and delayed graduation. The topics I turn to now are retention and other academic outcomes of students with ASD within secondary schools.

Retention

As students with ASD are included in the mix with typically developing children, questions arise on what is expected for autistic children once they reach a grade, or on an assessment, that is beyond their capacity. Grade retention requires children to repeat a specific grade level and, is also referred to as non-promotion (Frey, 2005; Meisels & Liaw, 1993). In 2007, about 10% of students in kindergarten through eighth grade in the United States were retained (National Center for Education Statistics, 2009). In contrast

to public sentiment calling for the retention of poorly performing students (Katsiyannis et al., 2007), research has shown that retention is ineffective and has an adverse impact on long-term student success. Retention in any grade has been linked to high dropout rates, negative social implications, and lower academic achievement (Jimerson, Anderson, & Whipple, 2002).

There is much controversy in the literature regarding whether or not high-stakes tests are beneficial for students, especially those with autism (Katsiyannis, et al, 2007; Lai & Berkeley, 2012; Witmer & Ferreri, 2014). The most common student-related consequence of low performance on these high-stakes tests is grade retention (Greene & Winters, 2007). Many researchers have found that students with autism had high retention rates compared to typically developing children (Barrat et al., 2014; Tavassolie & Winsler, 2019). Tavassolie and Winsler (2019) found that those that were in special education were more likely to fail the high stakes test in 3rd grade and more likely to be retained after failing.

A statewide study in Utah examined school mobility, dropout, retention, and graduation rates across student disability categories from grades 6-12. Students who were classified with disabilities had poorer outcomes than their typical classmates. They had higher rates of mobility, dropout, and 12th grade retention, in addition to lower percentages of high school graduation. The outcomes varied by 13 federally defined disability categories, which emphasized the differences of students with disabilities (Barrat et al., 2014). The researchers concluded that most students with autism did not graduate on time with the graduation rates at around 45%, and by grade 12, 64.2% of the

autistic students were considered to be over-age, meaning that they had been retained at least once in a previous grade (Barrat et al., 2014). Only 11% of students with autism dropped out of school, however it is important to mention that 32.9% of all of the students with autism were continuing students meaning that they spent longer than four years in high school (Barrat et al., 2014).

In this era, preparing a student, especially one with autism, for future endeavors means getting a high school education. Completing middle and high school is considered essential for prosperity in the labor force (Dunn, Chambers, & Rabren, 2004; Katsiyannis et al., 2007). A high-school diploma is necessary for acceptance into college and many jobs or careers. The policies and procedures that states develop and implement will affect graduation decisions for students with disabilities and, ultimately, their post-school activities. More stringent graduation requirements, for example, may result in a greater number of students who drop out (Guy, Shin, Lee, & Thurlow, 2000). In response to failing and realizing the value of a diploma, many states have moved to having multiple diplomas, as well allowing some students to meet graduation requirements by meeting their IEP objectives. Other school systems made the initiative to give the students the option of an additional year to complete graduation requirements (Mclaughlin, 2010). Dropping out of school, being retained or delaying or even erasing the option of graduation from high school for an adolescent with ASD can limit their career options, potential for achievement, and self-esteem (Guy et al., 2000). Given the fact that high-stakes tests have the potential to have profound effects on students' lives, they should be subject to careful examination.

Academic Outcomes for Those on the Spectrum

In a meta-analysis, Keen, Webster, and Ridley (2015) reviewed literature related to the academic achievement of children and adolescents with ASD. The 19 studies reviewed tended to have participants who were younger in age (median=10.4 years, $SD=4.1$ years) and had a higher IQ (>70), which suggests that the literature does not represent all adolescents on the autism spectrum well (Keen et al., 2015). The results indicated that autistic individuals have a diverse profile of academic achievement, meaning that some perform below, and others above, the expected levels. A similar study yielded the same results in that children with ASD show discrepancies between actual achievement levels, as well as levels predicted by their intellectual ability (Mayes-Dickerson & Calhoun, 2003b). Some students achieved a score that is better than their IQ would forecast, while others displayed academic achievement at lower levels than would be anticipated given their IQ or exceptionality (Estes, Rivera, Bryan, Cali, & Dawson, 2011). In addition, an irregular pattern of achievement was often apparent in different academic subjects (Mayes-Dickerson & Calhoun, 2003b). For example, students with both high and low abilities often performed better on spelling than on written assignments (Mayes-Dickerson & Calhoun, 2003a). A common research-based assumption is that ability predicts achievement. According to Assouline, Foley Nicpon, and Dockery, (2012), over 50% of the variance in achievement is accounted for by ability, measured by IQ, for typical children. The results of these studies show that there appears to be a great deal of variability in general academic achievement across the spectrum. This variability highlights the need for psychologists and educators to

undertake specific assessments across the range of academic skill areas to ensure educational programs are responsive to individual strengths, peaks, and dips in academic learning.

One study researched the outcomes of 152 ASD children followed from childhood to adolescence over a 10-year period (Baghdadli et al., 2011). The children participated three times during the data collection where at time 1, the children (82% male) were between the ages of 3 and 7 and were clinically assessed as having autism. The researchers also used parental reports to further examine the children's functioning, and a group based-trajectory analysis to look at their developmental trajectories across their life-span. According to Baghdadli et al. (2011), the analysis shows that children with autism who have slow social and communication trajectories also tend to have low cognitive and language skills, more likely to have seizures, and a more severe exceptionality of autism. On the other hand, the results also suggest that risk factors at five years old including little language and severity of their diagnosis predict their ability to socialize and communicate ten years later (Baghdadli et al., 2011). Moreover, Baghdadli et al. (2011) found that cognitive skills, such as IQ and language abilities are the most common predictors for the outcomes of autistic students, and, most importantly, that early intervention seems to help with communication skills.

Gender

In addition to the great variability that exists within those on the autism spectrum, studies have also shown that there is an autism diagnosis sex imbalance and the field has a rather "male" conceptualization of ASD in that girls are more likely to experience

delays in obtaining their autism diagnosis (Salomone, Charman, McConachie, & Warreyn, 2015). In fact, Baio et al. (2018) found that males were four times as likely than females to be given an autism exceptionality. One of the main explanations for gender biases in the diagnosis of ASD is that females and males may present their symptoms differently despite showing the same core symptoms (Fulton, Paynter, & Trembath, 2017). Halladay et al. (2015) mention that females may be under diagnosed because males tend to show more of the problem behaviors that may trigger a clinical evaluation, like hyperactivity and aggression. Other differences mentioned are that females have higher language abilities, or differences in memory, cognitive flexibility, verbal fluency and social communication that cause them to get diagnosed less often compared to their male counterparts (Halladay et al., 2015). It is also important to mention that the expectations from parents and clinicians in regards to social communication and play behaviors add an extra layer of complication for diagnosing males versus females. Therefore, it is possible that the male versus female prevalence differences could be inflated due to the biological and sociological differences that are not specific to autism (Halladay et al., 2015).

