Achievement and Representation of English Learners with Disabilities in Maryland Public Schools Grades Three through Six: Cross Sectional and Longitudinal Analyses

by

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ABSTRACT

This research study examined the achievement of English learners with disabilities on reading and mathematics high stakes tests in the state of Maryland in grades three through six. Also examined was the representation of EL students in special education programs in grades three through six. A longitudinal data set with over 214,000 participants was used. Cross sectional and longitudinal analyses were run to determine the achievement and representation patterns for ELD students. ELD students were determined to have very low achievement in all grades examined and in both subjects, significantly below that of their GenEd, EL, and SWD peers. ELD FARMS students scored significantly below their ELD non-FARMS peers. The pattern of achievement changed between grades three and six in both reading and mathematics. In reading, the gap between ELD students and their peers widened between grades three and six whereas in mathematics the gap between ELD students and their peers narrowed. Regarding representation, there was not found to be any noteworthy disproportionality occurring in grades three through six in the state of Maryland for EL students in special education programs. The representation statistics were also not over-represented or under-represented when controlling for FARMS.
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CHAPTER I

Introduction

It is a challenge to everyone in the education arena to ensure that the resources available are being distributed fairly. One group that has been overlooked is English Learners with disabilities (ELD), students who are English learners (EL) and also have been identified as having a disability. English learners are students who are learning English as a second language. In the USA, ELD students number more than 543,000 (9.3% of all students receiving special education services) and are at risk due to (a) having an identified disability, (b) learning English as a second language and (c) low socioeconomic status. Nearly 60% of all EL students participate in Free and Reduced Meals (FARMS) (Nguyen, 2012). However, as of the 2011-12 school year, only seven states disaggregated data for ELD students (Albus, Lazarus, & Thurlow, 2014). While some research has been conducted on ELD achievement, it has mainly focused on how to properly identify these students, how to train teachers of these students, and the representation of EL students in special education programs.

The few studies published on the high stakes achievement of ELD have shown these students to achieve below both the EL and students with disabilities (SWD) groups (Liu et al., 2005; Solari, Petscher, & Folsom, 2014). These studies have been conducted at the state level since the differences between reporting procedures and testing among states are so vast as to make comparison highly problematic. One viable national data source is the National Assessment for Educational Progress (NAEP), which indicates a similar pattern of low achievement (National Center for Education Statistics, 2015). While the NAEP is not intended to be used for high stakes decisions, it is another indicator of ELD students’ achievement.
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One area where ELD students do achieve at or above the level of their non-EL peers is on the Alternate Assessments for Alternate Achievement Standards (AA-AAS) (Albus, Lazarus, & Thurlow, 2014; National Center on Education Outcomes, 2013;). The AA-AAS are below grade level assessments that were created for students who achieve in the lowest one percent of all students and therefore would not be well served by the regular high stakes assessments. The AA-AAS is an alternative assessment for students with disabilities and a language barrier, which is suitable for ELD students because the validity and reliability of regular high stakes testing for ELD students is questionable (Liu & Barrera, 2013).

Various studies have examined how EL students are represented in special education (Coutinho & Oswald, 2005; Linn & Hemmer, 2011; Park, 2014; Sullivan, 2011; Zehler et al., 2003). Currently, at the national level EL students are slightly overrepresented in special education, with 9.1% of all students being EL, but 9.3% of all SWD being EL (OSEP, 2014). However, when data are examined at the state level, results change. In some states there is overrepresentation and in others there is underrepresentation. Representation also changes over time, with some states moving more towards proportionate representation and others moving towards greater disproportionality (Linn & Hemmer, 2011; Sullivan, 2011). Nationally, representation also varies by disability with EL students being underrepresented in low incidence disabilities such as visual impairments and hearing impairments, but they are overrepresented in high incidence disability categories of specific learning disability and speech or language impairment (Gage, Gersten, Sugai, & Newman-Gonchar, 2013; Sullivan, 2011).

The picture is further complicated by the rapidly changing demographics of the U.S. population. Hispanics, who make up approximately 80% of the EL population, are by far the most rapidly growing segment of the U.S. population and are predicted to continue that growth.
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for many years (U.S. Census Bureau, 2012). These big changes suggest that it is critical to continue monitoring representation statistics which will naturally change as demographics change. As the influx of EL students into public schools continues, schools will have to closely monitor that they are meeting the needs of the students they serve. Since the country is becoming more diverse, the education system will have to change as well, and become equipped to handle a population with a sizeable proportion of students that speaks a language other than English at home (Wagner, Francis, & Morris, 2005). Not only does representation vary between states, districts and disabilities, but it naturally changes over time and thus necessitates continuous monitoring.

Representation is one area in which the federal government has requirements for states. Under the Individuals with Disabilities Act (IDEA) of 2004, states are required to have policies and procedures to prevent the inappropriate identification and significant disproportionate representation by race, ethnicity, and particular disability among students with disabilities. Federal policies regarding ELD students also extend to the language of assessment, which must be in the native language of the child (IDEA, 2004).

No Child Left Behind Act of 2001

The passage of No Child Left Behind (NCLB) in 2001 caused a large number of changes to be made in how public schools are administered and evaluated. One of the major changes that NCLB initiated was that test score data had to be disaggregated by racial groups, special education status, EL status and Free and Reduced Meals (FARMS) status, which is an indicator of poverty. Based on the test score data in reading and mathematics, schools would be judged as having made adequate yearly progress (AYP) or not. For a school to make its AYP goals, all of the subgroups would have to improve year after year. If a school did not meet the goals in any
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subgroup, the school would be deemed to have failed to make AYP. If the school did not make AYP in consecutive years, the school would face penalties and ultimately could be shut down. This led to increased scrutiny for disadvantaged groups, such as EL students and SWD. If these groups did not make gains in both mathematics and reading year after year, the school, including the principal and the teachers would be in trouble. In some ways, this was good for ELD students because it led to more attention and resources being devoted to helping EL students and SWD perform at higher levels. Unfortunately for ELD students, the disaggregation did not extend to the intersection of EL and SWD, or ELD students. A ramification of this failure is that many states do not report data on ELD students in terms of participation in high stakes exams, or achievement on those exams (Albus, Lazarus, & Thurlow, 2014).

**Common Core State Standards**

The field of education moved forward from NCLB into the Common Core State Standards (CCSS). The CCSS were developed to bring continuity to public education across the United States and to raise standards so that all students who graduate from high school are college and career ready. The CCSS were created by the National Governor’s Association (NGA) and the Council of Chief State School Officers (CCSSO) in a joint effort that was not overseen by the federal government. However, the federal government did step in to encourage states to adopt the CCSS, new state assessments, and new methods of evaluating teachers that tie performance ratings to student success with waivers that allowed states to be free of some of the more cumbersome parts of NCLB. The CCSS movement began in 2007 and is still active as of the publication of this dissertation. It remains to be seen how the CCSS will affect ELD students, but the CCSS undoubtedly will affect all students given how far reaching the CCSS are presently. The requirements of NCLB can be waived to free states from some of the more
stringent requirements which focused on subgroups to identify needs. Under the new system, educational agencies will focus on the lowest achieving members of a school that is struggling, using achievement instead of simply membership in a certain subgroup (U.S. Department of Education, 2012). This may benefit ELD students since they are typically very low achieving (Solari, Petscher, & Folsom, 2014). If state educational agencies (SEA), local educational agencies (LEA), and schools all focus on the lowest achieving students, ELD students are less likely to be overlooked.

**Criticisms of having ELD students take high stakes assessments**

The idea of having ELD students take high stakes assessments is one that has drawn criticism from researchers in the field (Liu & Barrera, 2013). High stakes assessments are given at given state-wide and used to make student level decisions regarding tracking and graduation, as well as at the school and state level regarding performance. When high stakes assessments are created, they typically go through a long evaluation process to ensure that the questions are fair, appropriate, reliable and valid indicators of the standards that are being assessed. This process includes standardization of the test results for the population that the assessment targets. When assessments are created for fairly small, homogenous groups this task is manageable and more trusted. However, when an exam is being created that may be taken by millions of students across thousands of miles of the United States, it becomes much more difficult to create an exam that will truly be valid for all participants. With a high stakes assessment that will be used for graduation decisions, promotion, tracking and other decisions, it is critical that the information being used is accurate for all participants.

Validity is a major concern for ELD students since as a subgroup they fall so low on the achievement spectrum. Kopriva, Wiley and Emick (2007) tested the internal consistency validity
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of using high stakes tests on EL students. They used data from more than 2,500 students in 21 schools in Maryland, and approximately half were EL students. The validity of the high stakes test data was significantly higher for the non-EL students than for the EL students. Notably, the validity was particularly low among the lowest achieving EL students. Since ELD students fall in that lowest group, it would mean that questions of validity are certainly warranted when using high stakes tests to make decisions regarding ELD students.

Studies like Kopriva’s et al. (2007) are one reason that many states choose to give ELD students assessments based on alternate achievement standards (AA-AAS). Many states take this route and in recent years many more states disaggregated and reported their data for participation and performance for ELD students on the AA-AAS compared to the regular high stakes state assessment. This disparity in reporting practices is due to the fact that NCLB did not require that level of disaggregation. Due to the fact that all AA-AAS participants have disabilities, only one additional level of disaggregation is required to report out on ELD students.

If the results are not valid, or the results are at least highly questionable, it is in the best interest of all parties to use multiple sources of information to make decisions. For ELD students this could entail informal measures such as interviews, observations, questionnaires, language samples, storytelling and teacher ratings for making decision about whether or not EL students should be placed in special education programs (Miller, 2011).

Resources Allocated to ELD Students

Students with disabilities are entitled to a free and appropriate education under the Individuals with Disabilities Education Act (IDEA) of 2004. The federal government provides financial assistance to school systems that follow the guidelines set forth in IDEA. This money can be used to do things like hire special educators to work in classrooms with SWD, or to
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purchase equipment or software that will support SWD. In theory, this money allows SWD to access the free and appropriate public education that is required by law.

Likewise, Title III is a federal law that requires that states have policies and procedures in place to ensure that EL students attain English proficiency and are taught using the same standards as students who are fluent in English. The federal government provides money to educational agencies to hire teachers who are certified to teach English as a second language as well as obtain additional resources such as dictionaries or interpreters. These extra services are targeted at preventing EL students from falling behind their English speaking peers solely because they do not speak English.

ELD students receive services under both the IDEA and Title III. Receiving services as a result of one of these laws does not mean that a student cannot access services under the other program. The two laws were designed to be non-overlapping, there are separate provisions for each piece of legislation and they are not mutually exclusive. An ELD student should be receiving all the services that he or she is entitled to under IDEA as well as all the Title III services.

Frequently these provisions mean that ELD students are in classes that are co-taught by a general and special educator. The special educator is trained in the best practices for instructing students with special needs and works with the general educator in instructing students in all content areas. In addition to being in co-taught classes, the ELD students are also required to have a case manager who oversees the implementation and maintenance of the IEP. The special educators and case managers provide support to students pursuant to the students’ disabilities. Furthermore, ELD students should be participating in EL classes with a teacher who is certified
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in teaching EL students. These classes typically include focused instruction in vocabulary and functional use of the English language.

Academic Standards for ELD students

ELD students are subject to two main types of standards in schools. One type of standard that ELD students are measured against is the academic content standards. An example of an academic content standard is that by tenth grade Biology students should be able to differentiate between DNA and RNA. Content standards such as these pose great difficulty for EL students in general, but especially for ELD students (NCEO, 2013). At some point in elementary school, typically around fourth grade, students transition from learning to read to reading to learn. Specifically, the students must be reading in English. One thing that Title III money does not pay for in almost all schools is foreign languages textbooks. Therefore, if students are not able to read in English, and read at or near grade level, many of the content standards remain inaccessible because so much of the material is learned by reading. This is another reason why many states give ELD students the AA-AAS, because ELD students are being taught on a daily basis using standards that are below grade level simply because they cannot reasonably access grade level material (NCEO, 2013).

The other major standard applicable to ELD students is the English proficiency standards that are used to determine if students should remain in EL programs. English proficiency assessments gauge the ability of EL students in reading, writing, speaking, listening, and comprehension in English in relation to the standards. There are varying levels of competency, and for a student to exit the EL program, he or she must be able to achieve a certain level of proficiency in the five areas. Proficiency assessments must be given annually according to federal law. For ELD students, their disability may prevent them from passing an assessment that
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is testing their English proficiency as quickly as their peers so they may be required to receive EL services for longer because they may achieve English proficiency at a slower rate than their non-disabled peers.

**ELD Students and the Law**

ELD students are protected by multiple laws in the United States, most notably IDEA, Title III, Section 504 of the Rehabilitation Act of 1973, and Title VI of the Civil Rights Act of 1964. IDEA is currently the major piece of legislation that governs special education in the United States. IDEA pertains to all students who have been determined to have a disability and ensures that they will receive a free, appropriate, and public education (IDEA, 2004). Part B of IDEA addresses the needs of children ages 3-21, including ELD students.

Section 504 of the Rehabilitation Act of 1973 was the first federal law guaranteeing rights to individuals with disabilities. It guarantees that no one can be excluded from participation in or denied the benefits of any program that receives federal assistance (Section 504, 1973). One way this applies to ELD students is on standardized assessments. While it does not guarantee that assessments must be in the native language, it does state that extraneous factors such as speaking or listening skills may not detract from a student’s ability to perform on an assessment. This allows for many accommodations such as native language assessments, linguistic simplifications, simplified instructions, extra time, and/or use of a dictionary (Special Ed Connection, 2014).

Title III is another piece of legislation that applies to ELD students because it provides regulations on how EL students must be educated. Title III was originally part of the Higher Education Act of 1965 but the part of Title III that applies to ELD students is Part A, officially known as Language Instruction for Limited English Proficient and Immigrant Students (US
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Department of Education, 2014). Part A was enacted under NCLB in 2001 and states that students must attain English proficiency through their schooling and be tested on certain grade level standards in reading and mathematics. Under Part A, programs are funded to prevent students from falling too far behind solely because they cannot speak English. These programs concentrate on building skills in English proficiency while learning subject matter content areas.

Title VI of the Civil Rights Act of 1964 is directly applicable to ELD students because it prevents discrimination on the basis of race or ethnicity (Special Ed Connection, 2014). One example of how this law protects EL students who may have a disability is when tested to determine their eligibility for special education. Due to the fact that the tests may have been normed on students who are not EL nor have a disability, the results may not be valid or reliable for EL students. Therefore, giving the test to an EL student is a form of discrimination because that instrument is not a valid tool. These laws together protect a student population that is highly vulnerable.

The Supreme Court case of Lau v. Nichols was a landmark case that ruled that school districts were required to provide services to EL students (U.S. Department of Education, 2015). This case was decided in 1974 and pertained to a group of approximately 3,000 Chinese students in San Francisco, CA. Nearly two thirds of these Chinese-speaking students were placed in regular classrooms without any supplemental instruction to help them acquire English. It was ruled that this effectively shut them off from and denied them of the public education because their experiences in the classroom were incomprehensible due to the language barrier (United States Department of Education, 2015).

Representation of ELD students
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**Racial Disproportionality.** In addition to having a slightly over-represented EL population in special education, there are disparities in terms of racial groups as well (Elementary and Middle School Technical Assistance Center, 2014). Disproportionality occurs when a certain group of people is overrepresented in a particular group or system. A hypothetical example would be if a school was 75% White and 25% Asian, but 45% of all Asian students were suspended. On national statistics among racial groups, African Americans have the highest degree of disproportionality, being over-represented in nine of the 13 categories. American Indians are also over-represented in nine of the 13 categories at the national level although slightly less than African Americans when numbers are averaged. Hispanic and Asian students are both over-represented in three of the 13 disability categories.