Harrop et al. (2019) had similar findings with their sample of participants with ASD in that there were trends for earlier first concerns and diagnoses in males. Moreover, Hull, Mandy, and Petrides (2016), conducted a meta-analysis of sex/gender differences in autism spectrum core condition symptoms, such as social/communication impairments and restricted behaviors and interests and IQ. Their results suggested that the individuals with ASD displayed gender differences in the core condition traits, suggesting that

females with ASD present their cognitive and behavioral phenotypes differently than males and clinicians should be mindful of that during assessment and diagnosis of all individuals (Hull et al., 2016). Age-related patterns were found for internalizing and externalizing problems. Younger females tended to report higher levels of internalizing problems, while males with ASD reported higher levels of externalizing problems; however, as both genders became older, their levels of internalizing and externalizing problems became more similar (Hull et al., 2016). This study suggests that there are many individual factors, including age, IQ, and social background that may interact with a child's autism conditions to produce variations in development, and therefore should not be disregarded. Overall, these studies provide support for the notion that the different symptoms of those with ASD may be a function of their gender, which is important for health and education professionals to keep in mind when diagnosing and training these individuals. For this reason, I will explore gender differences in later academic outcomes for children with ASD.

Prior Work with the MSRP

A study by Williams and Winsler (2019) reported the academic outcomes of children with autism who were in grades K-5 (special education preschool programs). Williams and Winsler (2019) used data from the Miami School Readiness Project (MSRP) and reported data on GPA, standardized test scores, and rates of retention, absence, and suspension. In elementary school, the results showed that only about a third of the autistic children in the sample took the high stakes test in third grade (Williams & Winsler, 2019). More specifically, of the 35% of students with autism in 3rd grade who

took the FCAT, 26.5% of the students failed the FCAT math and 44.2% failed the FCAT reading portion. Laws in Florida say that failing the reading portion of the FCAT in 3rd grade results in mandatory retention and as shown by Williams and Winsler (2019), 31 students (9.57%) were retained in 3rd grade. The same trend was found in Grades 4 and 5 where only about a third of the autistic students took the test and more than half of them ended up failing both the reading and math portion. The overall trend for retention in this sample does not seem to have a set pattern but it is important to note that the percentage of retention for the overall MSRP sample was 13.4%, and the percentages were found to be higher, 15.7%, in the ASD sample (Williams & Winsler, 2019). Their GPA tended to fluctuate around a B average; however, it is important to highlight that teacher-assigned grades for those with ASD may have a different meaning because each student's IEP is different and therefore grades cannot be interpreted in the same way as it would in a general education classroom. A very notable finding is that by 5th grade, more than 75% of students who took the FCAT failed the exam.

Taken together these data show that there is a lot of literature on young children with ASD, but there is little literature on adolescents with ASD. This gap in the literature needs to be filled in order to understand secondary school students with ASD and their needs. The main objective of this thesis was to help fill this gap and figure out how the autistic students are doing within the school system.

Study Overview

Gaps in current research have made it clear that there is not a lot of research on secondary school-aged students with autism (Hanushek et al., 2002; Ryndak et al., 2002).

To fill this gap, the current research study examined the academic outcomes of autistic students in secondary school, while taking a special look at the scores on the standardized test in Florida, the FCAT. This study expands on the work of Williams and Winsler (2019), who examined the longitudinal academic outcomes of a similar smaller sample of students with ASD in grades K-5, by looking at academic outcomes for children with ASD in grades 6-12. To be more specific, this sample includes students who had a primary exceptionality of autism at some point in K-5, whereas Williams and Winsler's inclusion criteria were that the autistic students were in special education pre-kindergarten programs. Since the implementation of Florida's high-stakes test policy in 2002, little research has been conducted regarding the standardized assessments and how it has been applied for autistic children in Florida. The current thesis takes a closer look at what is happening with the Miami School Readiness Project, (MSRP; Winsler et al., 2008), in order to accurately examine the academic trajectories of students with ASD from 6th-12th grade. The MSRP is a large-scale, ongoing, longitudinal study following the development of almost 50,000 students (56.8% Latino/Hispanic, 36% Black/African American/Caribbean, & 7% White/Other/Asian/Mixed) in Miami, FL who received subsidies for childcare at age 4; as well as those who attended public school pre-K programs during the years 2002-2007 (Winsler et al., 2008). The aims of this thesis are to examine all of the students ever classified with ASD and see if they take, pass or fail the FCAT, as well as look at their GPA and EOC scores. To the extent possible, I will also look at student's pass/fail rates and their overall academic performance; retention,

attendance and graduation rates and percentages are also examined. The following questions are addressed:

1. How do children with ASD in MSRP do in terms of end-of-year grades (GPA) from Grades 6-12?

I expected that their grades will be relatively stable, at around a B in middle school, but as they get into high school and take harder classes, the grades may start to decrease more toward average.

2. What percent of students with ASD are retained in grades 6-12?

As found by Williams and Winsler (2019), the percent of students with ASD that were retained sometime in elementary school was 15.7%; using this, I expected that the results will be a bit higher and around 30% will be retained sometime in grades 6-12.

3. What proportion of children with ASD take the FCAT in grades 6-12, and for those who do take the test, how do they do?

I expected only about a third, or 33%, of students with ASD (Williams & Winsler, 2019) to take the FCAT. Given that 44% of students in 3rd grade failed the FCAT reading, 62.8% failed the math and 76.3% failed the reading in 4th grade and 77.2% failed the math and 83% failed the reading in 5th grade in the study by Williams and Winsler (2019), I expected that about 75% of the students would fail the reading and math portions of the FCAT in middle and high school.

4. How do the students with ASD do on EOC (End of Course) exams and what percent took the EOC exams?

I expected that students with ASD will struggle with the EOC exams and that about a third of the students with ASD will take the EOC exams given that about a third of the sample from Williams and Winsler (2019) took the FCAT.

5. How are those that do and do not take the standardized tests different in terms of GPA?

I expected those that take the FCAT would be those who are doing well academically, who require less support, have more language skills, and less psychopathology, so I expected those students would have a higher GPA.

6. What type of diploma, if any, do the students receive?

I expected that few of the students with ASD will have received standard diploma and more will have received a certificate of completion; I expected these two to be low because in Barrat et al. (2014), graduation rates were low, and I expected the students to be retained at least once, to fail some or all of the standardized tests, and to have a low GPA, which will all affect the times the student graduates and what type of diploma he/she will receive.

7. Are there gender differences in any of the above?

I did not have a priori hypotheses about gender differences but added this as an exploratory question.

METHOD

Participants

The participants in this sample are a subset of participants from the MSRP, which used a cohort-sequential longitudinal design. For the purposes of this thesis, data used from the MSRP dataset from the years 2009-2017 follows five cohorts of students ever classified with autism in elementary school, from grades 6-12 ($n = 781$). The inclusion criteria for the sample was that they had to have an indication of being present in elementary school as well as a primary exceptionality identified as autism in K-G5. There were a total of 781 students with a primary exceptionality of autism sometime in school. Of the 781 students total classified with autism, 57 of these children did not receive the primary exceptionality of autism until secondary school. Further, 35 of the 726 students with ASD lost their primary exceptionality of autism sometime in school. It is important to mention that it is possible that the students who did not receive their exceptionality of autism until secondary school could have had a previous exceptionality that was not autism, before ASD became their primary exceptionality. Similarly, those who lost their autism exceptionality could have switched to a different exceptionality after ASD, or the students could have had no record of any type of exceptionality but did have data in those grades, meaning they were present they just did not have any exceptionality for that grade. The other possible exceptionalities are: orthopedically impaired, speech impaired,

language impaired, deaf or hard of hearing, visually impaired, emotionally handicapped, specific learning disability, gifted, hospital/homebound, dual-sensory impaired, severely emotionally disturbed, traumatic brain injury, developmentally delayed, established conditions, other health impaired, and intellectual disability.