*Representation and the Law.* IDEA requires states to have policies and procedures in place to prevent the inappropriate identification and disproportionate representation of students in special education programs (IDEA, 2004). An example of how disproportionality is that if African Americans are 12% of the population, but 25% of the special education population, it appears that something is being done improperly and too many African American students are being referred and identified as disabled. This protection pertains not only to racial groups, but also to EL students. This is an important law because it aims to prevent discrimination on a systemic level and holds states accountable for having disproportionate representation. Given that population figures are continuously in flux, this data must be reported on a yearly basis to ensure disproportionate representation is being addressed.

Current representation statistics show that while 9.1% of the K-12 population is EL students receiving services under Title III, 9.3% of SWD are receiving EL services (OSEP, 2014). There is a very slight over-representation of EL students in special education programs.
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These numbers vary by state and district. Some states and districts have a high degree of over-representation, some states and districts have a high degree of under-representation, and some states and districts have proportionate representation figures. In addition to varying among states and districts, the percentages change from year to year, thus necessitating continuous monitoring.

Among the 13 disability categories, EL students are over-represented in special education programs in specific learning disability and speech or language impairment (OSEP, 2014). This is a slight over-representation, but since these are the two highest incidence disability categories it leads to a large effect in the overall average. In the other 11 disability categories, EL students are slightly under-represented in special education. In this case, although there are fewer over-represented disability categories than under-represented disability categories, the two over-represented categories are far larger and therefore outweigh the under-represented categories leading to a slight over-representation on national all-disability statistics.

*Measuring Disproportionality.* Three common methods for measuring disproportionality are composition, risk, and risk ratio (Bollmer, Bethel, Munk, & Bitterman, 2014). Composition determines the percentage of students in a certain group who are of a certain background. If a researcher wanted to determine what percentage of all special education students were EL students, composition would be the statistic to use. In this case, composition can be more specific and answer the question “What percentage of all students receiving special education services for autism are EL students?” (Bollmer et al., 2014). The formula used to calculate composition in this instance would be to divide the number of EL students who have autism by the total numbers of students with autism and multiply by 100.
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Risk is a slightly different statistic, but also used to determine when disproportionality is occurring. Risk would be used to determine the percentage of students within a certain ethnic category that have a disability. For example, if a government official wanted to know the risk of EL students being referred to special education, risk would be appropriate to use. The procedure used to calculate risk is to divide the number of EL students who have disabilities by the total number of EL students and multiply by 100.

Risk is a useful statistic, but can be taken a step further by calculating the risk ratio. The risk ratio is a way to compare the risk between two groups (Bollmer et al., 2014). It is important to understand that risk occurs in context and so a raw risk number may not be especially useful. The risk ratio makes the risk statistic more useful by enabling comparisons to be made within context. A researcher studying the risk for Hispanic students receiving services for a speech/language disorder disability compared to the risk for all other students receiving services for a speech/language disorder would first calculate the risk of a Hispanic student having a speech/language disorder. Then, divide that number by the risk of all other students having a speech language disorder. A risk ratio greater than one would indicate that Hispanics are more likely to have a speech/language disorder and a risk ratio less than one would indicate that Hispanic students are less likely to have a speech/language disorder than all other students.

Ways to Reduce Disproportionality. Once disproportionality is discovered, the next logical step is to use strategies to address it. Typically, disproportionality is symptomatic of systemic issues; any remedy will have to be multi-faceted (EMSTAC, 2014). Effective practices include teacher training, culturally appropriate assessment and instruction, cultural sensitivity, home and school collaboration, multi-tiered systems of support, and an effective pre-referral process. Teacher training can help by making teachers more aware of the subtle differences
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between students that may be affecting the ability of a teacher to serve certain students. Culturally appropriate assessments are important because if students are given a test that is culturally biased it will inevitably lead to some groups of students scoring higher than others. For example, if a reading test that include four passages about sledding is given to children in Arizona and Massachusetts, the children in Massachusetts will naturally have an advantage because the children in Arizona may have experienced neither snow nor sledding. Home and school collaboration is critical because it helps parents of students who may come from traditionally under-represented groups to feel that they are a part of the school culture which leads to increased buy in. Having all stakeholders actively engaged in the education process is critical to lasting success. An effective pre-referral is important in reducing disproportionality because there can be simple fixes, such as getting a short-term tutor or changing seats in a classroom, that can circumvent the need for a special education assessment and identification (Stump, 2015).

Teaching ELD Students

ELD students require extra interventions and targeted teaching strategies if they are going to overcome the barriers they face. Specific practices that are recommended for the classroom include using culturally responsive pedagogy, primary language supports, active parent involvement, open communication between teacher and student, cooperative learning tasks, and a focus on high level cognitive skills (Park, 2014; Rodriguez, 2005). Culturally responsive pedagogy is a student centered approach that focuses on children’s cultural strengths and is critical with all EL students, and especially so with ELD students.

Speaking a language other than English means that EL student have inherent cultural differences and skilled teachers will need to respond to these differences to effectively reach
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their ELD students. Primary language supports include being able to converse with ELD students in their primary language, and communicate with parents in their native tongue. With so many languages being spoken in schools, it is operationally difficult to achieve this goal but schools and districts must make every effort to have interpreters available to communicate with families and children who speak languages other than English. This will open lines of communication and increase student and parent investment when they know that their input is valued and wanted. By using cooperative learning tasks, teachers can increase engagement and build relationships in the classroom. Another strategy that teachers can use is to focus on high-level cognitive skills such as self-monitoring so that students can be more responsible for their own behavior. One more technique that has been shown to have positive outcomes for ELD is to have instructional conversations between the teacher and students (Park, 2014). By having the teacher take time to discuss academic content and address any concerns that students have, the teacher can have a better sense of how the student is learning. This will allow for better instruction and differentiation of lessons to meet the specific needs of ELD students.

Research Problem

Students with disabilities who are also English Language Learners (ELD) are a high risk group for low achievement. While there has been research conducted on how to properly train teachers of these students, how to identify ELD students, and the representation of EL students in special education, there has been little research on ELD students’ achievement. Recent research shows ELD students to be achieving substantially below their peers who are in either special education or EL programs. ELD students have been a part of US schools since their inception, but ELD students have come under increased scrutiny as the number of EL students rises. ELD
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students require extra services in the classroom than their peers and teaching strategies must be changed to accommodate the additional needs.

There has been a great deal of legislation and educational reform issues impacting ELD students. The NCLB Act of 2001 increased consequences for schools that failed to increase the pass rates of all students on tests and forced states and districts to pay closer attention to both EL students and SWD. The CCSS movement was created after NCLB to make standards more uniform across the country. The CCSS has led to changes in academic standards for all students in the states that have adopted them. In addition to the CCSS have come new assessments, the PARCC and SBAC which are changing high stakes assessments for ELD students. However, the use of high stakes assessment for ELD students has been criticized due to a lack of validity and reliability and questions of legality. Laws that affect ELD students include IDEA, Title III, Section 504 of the Rehabilitation Act of 1973, and Title VI of the Civil Rights Act of 1964.

Proper representation of EL students in special education is enforced by law (IDEA, 2004). States must check their representation statistics annually by collecting data and then analyzing that data to determine if over-representation is occurring. If disproportionality is occurring, steps must be taken to ensure that the districts and schools who are in violation take corrective procedures to remedy the problem.

**Research Questions**

1.0 How do ELD students in elementary school perform on mathematics high stakes test in MD compared to their GenEd, EL and SWD peers?

1.1 Do ELD students from four birth year cohorts perform significantly below GenEd, SWD and EL students on mathematics high stakes tests in Maryland in grade three?
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1.2 Do ELD students from four birth year cohorts perform significantly below their peers on mathematics high stakes tests in Maryland in grade three, controlling for FARMS?

1.3 Does the achievement level of ELD students from one birth year cohort on mathematics high stakes tests change over time between grades three through six?

1.4 Does the achievement level of ELD students from one birth year cohort on mathematics high stakes tests change over time between grades three through six, controlling for FARMS?

2.0 How do ELD students in elementary school perform on reading high stakes test in MD compared to their GenEd, EL and SWD peers?

2.1 Do ELD students from four birth year cohorts perform significantly below GenEd, SWD and EL students on reading high stakes tests in Maryland in grade three?

2.2 Do ELD students from four birth year cohorts perform significantly below their peers on reading high stakes tests in Maryland in grade three, controlling for FARMS?

2.3 Does the achievement level of ELD students from one birth year cohort on reading high stakes tests change over time between grades three through six?

2.4 Does the achievement level of ELD students from one birth year cohort on reading high stakes tests change over time between grades three through six, controlling for FARMS?

3.0 Are EL students disproportionately represented in special education programs in Maryland in elementary school?
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3.1 Are EL students from four birth year cohorts disproportionately represented in special education programs in the state of Maryland in grade three?

3.2 Are EL students from four birth year cohorts disproportionately represented in special education programs in the state of Maryland in grade three, controlling for FARMS?

3.3 Does the representation of EL students from one birth year cohort change in special education programs in the state of Maryland change between grades three and six?

3.4 Does the representation of EL students from one birth year cohort change in special education programs in the state of Maryland change between grades three and six, controlling for FARMS?

4.0 Are EL students at a higher risk for receiving special education services compared to their non-EL peers in Maryland in elementary school?

4.1 Are EL students from four birth year cohorts at a higher risk for receiving special education services when compared to their non-EL peers in the state of Maryland in grade three?

4.2 Are EL students from four birth year cohorts at a higher risk for receiving special education services when compared to their non-EL peers in the state of Maryland in grade three, controlling for FARMS?

4.3 Does the risk for EL students from one birth year cohort receiving special education services when compared to their non-EL peers change between grades three and six in the state of Maryland?
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4.4 Does the risk for EL students from one birth year cohort receiving special education services when compared to their non-EL peers change between grades three and six in the state of Maryland, controlling for FARMS?

Research Hypothesis

1.0 ELD students in elementary school perform lower than their GenEd, EL and SWD peers on mathematics high stakes test in MD.

1.1 ELD students perform significantly below GenEd, SWD and EL students on mathematics high stakes tests in Maryland in grade three.

1.2 ELD students perform significantly below their peers on mathematics high stakes tests in Maryland in grade three, controlling for FARMS.

1.3 The achievement level of ELD students on mathematics high stakes tests does not change over time between grades three through six.

1.4 The achievement level of ELD students on mathematics high stakes tests does not change over time between grades three through six, controlling for FARMS.

2.0 ELD students in elementary school perform below their GenEd, EL and SWD peers on reading high stakes test in MD.

2.1 ELD students perform significantly below GenEd, SWD and EL students on reading high stakes tests in Maryland in grade three.

2.2 ELD students perform significantly below their peers on reading high stakes tests in Maryland in grade three, controlling for FARMS.
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2.3 The achievement level of ELD students on reading high stakes tests does not change over time between grades three through six.

2.4 The achievement level of ELD students on reading high stakes tests does not change over time between grades three through six, controlling for FARMS.

3.0 EL students are not disproportionately represented in special education programs in Maryland in elementary school.

3.1 EL students are not disproportionately represented in special education programs in the state of Maryland in grade three.

3.2 EL FARMS students are not disproportionately represented in special education programs in the state of Maryland in grade three, controlling for FARMS.

3.3 The representation of EL students does not change in special education programs in the state of Maryland change between grades three and six.

3.4 The representation of EL students does not change in special education programs in the state of Maryland change between grades three and six, controlling for FARMS.

4.0 EL students are not at a higher risk for receiving special education services compared to their non-EL peers in Maryland in elementary school.

4.1 EL students are not at a higher risk for receiving special education services when compared to their non-EL peers in the state of Maryland in grade three.
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4.2 EL students are not at a higher risk for receiving special education services when compared to their non-EL peers in the state of Maryland in grade three, controlling for FARMS.

4.3 The risk for EL students receiving special education services when compared to their non-EL peers does not change between grades three and six in the state of Maryland.

4.4 The risk for EL students receiving special education services when compared to their non-EL peers does not change between grades three and six in the state of Maryland, controlling for FARMS.
CHAPTER II

Literature Review

Background on ELD Students

Federal law requires that all students are provided a free, appropriate, and public education (IDEA, 2004). In addition to the extensive challenges that ELD students will face integrating themselves into a culture that does not primarily speak their language, these children often have disabilities which limit their ability to learn at the rate of their non-disabled peers. However, there is little published data on the achievement of ELD students despite the fact that this is a highly vulnerable and growing segment of the population.

With the advent of No Child Left Behind in 2001, assessment data was required by the subgroups of race, FARMS status, SWD status, EL status and grade level. The FARMS, EL, and SWD groups have been well documented as subgroups that are at-risk for low achievement, with scores consistently below that of their English-speaking, general education (GenEd), non-FARMS peers (Solari, Petscher, & Folsom, 2014). Combinations of these risk factors, such as African American, male and FARMS lead to further identification of achievement gaps among groups of students. Examining combinations of subgroups at risk for poor outcomes may be an important first step in prevention. If being a SWD is a risk factor for lower performance on high stakes tests and being an EL is also a risk factor for lower performance on tests, the ELD group is likely at higher risk than the EL and the SWD groups individually (Hanson et al., 2011). However, the effect may not be strictly additive, but due to scant descriptive research and inconsistent published reports, the interaction is not precisely known. While there is some literature focusing on this issue (Liu, Barrera, Thurlow, Guven, & Shyyan, 2005; Solari et al. 2014), additional research on this subgroup is warranted.
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When comparing the SWD and EL students, some similarities emerge. Among the high incidence disorders (learning disabilities, emotional disorders, other health impairments, and speech/language disorders) there are many shared characteristics between ELs and SWDs (Chu & Flores, 2011). These include poor comprehension, difficulty following directions, syntactical and grammatical errors, and difficulty completing tasks. Other research has found mild cognitive impairments in phonological processing, naming speed, and working memory tied to performance in EL students who have reading disabilities (Swanson, Orosco, & Lussier, 2011).

It is important to remember that speaking a language other than English is not a disability; however EL students do struggle to learn academic content in a language that is foreign to them without proper supports. However when tested in English, EL students may have many shared characteristics with SWD.

If these SWD and EL students have shared needs, it may mean that a test for a disability may falsely identify (false positive) a student as having a disability because they are an EL student and not able to properly understand the procedural instructions given in English. While this issue is relevant, it may not be affecting the prevalence of EL students to a large degree nationally because EL students are not over-represented in special education programs (OSEP, 2014). However, in states where there is overrepresentation of EL students in special education, a good policy intervention would be to closely examine the assessments that are being used to identify EL students as having a disability. Two ways to ensure that tests for special education eligibility are valid and accurate for EL students are (1) to give the assessments in native language, or (2) to give non-verbal tests. Additional evidence, besides test results can come from informal measures such as interviews, observations, questionnaires, language samples, storytelling and teacher rating (Miller, 2011). Appropriately assessing EL students for special
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education eligibility appropriately will lead to more balanced representation statistics in special education and prevent students from being misidentified.

Current State of Research on ELD Students

Studies focused on ELD students have largely focused on three topics (a) identification, (b) representation, and (c) teacher training (Park, 2014). There is a gap in the literature regarding academic achievement of ELD students. There is little research describing the achievement level of ELD students, but what has been done shows them to be a very low achieving group of students.

Identification. Recently, studies have examined how to properly identify EL students with a disability (Case & Taylor, 2005; Figueroa & Newsome, 2006; Chu & Flores, 2011). This is a difficult task because students with learning disabilities and ELs share many of the same characteristics such as problems with pronunciation, syntax, semantics, and discourse (Chu & Flores, 2011). It was found that few states have and/or follow explicit procedures for how to fine tune the Individualized Education Program (IEP) process when dealing with an EL student.