The sample consists of mainly males (86.1%; female $n = 105$) and is ethnically diverse with 67.6% being Hispanic, 16.6% Black and 15.8% White, Asian or other. The last year of data was obtained in 2016-2017, and it is important to note that some students have graduated and some are still completing high school. Cohort A and Cohort B have completed high school by then but Cohorts C, D, and E still are in high school. Therefore, only Cohort A and Cohort B have had a chance to graduate, and the total number of students with 12th grade data is 103 students; see Figure 1.

	'02- '03	'03- '04	'04- '05	'05- '06	'06- '07	'07- '08	'08- '09	'09- '10	'10- '11	'11- '12	'12- '13	'13- '14	'14- '15	'15- '16	'16- '17
A	Pre-K	K	1	2	3	4	5	6	7	8	9	10	11	12	
B		Pre-K	K	1	2	3	4	5	6	7	8	9	10	11	12
C			Pre-K	K	1	2	3	4	5	6	7	8	9	10	11
D				Pre-K	K	1	2	3	4	5	6	7	8	9	10
E					Pre-K	K	1	2	3	4	5	6	7	8	9

Figure 1. Cohort-Sequential Longitudinal Nature of Data Collection

Participants who lost their primary exceptionality of ASD

Students who lost their primary exceptionality of autism sometime during school had the possibility of falling into two categories: they either switched to a different exceptionality, or had no record of any exceptionality but were around in school. There were a total 3.8%, or 30 of 781, students with autism who switched to a different exceptionality after their primary exceptionality of ASD. Two students switched to a primary exceptionality of language impairment, four to emotionally handicapped, nine to a specific learning disability, five to gifted, one to hospital/homebound, three to other health impaired, and six to intellectual disability. Interestingly enough, eight of the 30 students had also been given two other exceptionalities, either before or after, ASD. For example, one student first had an exceptionality as developmentally delayed, then autism, and then finally as emotionally handicapped. The remaining 5 students who lost their autism exceptionality had record of being present after their exceptionality of ASD, but they had no record of any exceptionality. It is also important to mention that eight students of the 30 students who lost their exceptionality of autism also fell the category of obtaining a late exceptionality of autism.

Participants who received a late primary exceptionality of ASD

Students who received a late exceptionality of autism in secondary school had the possibility of falling into two categories: first time ever having ASD as the primary exceptionality or had a previous exceptionality that was not ASD. Fourteen students fell into the category of ASD being their first primary exceptionality ever and 43 students had record of a previous classification before their late exceptionality of ASD. Of the 43

students who had a previous exceptionality before ASD, one student was previously listed as orthopedically impaired, two had been classified as speech impaired, four were language impaired, six were emotionally handicapped, 18 had a specific learning disability, four were gifted, one was hospital/homebound, five were other health impaired, and two were previously intellectual disability. Seven of the 43 students had 2 or more exceptionalities before their late ASD exceptionality. For example, one student was classified as emotionally disturbed and emotionally handicapped before they were given the primary exceptionality of autism.

Measures

Predictors

Ethnicity. Ethnicity is coded into three groups: 1=White/Asian/Other, 2=Hispanic, and 3= Black (including Hispanic/Black). The criteria for these groups are based on the declared ethnicity according to the parents and school records.

Gender. Gender is coded as 0 for female or 1 for male as coded by the school district.

Outcome Variables

Standardized Test Scores. All students in Florida, are required to take the Florida Comprehensive Assessment Test (FCAT), aside from the 1% of students who are allowed to take the alternate assessment. This standardized assessment is Florida's way to account for student achievement in the school system. This study used the FCAT math and reading scores as a measure of academic performance in grades 6-12. A variable was made for Yes/No did they take the FCAT - those who took the test received a 1 and those

who did not received a zero. Test performance was scored on a 1-5 measure. The FCAT's are scored on a scale of 1-5 where the lowest passing score is a 3, and anything below a Level 3 is non-satisfactory/not grade level. Scoring a Level 4 or 5 means that the student passed and are at grade level.

GPA. Another measure of academic achievement for this study is the grades that are received at the end of the year for all subjects. The grades are given to the students by teachers and are on a 5-point scale where A=5, B=4, C=3, D=2, and F=1. Then the grades are averaged to create a composite score of the performance of the student for that particular school year.

End of Course (EOC) exams. The final measure of academic achievement for this study is scores on End of Course (EOC) assessments. The assessments are scored on a scale of 1-5 where the lowest passing score is a Level 3, and anything below a Level 3 is not satisfactory and is indicative that the child will need substantial support for the next grade. Scoring a Level 4 on the EOC assessment means that the student is likely to excel in the next grade and Level 5 means that the child is highly likely to excel in the next grade.

Retention. If the student completed a grade, then repeated that grade and also had a final GPA for that grade a second time, then the student was coded as having been retained. If this occurred one or more times, then they were considered to have been twice retained.

Diploma Type. A standard high school diploma requires successful completion of 24 credits and participation in and passing statewide assessments, as well as maintaining

a GPA of 2.0 out of a 4.0 scale (Miami Dade County Public School [MDCPS] Curriculum Bulletin, 2019). There is also a certificate of completion in which a student either earns the 24 credits under the standard diploma, or the 18 credits under the Academically Challenging Curriculum to Enhance Learning (ACCEL) option, but does not get passing scores on the high stakes tests or maintain a 2.0 GPA. Such students are awarded a certificate of completion (Miami Dade County Public School [MDCPS] Curriculum Bulletin, 2019). Miami-Dade County School Board also provides a Superintendent's Diploma of Distinction in which the students meet the requirements of a standard diploma, in addition to at least four Honors, Advanced Placement, International Baccalaureate, Advanced International Certificate of Education, Dual Enrollment, and/or Internal Studies Courses; they also have to complete 75 hours of community service and earn a 3.5 GPA with no grade less than a C (Miami Dade County Public School [MDCPS] Curriculum Bulletin, 2019). In addition to the other diplomas offered, MDCPS provides students with the Advanced International Certificate of Education Diploma where students have to achieve a minimum of seven credits in subject groups but there has to be at least one credit in math, science, languages, and in arts and humanities and one of them has to include global perspectives and research; they also have to complete the 75 hour community service requirement (Miami Dade County Public School [MDCPS] Curriculum Bulletin, 2019).. Finally, students in MDCPS have the opportunity to achieve an AP Capstone Diploma in which students earn a 3 or above on the Advanced Placement Seminar and Research classes and on four additional AP exams (Miami Dade County Public School [MDCPS] Curriculum Bulletin, 2019).

Was Around for Each Grade. This variable is based on free and reduced lunch status. If the child had data for their free and reduced lunch code, then that means that they were present for each grade. If they were around and present for each grade, they were coded as a 1 and if there were no data, they were given a zero for that grade.

When Received Autism Exceptionality. If the students received their primary exceptionality of autism in kindergarten, then they would receive a 0, if they received it in 1st grade, then they would receive a 1, and if they received their exceptionality of ASD in 2nd grade, they would receive a 2 and so on. This helped determine when the children were given their autism exceptionality in K-5, more specifically on whether they were given their exceptionality early or late.

Switched Exceptionality. I used the when received their exceptionality variable and then created a yes/no variable where, yes, autism is the first exceptionality=1, and no autism is not the primary exceptionality=0. Then I flagged those who switched to autism and when they got their non-autism exceptionality.