A contextual study by Fernandez and Inserra (2013) examined how and why EL students were identified with disabilities and placed in academic classes. The purpose of the study was to examine the mechanisms used for enrolling of EL students in SWD programs. The authors questioned schools’ intentions of identification and resources to pay for services since the percentage of EL students being classified as SWD was rising (Sullivan, 2011). Were EL students being referred into SWD programs for services for their disabilities or were SWD services helping EL students close the gap with their English speaking peers? It was found that teachers’ knowledge of acculturation and the referral process to get an IEP were both highly variable (Fernandez & Inserra, 2013). While the study was small in scope with limited reliability
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and validity, it did lead to reasonable recommendations that would be pertinent for teachers to use to decide when to refer or not refer EL students for evaluation. Major recommendations included a) provide professional development for teachers on acculturation and language acquisition, and b) fine tune the referral process for SWD to be responsive to the needs of EL students.

Those trying to determine if EL students have a disability must be very careful to differentiate between EL students with a disability and those without a disability. Research has shown questionnaires in students’ first language, nonword repetition and tense morphology to be good indicators of disability status among EL students (Paradis, Schneider, & Duncan, 2013). Some low-incidence disabilities, such as blindness or deafness will be more easily diagnosed among EL students. The difficulty is when the distinction between those with a disability and those without a disability is more subtle. It is critical to remember that EL students are not cognitively impaired; they are being educated in a foreign language, so it will take time for them to acquire the skills they need to read in English at grade level. This is a difficult issue and a reason why so much research has focused on how to properly identify EL students as having a disability.

Findings from these contextual studies have shown that students who are in both SWD and EL programs have more resources devoted to them than students who are enrolled only in SWD programs or in EL programs (Nguyen, 2012). This interaction among resources would increase the chances for collaboration to occur among teachers. In an optimal service delivery for a high incidence ELD student, there should be three educators: one EL teacher, one special educator, and one general educator. This model is in contrast to a non-EL student with a disability who typically receives services from two teachers often in a co-teaching model: a
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special educator and a general educator. Alone, these teachers enact separate unconnected initiatives, but together they could make cross-connections and build on each other’s efforts to better serve the ELD students (Nguyen, 2012). This may be a critical factor because some accommodations work better than others for each individual student, and having more teachers know the child to share information may increase the chances that appropriate accommodations and interventions will be identified and implemented (Abedi, Lord, Hofstetter, & Baker, 2000).

**Representation.** Further research has focused on whether EL students are overrepresented or underrepresented among SWD. Nationally, EL students are not overrepresented in special education programs, with 9.1% of all students being EL, and 9.3% of all special education students being EL (OSEP, 2014). However, this rate varies by individual states and territories (Nguyen, 2012). Some studies found that EL students are overrepresented in special education programs (Artiles & Harry, 2006), while others have found that it depends on the composition of the district (Park, 2014). In districts with a high percentage of EL students, there tends to be an overrepresentation of EL students in SWD programs, whereas the trend reverses in districts with a low EL population (Nguyen, 2012). This may be due to the fact that in districts with low EL numbers there are plenty of resources for EL students and these resources take effect early with EL students preventing the necessity of placing them in special education programs. Whereas in districts with high percentages of EL students, there may be a watering down effect of the money and expertise so that being identified as EL is not beneficial to students and may lead to more students struggling and consequently being referred for special education services.

One study that closely examined disproportionality in special education was conducted in 2011 by Sullivan. In a southwestern state over an eight year period, the risk of EL students being
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in special education as compared to White students was studied. The study aimed to determine (a) if disproportionate representation was occurring, (b) if it changed over time, and (c) to what extent ELD students were being placed in the least restrictive environment. The study found that at the state level ELD students were over-represented in each of the high incidence categories of specific learning disability (SLD), speech language impairment (SLI), and mild impairment mental retardation (Sullivan, 2011). Over the eight years of the study, districts were increasingly less likely to have under-representation occur for ELD students in special education with SLD and SLI peaking in the final year of the study with risk ratios of 1.82 and 1.63 respectively. However, risk ratios did vary between districts and disabilities. Emotional disturbance was one disability where there was a high amount of under-representation. Another finding was that ELD students were more likely to spend some of their time pulled out of the classroom than their white peers. However, they were less likely to spend the entire day pulled out of the classroom. These findings are relevant to the current study because they highlight the need to continue monitoring ELD representation in special education. If the number of ELD students is growing, and the risk for ELD students is also growing each year, that indicates that the number of ELD students is increasing rapidly and as the number of ELD students increases the situation will be harder and harder to deal with. One weakness of the study is that ELD students are not a homogeneous group. There is a high degree of variation with ELD students in how much English they can read, write, speak and understand as well as in the degree of disability they have (Sullivan, 2011).

Representation is an important topic to consider because the proportion of students served in US public schools who were EL increased by approximately 105% from 1991 to 2011 while the overall school population has increased by only 12% during that same time (Chu & Flores, 2011). In North Carolina, the Hispanic population grew by 301% from 1998-2008 (Center for
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International Understanding, 2011). Nearly one in five U.S. public school students speaks a language other than English at home (Wagner, Francis, & Morris, 2005). As of the 2013-14 school year, there were more than 543,000 ELD students nationwide (OSEP, 2014). This number is rising and is predicted to continue rising as America becomes an increasingly minority country (U.S. Census Bureau, 2012). This population may be even more at-risk considering the fact that nearly 60% of all EL students participate in the FARMS program (Nguyen, 2012). The exact nature of the relationship between the SWD and EL markers as risk factors is important to sort out so that resources can properly be distributed. The stakes of assessments are especially high when test results are used at the student level for promotion/retention, graduation, tracking decisions, and at the state/national levels for funding and investment (Heubert, 2002).

**Teacher Preparation.** The third major focus area of existing ELD studies addresses preparation for teaching ELD students. This is an important topic because properly preparing teachers is difficult due to the resources, amount of time, and instructional time necessary to conduct professional development (PD. Properly preparing teachers to serve ELD students would bring together two skills and certificate areas, ESOL and Special Education. Each of these receives specific federal funding, special education programs get money from Individuals with Disabilities Education Act (IDEA) programs and EL programs get money from Title III. When students are identified as ELD they ideally will be getting the necessary attention and support needed to help them.

Other research that has been conducted with ELD students has focused on teacher best-practices. Nguyen (2012) focused on teacher preparation and found that pre-service and in-service teachers could benefit from a wide array of skills and techniques to properly educate ELD through a collaborative approach to teaching. Having special education teachers meet with
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GenEd teachers and with EL teachers would allow them to share expertise and discuss the needs of specific students. This collaborative approach will allow for increased communication about the students and help teachers find strategies that work.

**High Stakes Testing Choices for ELD.** When states give high stakes assessments to the ELD subgroup, there are options regarding test choice. SWD may take the same high stakes assessment as their general education peers with or without accommodations as specified in an IEP; both of these choices incorporate grade level appropriate standards into the assessments. A second option is to take the Alternate Assessment based on Alternate Achievement Standards (AA-AAS) (NCEO, 2013). The AA-AAS was designed for students with the most significant disabilities. The AA-AAS was created because some students were unable to participate in classes that used grade level appropriate standards. For students in classes that do not use grade level standards, regular assessments would be inappropriate because they are based on standards that the students may not be taught. In many states, the only data reported for ELD students is from the AA-AAS (Albus, Thurlow, & Liu, 2009). This is a problem because ELD students are being given the grade level high stakes tests, but the results are not being reported.

The issue of whether to give ELD students grade level assessments, or the AA-AAS is one of multiple issues with ELD assessment. Further complicating matters is the process of identifying EL students as having disabilities. In a presentation made at the State Collaborative on Assessment and Student Standards conference in 2014, Park found further problems with administering assessments to EL students. Park (2014) conducted a meta-analysis of research that had been conducted on the topic of ELD students. One topic that was missing from this analysis was achievement of the ELD students. A glaring problem with special education evaluations was that the assessments were all administered in English; there was no screening to
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determine if an EL child was ready to be assessed in English. Other issues were that the assessments were linguistically complex and that the referral process was subjective and biased. One study found that psychological evaluations for EL students ignored guidelines on how to give nondiscriminatory assessments (Figueroa & Newsome, 2006).

ELD Achievement

Review of recent literature indicate two major findings concerning ELD achievement (1) ELD students performed below their peers who are GenEd, EL without a disability, and non-EL student with a disability, and (2) there are substantial issues with states’ reporting high stakes assessment results for ELD students. Each of these issues will be discussed below.

ELD Students Achieve Low. There has been some research reporting the achievement of ELD students. Generally the findings indicated that ELD students achieved below their peers who were non-disabled EL, non-EL disabled, or GenEd. In one study, Liu et al. (2005) examined ELD students’ achievement by investigating the participation and pass rates on graduation exams and other high stakes tests in Minnesota public schools. The study compared four groups: (a) ELD students, (b) EL students, (c) SWD, and (d) GenEd students. The GenEd students scored the highest and had the largest numbers of participants; the EL and SWD separately scored lower on the high stakes tests, with ELD students scoring lower than the other groups on these high stakes tests. One weakness of this study was the small number of students in the ELD group (n = 221, 0.3% of all students). Additionally, the results were only applicable for students with disabilities who participated in the high stakes test. Students with Specific Learning Disabilities (n = 126) and Speech/Language Impaired (n = 30) made up 71% of the students in the ELD subgroup. Interestingly, the ELD subgroup had similar within group participation rates in the exam as the SWD and the EL subgroups. The ELD students took the high stakes tests, but had a
very low pass rate (Liu et al., 2005). Liu et al.’s findings were one of the first to report that the ELD students are in schools, participate in the high stakes exams at the same proportion as their non-EL peers, but perform lower than their non-EL peers.

Further evidence of the struggles that ELD group have on high stakes tests was documented by Solari, Petscher, and Folsom (2014). They analyzed the Florida Assessments for Instruction in Reading (FAIR) test results for over 1,000,000 students in grade 3-10 from the 2009-2010 academic year. These tests were administered three times per grade level and have high content and face validity (Florida Department of Education, 2009). Achievement was measured using a scaled score for reading comprehension, spelling and fluency. Results indicated that the ELD group achieved the lowest in reading comprehension, spelling and fluency when compared to the EL, SWD, and GenEd groups. This low performance was consistently shown across all grade levels and within each of the three yearly administrations.

Solari et al. (2014) included covariates in their model and found a significant effect for FARMS status. They found that students who were FARMS achieved significantly lower within each subgroup; the FARMS-ELD students were the lowest, with the non-FARMS GenEd students scoring the highest. These data were analyzed by using a five level (time, students, classes, schools, and districts) linear growth model to examine the reading scores in three categories of comprehension, spelling, and reading efficiency as measured by the FAIR tests. In addition to finding that the FARMS-ELD students achieved the lowest at the start of the year, it was shown that there was negligible narrowing of the gap between the groups during the school year. The relevance of the Solari et al. study was that it was one of few studies to have considered the ELD subgroup achievement and they, like Liu et al. (2005) found the ELD
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students were achieving below their SWD and EL and non-EL typical peers. Only two states, Minnesota and Florida, have conducted studies to investigate the achievement of ELD students.

Albus, Thurlow, and Liu (2009) further analyzed the AA-AAS data by comparing students in elementary schools, middle schools, and high schools. They compared the ELD who took the AA-AAS group to the all students who took the AA-AAS group. At the elementary school level, the ELD scored higher than all students among those who took the AA-AAS. In the other eight states that reported data for elementary students, the ELD subgroup scored similar to all students on the AA-AAS. At the middle school level, the results were similar when comparing the ELD students and all students, with some states reporting ELD scored higher in math. At the high school level, in most states the ELD subgroup scored higher than the all students group in reading and math on the AA-AAS. They concluded that the high performance of the ELD subgroup on the AA-AAS suggested that the ELD scored higher because of (a) better instruction, (b) having less severe disabilities than the non-EL peers, or (c) inappropriate placement for the AA-AAS assessment. This study is relevant because it shows that ELD students can score similarly, if not better, than their non-EL peers. This conclusion is contrary to the results of other previous studies and points to a need for further research. One limitation is that the results were taken from the AA-AAS results and not the regular state assessment. Less than one percent of all students take the AA-AAS (NCEO, 2013).

Thurlow, Bremer, and Albus (2011) also analyzed how the ELD students performed on the regular assessments. This was more feasible than in their previous study because they had five states reporting regular assessment performance data on the ELD students. However, caution is urged when comparing assessment results among states due to differences in how each state identified ELD, how each state determined which students would take the regular state
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assessment, and how each state determined which students would take the AA-AAS. On the regular state assessments, the GenEd students scored highest, with the SWD and EL students scoring lower, and the ELD students scoring the lowest. This pattern was consistent across all subjects (reading, math, and science), in all five states, and at all grade levels (high school, middle school, and elementary school). They did not analyze performance data for the AA-AAS. This is a problem because there is inconsistency in reporting between states. Some are reporting on grade level assessments and others are reporting on the AA-AAS.

There are also achievement results from the National Assessment for Educational Progress (NAEP). One issue with using this data is that the NAEP was not intended to be used as a high stakes test. For national data in math and reading, in both grades four and eight the GenEd students scored highest, with the SWD and EL groups scoring lower and the ELD group scoring the lowest (National Center for Education Statistics, 2015). This pattern is consistent across the previous six administrations of the test, in years 2013, 2011, 2009, 2007, and 2005. While this is not high stakes data used to make decisions about placement, promotion, and graduation, it does serve to support other research on high stakes tests that the achievement pattern of GenEd > EL > SWD > ELD.

Reported Issues for ELD Students. Two barriers that exist regarding states reporting of high stakes assessment results for ELD students are (1) not all the states report data, and (2) the data that are reported are reported inconsistently.

Some research has focused on the reporting of ELD scores by states. Under the IDEA, states must report performance and participation data on their students with disabilities to the federal government for accountability purposes. However, states are not required to report achievement data disaggregated for SWD with concomitant risk factors. Albus, Thurlow, and
Liu (2009) of the National Center on Educational Outcomes (NCEO) based at the University of Minnesota conducted a review of states’ reporting practices for ELD students. Their 2009 report encompassed data from the 2002-03 and 2006-07 school years from all 50 states. Albus, Thurlow, and Liu (2009) found that 20 states reported some data disaggregated for ELD in 2006-07, an increase from 2002-03 when only three states reported. This increase in 2006-07 was largely due to increased reporting of AA-AAS data, where among the 20 states that reported data, 17 did so by reporting AA-AAS data, seven reported on Title III (tests for accountability regarding EL achievement) data, and only one state reported using their regular assessment. The fact that states report in such disparate ways, or not all, is a barrier because it prevents comparisons across states.

NCEO continued in this line of research and published a similar report two years later (Thurlow, Bremer, & Albus, 2011). They again analyzed how states reported their ELD performance and participation data, including all 50 states and 11 unique states or territories (i.e., American Samoa, Bureau of Indian Education, Commonwealth of Northern Mariana Islands, U.S. Department of Defense Education Affairs, District of Columbia, Federated States of Micronesia, Territory of Guam, Republic of Palau, Commonwealth of Puerto Rico, Republic of the Marshall Islands, and U.S. Virgin Islands). NCEO found that for the 2008-09 school year five states reported data on participation and performance for all regular assessments, up from one state in 2006-07. On the AA-AAS, 20 states reported participation and performance in 2008-09, up from 14 in 2006-07. Among the unique states and territories, only one reported participation on the AA-AAS, and one reported participation on the regular assessments. The most common reporting method for participation was number of participants. The most common
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methods of reporting for performance were (1) number of students in each achievement level, basic, proficient, or advanced; and (2) the percent proficient and advanced.