RESULTS

Research Question 1

To answer the first question, how do children with ASD do in terms of end-of-year grades (GPA) from Grades 6-12, descriptive statistics were used to determine the overall GPA for each grade in 6-12. Table 1 shows that the total number of students around in each grade, and the number of students with GPA in each grade. The number of students around in each grade was not equal to the number of students with a GPA. This means that there were some students with autism who were not receiving grades at the end of each year. For example, there were 567 students with a GPA in 6th grade but there were a total of 701 students around for that grade level; see Table 1. To find the percentage of students with a GPA, we took the number of students with a GPA and divided it by the number of students around in that particular grade, which yielded a percentage of students with a GPA in each grade. Sixth grade had the highest percentage of students with a GPA, which was 81% but that year also had a total of 701 students around. In 7th grade, 78% of the students had a GPA and the number of students around that year rose to 727. Eighth grade had the largest number of students around ($n= 723$), and 554, or 77%, of them had a GPA. The number of students around in each grade level after 8th grade declined, and the percentage of students with a GPA also declined but the percentage of students with a GPA never went below 74%. Trends show that the number

of students around in each grade level rose from 6th to 8th grade but then declined all the way until 12th grade. The trends also show that the percentage of students with a GPA is decreasing as one goes from grade to grade, but the mean grades are actually increasing from grade to grade. It is possible that because their GPA is increasing over time and fewer students are around, but are getting higher grades that the later grades have more of the students who are doing well academically, require less support, have stronger language skills, and not as much psychopathology. While we do not have specific data on IEP's, we can assume that their particular IEP may not call for teacher-assigned grades at the end of each year.

The mean grade in 6th grade for children with ASD was a low B, a 4.08/5. Mean GPA in 7th grade was about the same, a 4.10/5. The same trend continued throughout 10th grade until 11th and 12th grade where the mean GPA rose to a 4.20/5 in 11th grade and 4.33/5 for 12th grade; see Table 1. These results contradicted my hypothesis, which was the assumption that since these students with autism are in high school, and are taking harder classes, their mean grades would decrease as they progress through school, but this is not the case given the results. The mean grades, or GPA, for the students actually increased gradually from grade to grade in high school.

Table 1. GPA and Retention in Grades 6-12

	6 th	7 th	8 th	9 th	10 th	11 th	12 th
# of students around	701	727	723	635	425	237	103
# of students with GPA	567	568	554	495	329	175	76
% with GPA	81%	78%	77%	78%	77%	74%	74%
GPA(SD)	4.08 (.66)	4.10 (.66)	4.16(.61)	4.11(.73)	4.12(.68)	4.20(.63)	4.33(.55)
# First retained	2	0	0	0	0	0	2
# Twice retained	38	0	0	0	0	0	-
% Ever retained with G12 data (n=103)				41%			

Research Question 2

To answer the second question, what percent of students with ASD are retained in grades 6-12, descriptive statistics and frequencies were run to determine the percentage of students retained in each grade, and an overall percentage of students who were retained ever in middle and high school. Table 1 also shows the number of students in grades 6-12 who were retained for the first time, retained for the second time, and the percentage of students ever retained ever in secondary school. Of the 781 students classified with ASD in elementary school, only 620 of them made it to 6th grade and had

data. There were 161 students who left the school system or had been retained more than two times, meaning that we lost track of them. In other words, if the student went to another school system entirely, we cannot keep track of them; the same goes for if they get retained more than two times, they disappear in our records. In 6th grade, there were two students who were retained for the first time and there were 2 students who were retained for the first time in 12th grade. There were 38 students who were retained for the second time in 6th grade. Therefore, there were 42 total students who were ever retained, either for the first or second time in grades 6-12. It is important to mention, however, that the students who were retained for the second time were retained for the first time in elementary school.

According to my hypothesis, I expected about 30% of the students to be retained at some point in grades 6-12. The results do not support my hypothesis, as 41% ($n = 42$) of the 103 students who had the chance to get to 12th grade have been retained at some point in grades 6-12. It is important to mention, however, that not all of the students in the sample are done with high school yet; only the students in Cohort A had the chance to get to 12th grade.

Research Question 3

To answer the third question, what proportion of children with ASD take the high stakes FCAT in grades 6-12, and for those who do take the test, how do they do? Descriptive statistics and frequencies were run to determine how many students took the FCAT in each grade, as well as how they did.

It is important to mention that there are multiple versions of the FCAT and FSA. The FCAT 1 was administered from 2006-2010 and the FCAT 2 was given from 2010-2014. In the year of 2015 was when Florida switched from the FCAT to the FSA, so the students who were around in that grade took that version of the test. For purposes of this thesis, categorical FCAT variables were used. In order to get the total percentage of participation, we totaled the number of students who took either a math or reading assessment (FCAT and FSA) in each particular grade and then divided it by the number of students who were around in that particular grade, which can see be seen in Table 1.

FCAT Math

Table 2 shows the number of students who took the FCAT math in each grade, as well as the percent of students who scored a 1 or a 2 on the exam, which is combined into percent failed in that grade. Also, Table 2 displays the percent of students who scored a 3, 4, and 5 on the exam, which then is combined into the percent of students who passed.

As seen in Table 2, 33% of students ($n = 232$) out of the 701 students around in 6th grade participated in the FCAT math assessment. Of the students who did participate, 82% of them failed, which means that they scored a 1 or a 2 on the exam, and 18% ($n = 42$) passed which signifies a score of 3 or higher. In 7th grade, the percentage of students who took the FCAT declined to 21%, and the percentage of students who passed was just a bit higher, at 20%. Eighth grade had the lowest pass rate of 17%, and the highest failure rate at 83%. However, the number of students ($n = 69$) who took the FCAT math in 8th grade was lower than students who took the FCAT math in G6 ($n = 232$) and G7 ($n = 156$). There was no record of any student in the sample who made it to G9 before

MDCPS switched to the FCAT 2. Since the FCAT 2 math exam stops at 8th grade there was no data for FCAT math in 9th or 10th grade, and the exam is not offered in 11th or 12th grade.

The number of students who passed the exam with a three or higher, was 18% in 6th grade, 20% in 7th, and 17% in 8th grade. It is also important to mention that the numbers of students taking the exam in each grade declined as time went on and students transitioned to the next grade. The percentage of students who passed the exam in grades 6 through 8 never went above 20%, and the percentage of students who failed stayed around 80%, where 6th and 8th grades had the highest percentages of failure. Seventh grade had a pass rate of 20%, and the lowest failure rate, as well as the highest mean on the exam, which was a 1.65 out of 5. Overall, around 80% of these students fail the FCAT math assessment in each grade.

FCAT Reading

Table 2 also reports the number of students who took the FCAT reading, the percentages of those who scored a 1-5, the percent who failed, passed, and the mean score for each grade. Similar to the FCAT math assessment, of the 233 students who did participate, 81% failed the exam meaning that they scored a 1 or a 2 on the exam and 18% passed the exam. In 7th grade, the number of students who took the FCAT reading in 7th grade was lower at 159 students. There were 86 students who took the exam out of 723 students who were around in 8th grade. Of the students who took the exam in 8th grade, 79% of them failed and 21% of them passed. In 9th grade, of the 35 students who took the exam, 71% failed and 29% passed. This pattern is interesting because the

proportion of students who took the exam declined each year, yet the grade with the highest pass rate was 9th grade. This means that the students who took the FCAT reading in 9th grade did slightly better than the students who took it in previous years. There was no record of any student with ASD who took the FCAT reading in 10th grade, however only the students from Cohort A would have had the chance to take it that year; so it is possible that no students in that Cohort took the FCAT reading. Additionally, the exam is not offered in grades 11 and 12. It is important to mention that the percentage of students who passed the FCAT reading was also similar to the FCAT math assessment where around 15-30% of the students passed the exam.