Many states do not report their data disaggregated for the ELD subgroup. When states do report the data it is inconsistent, with some reporting on the grade level assessments and other reporting on the AA-AAS. They also report in different ways; some states report by how many students took the test, others report how many achieved proficient or advanced, and still others report raw scores. This myriad of reporting methods makes using the data problematic and decreases the utility of the information.

Summary

Identifying students who fall into the ELD subgroup is a very complex and challenging task requiring knowledge and experience in many different areas and input from many different people (Shore & Sabatini, 2009). After properly identifying the students as ELD, finding a teacher who is qualified to teach this population is another major hurdle (Fernandez & Inserra, 2013). However, these tasks are becoming increasingly important due to the rising number of EL students in the United States and therefore the rising number of ELD students as well (Sullivan, 2011). With the EL population growing, the issue of over-representation was studied and found to be a local, not a national phenomenon (Park, 2014). Research around the achievement of ELD students is limited, but has shown this subgroup to be low achieving, with the FARMS-ELD subgroup achieving the lowest. However, this research is inadequate in scope and leaves questions unanswered about how these vulnerable ELD students are truly performing. In-depth analyses of data from the states that are reporting on ELD students are needed as well as an increase in number of states that are reporting disaggregated data for ELD students. Increased
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Consistency of reporting among states is critical to determine the extent of the problem and how it can be best addressed.
CHAPTER III

Method

This study examined the achievement of ELD students in relation to their GenEd, EL, and SWD peers in grades three through six in Maryland on reading and mathematics high stakes assessments. The representation of EL students in special education (ELD) also was studied as well as the risk for EL students receiving special education service (ELD). Research questions investigated in this study were:

1.0 How do ELD students in elementary school perform on mathematics high stakes test in MD compared to their GenEd, EL and SWD peers?

1.1 Do ELD students from four birth year cohorts perform significantly below GenEd, SWD and EL students on mathematics high stakes tests in Maryland in grade three?

1.2 Do ELD students from four birth year cohorts perform significantly below their peers on mathematics high stakes tests in Maryland in grade three, controlling for FARMS?

1.3 Does the achievement level of ELD students from one birth year cohort on mathematics high stakes tests change over time between grades three through six?

1.4 Does the achievement level of ELD students from one birth year cohort on mathematics high stakes tests change over time between grades three through six, controlling for FARMS?

2.0 How do ELD students in elementary school perform on reading high stakes test in MD compared to their GenEd, EL and SWD peers?
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2.1 Do ELD students from four birth year cohorts perform significantly below GenEd, SWD and EL students on reading high stakes tests in Maryland in grade three?

2.2 Do ELD students from four birth year cohorts perform significantly below their peers on reading high stakes tests in Maryland in grade three, controlling for FARMS?

2.3 Does the achievement level of ELD students from one birth year cohort on reading high stakes tests change over time between grades three through six?

2.4 Does the achievement level of ELD students from one birth year cohort on reading high stakes tests change over time between grades three through six, controlling for FARMS?

3.0 Are EL students disproportionately represented in special education programs in Maryland in elementary school?

3.1 Are EL students from four birth year cohorts disproportionately represented in special education programs in the state of Maryland in grade three?

3.2 Are EL students from four birth year cohorts disproportionately represented in special education programs in the state of Maryland in grade three, controlling for FARMS?

3.3 Does the representation of EL students from one birth year cohort change in special education programs in the state of Maryland change between grades three and six?

3.4 Does the representation of EL students from one birth year cohort change in special education programs in the state of Maryland change between grades three and six, controlling for FARMS?
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4.0 Are EL students at a higher risk for receiving special education services compared to their non-EL peers in Maryland in elementary school?

4.1 Are EL students from four birth year cohorts at a higher risk for receiving special education services when compared to their non-EL peers in the state of Maryland in grade three?

4.2 Are EL students from four birth year cohorts at a higher risk for receiving special education services when compared to their non-EL peers in the state of Maryland in grade three, controlling for FARMS?

4.3 Does the risk for EL students from one birth year cohort receiving special education services when compared to their non-EL peers change between grades three and six in the state of Maryland?

4.4 Does the risk for EL students from one birth year cohort receiving special education services when compared to their non-EL peers change between grades three and six in the state of Maryland, controlling for FARMS?

Participants

The sample was composed of four longitudinal cohorts of students who had taken high stakes assessments that were tracked by the Maryland State Department of Education from enrollment through the 2013-14 school year. Students who did not take the state high stakes assessment were not included in the participant pool. Children were stratified into birth year cohorts; cohorts were constructed for typical age appropriate school progress trajectories. A typical age appropriate trajectory for Cohort 1 would be a student with a birthdate between
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September 1, 2001 and August 31, 2002; this student would be 5 years old by September 1, 2007 and eligible to enroll in kindergarten in the state of Maryland for the 2007/08 Academic Year. See Table 1 for Cohorts’ birthday ranges and typical school trajectories.

Table 1

Composition of Four Longitudinal Cohorts by Grade and Birth Year

<table>
<thead>
<tr>
<th>Birthdate Range</th>
<th>Cohort</th>
<th>Academic School Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>09/01/2001 - 08/31/2002</td>
<td>C1</td>
<td>2010/11 2011/12 2012/13 2013/14</td>
</tr>
<tr>
<td>09/01/2001 - 08/31/2003</td>
<td>C2</td>
<td>2011/12 2012/13 2013/14</td>
</tr>
<tr>
<td>09/01/2001 - 08/31/2004</td>
<td>C3</td>
<td>2012/13 2013/14</td>
</tr>
<tr>
<td>09/01/2001 - 08/31/2005</td>
<td>C4</td>
<td>2013/14</td>
</tr>
</tbody>
</table>

The first cohort (C1) was age eligible to begin kindergarten in 2007, the second cohort (C2) was age eligible to begin kindergarten in 2008, the third cohort (C3) age eligible to begin kindergarten in 2009, and the fourth cohort (C4) age eligible in 2010.

In this section, grade three data were examined to determine similarities among cohorts. C1 had 52,768 participants, C2 had 55,081 participants, C3 had 57,216 participants, and C4 had 49,538 participants for a total of 214,585 participants. Table 2 summarizes these data and includes data for grade four, five and six when available. The data set does not contain information about Part C services, birth through 2 years old, but only for Part B services, ages 3-21. Demographic data, including race, FARMS status, gender, date of birth, date of first IEP was also collected for participants. Eligible students took high stakes tests. When the distribution of disabilities was examined, 4 types of disabilities accounted for the majority (85.7%) of all the disability cases ($n = 14,588$) and were termed the high incidence disabilities. The high incidence
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disabilities were (a) speech/language impairments at 39.8%, (b) specific learning disabilities at 23.7%, (c) other health impairments at 17.6%, and (d) emotional disability at 4.7%. Autism, which is typically considered a low-incidence disability accounted for 8.9% of all participants.