FSA Math

Due to the transfer from the FCAT to the FSA in the years 2015-2016, some students with ASD took the FCAT, others took the FSA, and some haven't had time to take the assessment yet. The FSA is scored on the same scale as the FCAT where 1 and 2 are considered failure, and 3 and above 5 is passing. As seen in Table 2, there were 73 students who took the FSA math exam in 6th grade; of the students who took the exam in 6th grade, 70% scored a 1 or a 2 on the exam, and the remaining 30% passed the exam. In 7th grade, only four students took the FSA math exam, and all of them scored a 1 (failed). Eighth grade had the highest number of students who took the exam ($n = 101$), where only 69% of the students failed the exam and 31% passed. The FSA math exam was not offered in 9th, 10th, 11th or 12th grade. What is important to mention is that thus far, students are performing better on the FSA math exam compared to the FCAT assessments.

FSA English Language Arts (ELA)

In 6th grade, 86 out of the 701 students around in grade 6 took the FSA English Language Arts exam; see Table 2. Of those who participated in the FSA ELA assessment in 6th grade, 66% failed and 34% passed the exam. Similar to the FSA math assessment, only 4 students took the exam and all of the students received a 1, which is considered failure. In 8th grade, 115 of 723 students around in grade 8 took the FSA ELA exam. Of the students who took the exam in 8th grade, 68% failed the exam and 32% passed. Ninth grade had the highest number of students who took the FSA ELA exam, which was 150 out of 635 and of the students who took the exam in 9th grade, 61% failed and 39% passed, which is the highest pass rate across all assessments. In 10th grade, 114 students took the exam where 62% of them failed, and 38% passed with a 3 or higher. The FSA math assessment is not offered in 11th or 12th grade.

Overall, the students did better on the FSA assessments than on the FCAT math and reading assessments. When looking at the percentage of participation on the FCAT and FSA math exams, the highest percentage of participation was 44% in 6th grade. The percent declined to 22% in 7th grade and then rose slightly to 24% in 8th grade. Similar to the math assessments, the highest percentage of participation was at 46% in 6th grade for the FCAT and FSA reading assessments. In grades 7-10, between 20-30% of the students participated in the reading assessments. What is interesting is that a slightly higher percentage of students participated in the reading assessments compared to the math exams. The highest percentage of participation on both the reading and math assessments was in 6th grade and it declined in each following grade.

These results partially support my hypothesis that about 33%, or a third, of the students would take the standardized assessments. The highest percentage of students who took the FCAT or FSA assessments was in 6th grade where 44% took math exams and 46% took reading assessments. The percentage declined in the following grades to around 20-30%. The results support my hypothesis that about 75% of the students would fail the FCAT math and reading assessments, except for the FCAT reading assessment in 9th grade. For the FCAT math assessment, 82% of the students who took the exam in 6th grade failed, 80% failed in 7th grade, and 83% failed in 8th grade. The same pattern was found for the FCAT reading assessment; 81% of the students failed in 6th grade, 78% failed in 7th grade, 79% failed in 8th grade and in 9th grade, only 71% of the students failed the exam.

Table 2. FCAT and FSA Outcomes

	G6	G7	G8	G9	G10
<i>FCAT Math</i>					
# of students	232	156	69		
% Scored 1	72.8% (169)	68.6% (107)	66.7% (46)		
% Scored 2	9.1% (21)	11.5% (18)	15.9% (11)		
% Failed	82%	80%	83%		
% Scored 3	10.8% (25)	8.3% (13)	15.9% (11)		
% Scored 4	4.3% (10)	9% (14)	1.4% (1)		
% Scored 5	3.0% (7)	2.6% (4)	-		
% Passed	18% (42)	20% (31)	17% (12)		
Mean (SD)	1.55 (1.04)	1.65 (1.12)	1.52 (.82)		
<i>FCAT Reading</i>					
# of students	233	159	86	35	
% Scored 1	71.7% (167)	64.2% (102)	65.1% (56)	51.4% (18)	
% Scored 2	9.4% (22)	13.8% (22)	14% (12)	20% (7)	
% Failed	81%	78%	79%	71%	
% Scored 3	10.7% (25)	13.2% (21)	15.1% (13)	17.1% (6)	
% Scored 4	4.7% (11)	5% (8)	3.5% (3)	5.7% (2)	
% Scored 5	3.4% (8)	3.8% (6)	2.3% (2)	5.7% (2)	
% Passed	19% (44)	22% (35)	21% (18)	29% (10)	
Mean (SD)	1.59 (1.08)	1.70 (1.11)	1.64 (1.02)	1.94 (1.21)	
<i>FSA Math</i>					
# of students	73	4	101		
% Scored 1	46.6% (34)	100% (4)	49.5% (50)		
% Scored 2	23.3% (17)	-	19.8% (20)		
% Failed	70%	100%	69%		
% Scored 3	16.4% (12)	-	18.8% (19)		
% Scored 4	11% (8)	-	8.9% (9)		
% Scored 5	2.7% (2)	-	3% (3)		
% Passed	30% (22)	0%	31% (31)		
Mean (SD)	2.00 (1.15)	1 (.00)	1.96 (1.15)		
<i>FSA ELA</i>					
# of students	86	4	115	150	114
% Scored 1	47.7% (41)	100% (4)	45.3% (68)	45.3% (68)	34.2% (39)
% Scored 2	18.6% (16)	-	21.7% (25)	16% (24)	28.1% (32)
% Failed	66%	100%	68%	61%	62%
% Scored 3	17.4% (15)	-	16.5% (19)	20% (30)	23.7% (27)
% Scored 4	11.6% (10)	-	12.2% (14)	8.7% (13)	8.8% (10)
% Scored 5	4.7% (4)	-	3.5% (4)	10% (15)	5.3% (6)
% Passed	34% (86)	0%	32% (37)	39% (58)	38% (43)
Mean (SD)	2.07 (1.24)	1 (.00)	2.05 (1.19)	2.22 (1.37)	2.23 (1.17)
% Participation Math	44%	22%	24%		
% Participation Reading	46%	22%	28%	29%	27%

Research Question 4

To answer the fourth question, what percent take the EOC (End of Course) exams and how do the students with ASD do on EOC exams, descriptive statistics and frequencies were run.

EOC Algebra 1

Table 3 displays the number of students who took the EOC Algebra 1 exam, the percentages of those who scored a 1-5, the percent who failed, passed, and the mean score for grades 6-9. In 6th grade, only 8 students took the exam and of those who took the test, 12% failed (received a 1 or 2), and 88% passed which means they scored a 3 or higher. Only six students took the EOC Algebra 1 exam in 7th grade and they all passed with a mean score of 4.17 out of 5. In 8th grade, 30 students took and 93% passed the exam, but their mean grade was slightly lower at 3.90 out of 5. Ninth grade had 143 students of the 635 students who were around in G9, take the EOC Algebra 1 exam, and 64% of the students who took it failed.

It is important to mention that the only people who take the Algebra 1 EOC exam in a given grade are those who are also enrolled in the Algebra 1 course in that grade. Therefore, the percentage of participation cannot be calculated or compared to the FCAT or FSA assessments, because everyone is supposed to take the FCAT but only those who take Algebra 1 that year are eligible to take the EOC Algebra 1 exam. Overall, bearing in mind that the numbers of students who took the exam is low in comparison to how many students are around in that particular grade, the percentage of students who passed the EOC Algebra 1 exam in grades 6-8 is significantly higher than the pass rates on FCAT

assessments. However, it is possible that the students who are taking these exams are those doing better who require less support, have more language skills and not as much psychopathology due to the high percentages of passing the exam.

EOC Biology

In 6th and 7th grade, no students with ASD took the Biology EOC exam. However, in 8th grade, four students took the exam and 100% of the students passed the exam with a 3 or higher. In 9th grade, 17 students took the EOC Biology assessment where 12% of the students failed the exam, and 88% of the students passed. The 28 students in 10th grade who took the exam had a 46% pass rate with a mean score of 2.57 out of 5. Overall, students are doing better on the EOC Biology exam in G8 and G9, whereas more than half of the students failed the exam in G10.

The results from the analyses show that the students did not really struggle on either the Algebra or the Biology exam in 6th, 7th, and 8th grades, but 9th and 10th grades was when the percentage of students who passed declined to 30-40%. These results partially supported my hypothesis that the students would be struggling on the EOC exams, but this was only seen in the EOC Algebra 1 exam in grade 9 and the EOC Biology exam in grade 10. The hypothesis that a third, or 33%, of the students would take the EOC assessments cannot be answered due to the fact that EOC exams are only given if the student is enrolled in the course that year. What we can say is that the students with ASD who are enrolled in these higher courses in earlier grades are most likely the students who are doing well enough to be in regular education, require less support, have more language skills, and do not have as much psychopathology.

Table 3. EOC Outcomes

	G6	G7	G8	G9	G10
<i>EOC Algebra 1</i>					
# of students	8	6	30	143	
% Scored 1	-	-	-	51.7% (74)	
% Scored 2	12.5% (1)	-	6.7% (2)	11.9% (17)	
% Failed	12%	0%	7%	64%	
% Scored 3	50% (4)	33.3% (2)	40% (12)	25.9% (37)	
% Scored 4	-	16.7% (1)	10% (3)	7% (10)	
% Scored 5	37.5% (3)	50% (3)	43.3% (13)	3.5% (5)	
% Passed	88% (7)	100% (6)	93% (28)	36% (52)	
Mean (SD)	3.62 (1.18)	4.17 (.98)	3.90 (1.06)	1.99 (1.17)	
<i>EOC Biology</i>					
# of students			4	17	28
% Scored 1			-	-	21.4% (6)
% Scored 2			-	11.8% (2)	32.1% (9)
% Failed			0%	12%	54%
% Scored 3			25% (1)	47.1% (8)	25% (7)
% Scored 4			25% (1)	17.6% (3)	10.7% (3)
% Scored 5			50% (2)	23.5% (4)	10.7% (3)
% Passed			100% (4)	88% (15)	46% (13)
Mean (SD)			4.25 (.96)	3.53 (1.00)	2.57 (1.26)

Research Question 5

To answer the fifth question, how are those that do and do not take the standardized tests different in terms of GPA? An FCAT Yes/No variable was made which is a two-level categorical predictor where the students either took the FCAT or did not take the FCAT. GPA is a continuous variable so t-tests were used.

Before answering the research question, we conducted 2-2 Chi-squares using the FCAT dichotomous yes/no variable for a particular grade and its subsequent grade to see if there were students who were taking it in one grade but not the next. Then Chi-squares were run using the FCAT math and reading yes/no variables for each grade to see if the students were taking one FCAT and not the other. The results show that 3-14% of students took the exam one year but not the next (but they were around the next year). For example, in 7th grade, 11.9% of students took the FCAT but did not take the FCAT in 8th grade. As for taking the FCAT reading versus the FCAT math, 1-3% of students took one exam over another in the same year, and the majority chose to take the FCAT reading assessment. For example, in 6th grade there were 14 students who took the FCAT math assessment but did not take the FCAT reading and there were 17 students who took the FCAT reading but not the math. This pattern continued into 9th grade and is interesting because it shows that more students are choosing to take the reading assessment over the math assessment each year in grades 6-9.

In regards to determining how the students are different in terms of taking the FCAT and their GPA, t-tests were run and are shown in Table 4. In 6th grade, those who took the FCAT (1=yes) had a lower mean grade of 3.92, when compared to those who did not take the FCAT (0=no) who had a higher mean grade of 4.15, which was significant.

In 7th grade, the students who took the FCAT had lower mean grades when compared to the students who did not take the FCAT assessments, and those results were also significant. The results for 8th grade show that the students who participated in the FCAT exam had smaller marginal differences in GPA when compared to the group who did not take the FCAT, and the findings were not significant. In 9th grade, those who took the FCAT had significantly lower GPAs than those who did not take the FCAT, and these results were statistically significant.

These results do not support the hypothesis that those who take the FCAT will have higher GPA's. The findings show that those who take the FCAT actually had lower GPA's and those who did not take the FCAT had higher GPA's than the students who took the FCAT.

Table 4. T-tests of Students who did and did not take the FCAT in Relation to Mean Grade

	Took FCAT	N	Mean (SD)	Sig.	t
Mean grade G6	0	397	4.1495 (.67)	.000*	3.746
	1	170	3.9238 (.62)		
Mean grade G7	0	395	4.4197 (.67)	.008*	2.681
	1	173	3.9893 (.62)		
Mean grade G8	0	383	4.1832 (.63)	.217	1.235
	1	171	4.1140 (.54)		
Mean grade G9	0	338	4.1981 (.68)	.000*	4.192
	1	157	3.9072 (.79)		

Research Question 6

To answer the sixth question, what type of diploma, if any, do the students receive? Descriptive statistics and frequencies were used.

Frequencies were run for diploma type, and diploma types were combined into three categories: standard, accelerated, and special diploma; see Table 5. Within the standard diploma, there were 29 students who had a standard diploma graduation code but there was no graduation type; with these students, all we can assume is that they graduated with a standard diploma with no other accommodations. Six students graduated with a standard diploma via taking Access Courses and three students received a standard diploma but deferred the receipt of that diploma for some unknown reason. There were two students who had the FCAT waived but still received a standard diploma, and there were 26 students who had their Access Courses waived. As for the accelerated diploma type, only three students received an accelerated diploma and they also had the Access Courses waived. Six students received a special diploma via option 1. One student graduated with a diploma of distinction (DOD) via taking Alternate Access Courses and 7 students graduated with a regular DOD. In total, of the 83 students who graduated, 66 (79%) received some version of a standard diploma, 3 (4%) earned an accelerated diploma, and 14 (17%) received a special diploma or diploma of distinction. Out of the 103 students who were present in 12th grade, 83 (81%) graduated with some kind of diploma.

The hypothesis that few students would be receiving a standard diploma and more students would be receiving a certificate of completion was not confirmed. Of the 83 students who graduated, none of the students received a certificate of completion. The majority of the students who have graduated thus far received a standard diploma or a standard diploma with some type of accommodation, such as having the FCAT or Access Courses waived.

Table 5. Diploma Type

Diploma Type	Number of Students (with G12 data <i>n</i>=103)
<i>Standard</i>	
Standard Diploma	29
Standard Diploma via Access Courses	6
Standard Diploma; defer receipt of diploma	3
Standard Diploma; FCAT waived	2
Standard Diploma; Access Courses waived	26
<i>Accelerated</i>	
Accelerated Diploma; Access Courses waived	3
<i>Special</i>	
Special Diploma; Option 1	6
Diploma of Distinction; Alternate Access	1
Diploma of Distinction	7
TOTAL	83
% who have graduated	81%

Research Question 7

To answer the last research question, are there gender differences in any of the above? T-tests were used for continuous outcome variables (when cell sizes permitted) and chi-squares for categorical y's or outcomes. T-tests were run for gender and GPA for grades 6-12. The mean difference showed statistical significance in 6th grade on GPA favoring girls over boys; see Table 6. The pattern of smaller differences between genders continues up until 9th grade when no real differences in gender were seen, and then by 12th grade, the mean grades were actually slightly higher for the boys, but not statistically significant.

For EOC tests, the sample sizes for girls were typically too small to run a t-test, so the test was only done for 9th grade. For EOC Algebra 1 differences, in 6th and 7th grade only males took the course/assessment. In 8th grade, 28 males took the exam and had a higher mean of 3.9643 on the exam than when compared to the 2 females who had a mean of 3.00 ($t = -.925$; $p = .345$). For the EOC Biology exam, in 8th grade only 4 males took the exam and in 9th grade 16 males took the exam and 1 female took the exam. In 9th grade, the males had a higher mean score of 3.62, whereas the one female who took the exam scored a 2. In 10th grade, more males took the exam than the females, however the females had a higher mean score. In regards to FCAT scores, the only significant difference found between genders was 8th grade's FCAT reading assessment. In 8th grade, 75 males took the FCAT reading, and 11 females took the exam; of the males who took

the exam, their mean score was 1.72, which was significantly higher than the females' mean score of 1.09; see Table 6.

Chi-squares were run on gender and ever took FCAT, retention, and EOC variables. The FCAT and gender Chi-square showed that 160 (29.8%) of 537 males took the FCAT, but only 15 (18.5%) of 81 females took the FCAT, which was significant ($X^2=.035$; $p < .05$). In regards to retention, 39 of the 41 students who were retained were males; therefore, of the 103 students with G12 data, the percent of boys who were retained was 39% and for the girls the retention rate was 2% (Only two of all people retained were girls). The same pattern was found in the EOC assessments where more boys were taking the exams than the girls; six, or 7.4% of girls took the EOC exam and 48, or 9%, of boys took the EOC exam. The Chi square for the EOC assessment, however, was not significant ($X^2=.833$; $p < .05$).

Table 6. Gender Differences

	Gender	N	Mean (SD)	Sig.
Mean grade G6	Female	71	4.32 (.59)	.001*
	Male	496	4.05 (.67)	
Mean grade G7	Female	72	4.23 (.60)	.083
	Male	496	4.0826 (.67)	
Mean grade G8	Female	68	4.28 (.58)	.086
	Male	486	4.15 (.61)	
Mean grade G9	Female	63	4.25 (.67)	.100
	Male	432	4.09 (.74)	
Mean grade G10	Female	39	4.11 (.68)	.888
	Male	290	4.12 (.69)	
Mean grade G11	Female	23	4.27 (.52)	.591
	Male	152	4.19 (.65)	
Mean grade G12	Female	10	4.13 (.66)	.220
	Male	66	4.37 (.53)	
EOC Algebra 1 G6	Female	0	-	
	Male	8	3.63 (1.19)	
EOC Algebra 1 G7	Female	0	-	
	Male	6	4.17 (.98)	
EOC Algebra 1 G8	Female	2	3.00 (.00)	
	Male	28	3.97 (1.07)	
EOC Algebra 1 G9	Female	22	1.77 (1.15)	.356
	Male	121	2.02 (1.18)	
EOC Biology G8	Female	0	-	
	Male	4	4.25 (.96)	
EOC Biology G9	Female	1	2.00 (-)	
	Male	16	3.63 (.96)	
EOC Biology G10	Female	5	2.80 (1.64)	
	Male	23	2.52 (1.20)	
FCAT Reading G8	Female	11	1.09 (.30)	.05*
	Male	75	1.72 (1.05)	

DISCUSSION

The purpose of this thesis was to report the academic outcomes in grades 6-12 of students with autism in secondary school. This thesis is novel in that it reports how students with autism are doing in regards on GPA, standardized tests, as well as retention and graduation rates in middle and high school. Prior research has focused on younger children with autism, meaning that the literature does not fully represent adolescents with autism (Keen et al., 2015; Williams & Winsler, 2019). This study, however, looks at students in grades 6-12 who had ever been given a primary exceptionality of autism, as well as their academic outcomes.

Within this sample of autistic students, their GPA increased as they progressed through grades 6-12. The percentage of students with GPAs declined across each grade, which is interesting. So fewer students were receiving grades as they got older but the ones that did got better over time. I think this is because the later grades only had the autistic students who were doing well enough to be in regular education, required less support, had more language skills, and not as much psychopathology. Some of the ones not doing so well may have dropped out like the 11% of students in Barrat et al. (2014). Also, there were some students that did not receive a GPA for each specific year, which could mean that their particular IEP may not call for teacher-assigned grades. This hypothesis is in line with the results from Keen et al. (2015), which indicated that ASD

individuals have a diverse profile of academic achievement where some students perform below, and others above, the expected levels.

With regard to retention, more students were retained than originally hypothesized. Of the 103 students around in 12th grade, 41% of them had been retained at least once or twice during secondary school. It is important to mention that only Cohort A students had the chance to get to 12th grade, and not all of the students were done with high school. Comparing the 41% of autistic students retained in the current study to the 64% of autistic students who were retained at least once by 12th grade in Barrat et al. (2014), the percentage seems to be low. A much larger study by the National Center for Education Statistics in 2007 reported that 10% of typical students from K-8 were retained during school, which makes the current study's percentage seem to be high. The difference between the numbers of participants retained in each study makes it difficult to compare percentage of retention across grades, which is worth mentioning.

Overall rates of participation on standardized tests were highest, around 45%, in 6th grade for both math and reading assessments (FCAT and FSA). For grades 7-10 the percentage of participation stayed around 20-30%. These results are in line with the findings from Chamberlain and Witmer (2017) where around 30% of the students with autism took standardized tests. In the current study, the majority of the students with ASD are opting to not take the standardized assessment, which could be explained by their IEP. Perhaps the students' IEP calls for them not to take the standardized assessments, but rather the EOC exam in order to reflect more of what was taught in the

classroom (Mclaughlin, 2010; Olson, 2001). It is also possible that some of the students are taking the alternate assessment, but we do not have these data.

Around 75% of students who took the FCAT math or reading assessments in all grades failed the exam, which supported the hypothesis that students would perform poorly on the standardized assessments and further supported the conclusion by Chamberlain and Witmer (2017) that students with special needs are more vulnerable to failing standardized exams. Students performed marginally better on the FSA math and ELA exams, except in 7th grade where 4 students took the FSA math and 4 students took the ELA and they all failed. The students had higher pass rates on the FSA assessments compared to the FCAT assessments. What is interesting to note here is the FSA exams are administered on a computer and they did better, whereas those who took the FCAT used a paper and a pencil and did not do as well. It could be that the students tend to do better on technology based tests rather than handwritten exams. Although there are not many studies published on which assessment modality better suits students with ASD, there are a few. Alt and Moreno (2012) had school-age children with autism take the Expressive One-Word Picture Vocabulary test and the Receptive One-Word Picture Vocabulary test in both a computerized and paper format. Their results did not show any differences in regards to the versions of the tests (Alt & Moreno, 2012). Other researchers have also compared iPad and paper assessments that were administered to school children with ASD, and no differences were found (Marble-Flint, Strattman, & Schommer-Aikins, 2019). These authors did note, however, that using an iPad, or a computer, could provide

a different avenue of learning for students with autism that may be more motivating, and stimulating, rather than taking a test by hand (Marble-Flint et al., 2019).

In regards to the EOC exams, the students did not really struggle on the Algebra 1 or Biology exam in 6th, 7th, and 8th grade, but in 9th and 10th the percentage of students who passed declined to about 30-40%. It is also important to mention that the number of students who take the exam increases from grade to grade with the later grades having more students who take the exam. Additionally, it is important to keep in mind that the student has to be enrolled in the class that year in order to take the EOC exam. Therefore, as more students are taking the EOC exams across the years, more students are failing because those who were doing better academically were likely encouraged to take the classes in earlier grades. For example, in G8, 30 students took the EOC Algebra 1 exam and 7% failed, but in G9, 143 students took the exam and 64% failed. This hypothesis was partially supported as the students only struggled on the EOC exams in 9th and 10th grade.

There were significant differences between those who did and did not take the FCAT assessment in relation to the students' GPA in grades 6, 7, and 9. Surprisingly, the results show that those who took the FCAT actually had lower GPAs than those who did not take the FCAT, which contradicted my hypothesis. Findings also show that 1-3% of students opted to take the FCAT reading over the FCAT math in grades 6-9 and that 3-14% of students would take the exam one year but not the next. I hypothesize that the students who are taking the FCAT are receiving lower GPAs because they might be taking harder classes than the students who are not taking the FCAT.

In regards to the type of diploma the students received, I expected more students to receive a certificate of completion rather than a standard diploma. The results show, however, that 81% of the 103 students with G12 data actually graduated and received a diploma. Of the 83 students who graduated, 80% of them received a standard diploma or one of the subtypes of the standard diploma. What is important to mention is that the majority of the students received a standard diploma with some type of assessment or access courses waived, which makes sense because the findings show about 75% of the students with ASD who took the assessments failed. Only Cohort A students had the chance to graduate, which means that there are more students who still have not graduated. The 81% of students who graduated in this study is significantly higher than the 45% of autistic students who graduated in the study by Barrat et al. (2014). This sheds positive light on the MCDPS school system because the majority of the students with ASD are actually graduating.

There are many questions as to what is going on in regards to the students with autism graduating. By statute, the students are not supposed to graduate if they do not pass the EOC and FCAT/FSA exams, but the results from this study show that there are students with ASD who appear to have graduated with a standard diploma, and also had the FCAT or Access Courses waived. It could be that the school system is allowing the students who had the FCAT or Access Courses waived on their diploma to use their EOC exams to substitute and provide for a better indication of how they did in the classroom; this is similar to what was mentioned in Mclaughlin (2010) and Olson (2001). Additionally, being that the Every Student Succeeds Act (ESSA) was published in 2015,

due to the infeasibility of the NCLB act and its inability to fully accommodate those with disabilities, the ESSA could be providing students with disabilities more opportunities for succeeding in high school, such as graduating and receiving a diploma. There is not a lot of research on students with ASD graduating, nor is there recent research on students with ASD graduating without taking certain standardized tests or benchmarks.

Significant gender differences were found in 6th grade with GPA favoring the girls over the boys. But by 12th grade, GPAs were actually higher for the boys. This could be because females tend to have higher language abilities, verbal fluency, cognitive flexibility, and social communication, which would allow them to secure a higher GPA (Halladay et al., 2015). It could also be because younger females tend to have more internalizing problems and younger males tend to have more externalizing problems (Hull et al., 2016). This difference could explain why the girls had higher GPAs in 6th grade because externalizing problems would affect their immediate classroom environment more drastically than would internalizing problems. As Hull et al. (2016) noted in their study, as the males and females become older, the levels of internalizing and externalizing behaviors becomes more similar. However, as the students got older in the current sample, the GPA started to favor the males. One possibility is that public school education becomes more unpleasant for high functioning girls with ASD and they drop out more than the boys, leaving us with more competent boys still getting grades in the upper grades. Anecdotal reports indicate that with the onset of adolescence and puberty, girls with autism in middle and high school are stressed by the increased

complexity of social requirements and pressure for opposite sex relationships that are uncomfortable in school. Additional research should look into this further.

For the EOC Algebra 1 assessment in 8th and 9th grade, more males took the exam and scored higher than when compared to the few females who took the exam, but these results were not significant. In 9th grade, more males took the EOC Biology exam, and they did better than the females; in 10th grade, the females had a higher mean on the EOC Biology exam than when compared to the males. There were no significant differences between the males and females in regards to their scores on the math and reading FCAT exams, except in 8th grade males did better than the females on the FCAT reading assessment. What is interesting is that the females and males did not have big differences in regards to their scores on standardized tests, except for a few, in which not many students participated anyways. According to Hull et al. (2016), females and males present their cognitive and behavioral phenotypes differently, which could be the reason as to why there are no real differences in their scores on standardized tests. The study also mentions that there are a lot of individual factors that may interact with a child's autism development such as age, IQ, and social background (Hull et al., 2016). Overall, there are many factors that can interact with males and females' phenotype of autism, which could explain why large differences between males and females were not seen in this study.

Limitations

There were a number of limitations that may have impacted the results of this study. First, the number of students within this sample was large when compared to the typical samples within this area of research. However, in some cases (the later grades) it

was still too small, which does not allow for a good comparison of results between studies. It is also difficult to find large samples with adolescents who have autism because the majority of the research is focused on younger children. Even though the number of students who are obtaining their exceptionality is increasing, there is still significant difficulty in obtaining large sample sizes for relevant comparisons.

Another limitation was that all we had access to was the students' primary exceptionality not second exceptionalities. Nor did we have access to specific IEPs, or 504 information, to know what special exemptions and accommodations were in place for the ASD students. We also did not have access to data to determine if students with ASD took the alternate assessment instead of the standard assessment. This limitation is true not just for the current study but for all of the studies mentioned as none of the studies included specific IEP or 504 details about the students. Future studies should include information on all exceptionalities, as well as assessments of the severity of the exceptionalities.

Implications

What we learned from this study is that students with ASD have differing levels of abilities. Several of the students within this study switched exceptionalities once, twice or even three times; some students even performed at above average levels, and others below. There were high fail rates on the standardized tests in each grade, which should be revisited because if the majority of the students with that are taking the exam are failing then something needs to be changed within their IEP. We also learned that IEPs for students with autism should be adjusted based on each individual for ultimate success.

Additionally, some IEP teams may choose to opt a student out of standardized testing, but may still test them using EOC exams to show their knowledge in the classroom.

Teachers, administrators, and parents should take this into consideration when researching and comparing their student/child to others on the spectrum; no student with autism is the same. Individuals with autism have differing levels of abilities that can be shown differently in the classroom and in testing, which is crucial for teachers and administrators to understand. It is also important to mention that the majority of the students in this study were reasonably high functioning, because those who have a more severe exceptionality of ASD are most likely not within the school system, which is also useful to keep in mind for comparison of future research. In conclusion, future research should examine each student's IEP, as well as their assigned exceptionalities and determine if their IEP is actually individualized to each student in order to ensure success within the school system.

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BIOGRAPHY

Kayla Keith graduated from Blacksburg High School in Virginia in 2014. She received her Bachelor of Science from Virginia Tech in 2017.