Table 2

*Number of Students Receiving MSA Scores Within and Between Cohorts Across Years*

<table>
<thead>
<tr>
<th>Academic School Year</th>
<th>Grade 3 (N (%)</th>
<th>Grade 4 (N %)</th>
<th>Grade 5 (N %)</th>
<th>Grade 6 (N %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>52,766 (24.6)</td>
<td>50,163 (32.7)</td>
<td>48,897 (48.9)</td>
<td>43,987 (100.0)</td>
</tr>
<tr>
<td>C2</td>
<td>55,077 (25.7)</td>
<td>52,700 (34.4)</td>
<td>51,058 (51.1)</td>
<td></td>
</tr>
<tr>
<td>C3</td>
<td>57,204 (26.7)</td>
<td>50,402 (32.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C4</td>
<td>49,538 (23.1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>214,585 (100.0)</td>
<td>153,265 (100.0)</td>
<td>99,955 (100.0)</td>
<td>43,987 (100.0)</td>
</tr>
</tbody>
</table>

Of the 214,585 participants (all Grade 3 cohorts), 179,452 (83.6%) were GenEd, 18,115 (8.4%) were EL, 15,495 (7.2%) were SWD and 1,522 (0.7%) were ELD students. This breakdown was similar in each of the cohorts. In C1, 45,203 (85.7%) were GenEd, 3,761 (7.1%) were EL, 3,542 (6.7%) were SWD and 262 (0.5%) were ELD students. In C2, 46,267 (84.0%) were GenEd, 4,656 (8.5%) were EL, 3,822 (6.9%) were SWD and 336 (0.6%) were ELD students. In C3, 47,248 (82.6%) were GenEd, 5,144 (9.0%) were EL, 4,352 (7.6%) were SWD and 472 (0.8%) were ELD students. In C4, 40,747 (82.3%) were GenEd 4,555 (9.2%) were EL, 3,784 (7.6%) were SWD and 452 (0.9%) were ELD students.
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Racial data report for the entire study’s population 93,038 (43.4%) were White, 28,462 (13.3%) were Hispanic, 69,262 (32.3%) were African American and 23,822 (11.0%) were Asian or other races. In C1, 21,521 (40.8%) were White, 3,502 (12.5%) were Hispanic, 15,504 (32.3%) were African American and 7,605 (14.4%) were Asian or other races. In C2, 22,142 (40.2%) were White, 3,435 (13.0%) were Hispanic, 15,633 (31.9%) were African American and 8,241 (15.0%) were Asian or other races. In C3, 22,325 (39.0%) were White, 3,523 (13.4%) were Hispanic, 16,170 (32.3%) were African American and 8,740 (15.3%) were Asian or other races. In C4, 20,608 (41.6%) were White, 7,064 (14.3%) were Hispanic, 16,180 (32.7%) were African American and 5,686 (11.4%) were Asian or other races.

Students were evenly distributed across genders with 108,140 (50.4%) being male and 106,444 (49.6%) being female. In regards to FARMS status, 95,470 (44.5%) were FARMS and 119,114 (55.5%) were non-FARMS students. When the population was broken into EL and non-EL students, 19,637 (9.2%) were EL and 194,947 (90.8%) were non-EL students. For students who had a disability demographic data showed that 17,017 (7.9%) received services for a disability and 197,567 (92.1%) did not receive services for a disability.

Chi-square analysis was run for race, EL status, gender and FARMS status which confirmed that the four cohorts were similar in composition. Table 3 summarizes demographic information for the population including all cohorts. Table 4 summarizes the number and percent of participants broken down by disability type and EL status.
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Table 3

*Student Demographics in Grade 3 Only*

<table>
<thead>
<tr>
<th>Demographic</th>
<th>All Cohorts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (%)</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>93,038 (43.4)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>28,462 (13.0)</td>
</tr>
<tr>
<td>African American</td>
<td>69,262 (32.1)</td>
</tr>
<tr>
<td>Asian or other</td>
<td>23,822 (11.0)</td>
</tr>
<tr>
<td>Total</td>
<td>214,584 (100.0)</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>108,140 (50.4)</td>
</tr>
<tr>
<td>Female</td>
<td>106,444 (49.6)</td>
</tr>
<tr>
<td>Total</td>
<td>214,584 (100.0)</td>
</tr>
<tr>
<td><strong>FARMS</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>95,470 (44.5)</td>
</tr>
<tr>
<td>No</td>
<td>119,114 (55.5)</td>
</tr>
<tr>
<td>Total</td>
<td>214,584 (100.0)</td>
</tr>
<tr>
<td><strong>EL Status</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>19,637 (9.2)</td>
</tr>
<tr>
<td>No</td>
<td>194,947 (90.8)</td>
</tr>
<tr>
<td>Total</td>
<td>214,584 (100.0)</td>
</tr>
<tr>
<td><strong>Disability Status</strong></td>
<td></td>
</tr>
<tr>
<td>Disabled</td>
<td>17,017 (7.9)</td>
</tr>
<tr>
<td>Non-disabled</td>
<td>197,567 (92.3)</td>
</tr>
<tr>
<td>Total</td>
<td>214,584 (100.0)</td>
</tr>
<tr>
<td><strong>ELD Breakdown</strong></td>
<td></td>
</tr>
<tr>
<td>GenEd</td>
<td>179,452 (83.6)</td>
</tr>
<tr>
<td>EL</td>
<td>18,115 (8.4)</td>
</tr>
<tr>
<td>SWD</td>
<td>15,495 (7.2)</td>
</tr>
<tr>
<td>ELD</td>
<td>1,522 (0.7)</td>
</tr>
<tr>
<td>Total</td>
<td>214,584 (100.0)</td>
</tr>
</tbody>
</table>
Achievement and Representation of ELD Students

Table 4

*Number and Percent of all Students with a High Incidence Disability* by Cohort in Grade 3 Only

<table>
<thead>
<tr>
<th>Cohort</th>
<th>SLI N (%)</th>
<th>SLD N (%)</th>
<th>OHI N (%)</th>
<th>ED N (%)</th>
<th>LI N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>1,668 (43.9)</td>
<td>888 (23.4)</td>
<td>573 (15.1)</td>
<td>203 (5.3)</td>
<td>470 (12.4)</td>
</tr>
<tr>
<td>C2</td>
<td>1,752 (41.1)</td>
<td>959 (23.1)</td>
<td>701 (16.9)</td>
<td>183 (4.4)</td>
<td>563 (13.5)</td>
</tr>
<tr>
<td>C3</td>
<td>1,840 (38.2)</td>
<td>1,177 (24.4)</td>
<td>874 (18.1)</td>
<td>229 (4.8)</td>
<td>701 (14.5)</td>
</tr>
<tr>
<td>C4</td>
<td>1,513 (35.7)</td>
<td>1,001 (23.6)</td>
<td>839 (19.8)</td>
<td>188 (4.4)</td>
<td>695 (16.4)</td>
</tr>
<tr>
<td>Total</td>
<td>6,773 (39.8)</td>
<td>4,025 (23.7)</td>
<td>2,987 (17.6)</td>
<td>803 (4.7)</td>
<td>2,429 (14.3)</td>
</tr>
</tbody>
</table>

*Note: SLI = speech/language impairment, SLD = specific learning disability, OHI = other health impairment, ED = emotional disability, LI = low incidence including autism

Further descriptive analyses were run to describe the demographic factors broken down by subgroup. Among the GenEd students, 40.1% were FARMS, among all EL students 79.3% were FARMS, among all SWD 50.5% were FARMS and among all ELD students 79.4% were FARMS. Table 5 summarizes these data. Similar analysis was run for gender and subgroup. Among all GenEd students 48.3% were male and 51.7% were female. Among all EL students 51.6% were male and 48.4% were female. Among all SWD 70.6% were male and 29.4% were female. Among all ELD students 72.0% were male and 28.0% were female. These data were summarized in Table 6.
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Table 5

Number and Percent of Students by FARMS status and subgroup in Grade 3 Only

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>FARMS Status</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No N (%)</td>
<td>Yes N (%)</td>
<td></td>
</tr>
<tr>
<td>GenEd</td>
<td>107,394 (59.9 %)</td>
<td>72,058 (40.1 %)</td>
<td></td>
</tr>
<tr>
<td>EL</td>
<td>3,742 (20.7 %)</td>
<td>14,373 (79.3 %)</td>
<td></td>
</tr>
<tr>
<td>SWD</td>
<td>7,665 (49.5 %)</td>
<td>7,830 (50.5 %)</td>
<td></td>
</tr>
<tr>
<td>ELD</td>
<td>313 (20.6 %)</td>
<td>1,209 (79.4 %)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>119,114 (55.5 %)</td>
<td>95,470 (44.5 %)</td>
<td></td>
</tr>
</tbody>
</table>

Table 6

Number and Percent of Students by Gender and subgroup in Grade 3 Only

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>Gender</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male N (%)</td>
<td>Female N (%)</td>
<td></td>
</tr>
<tr>
<td>GenEd</td>
<td>86,747 (48.3 %)</td>
<td>92,705 (51.7 %)</td>
<td></td>
</tr>
<tr>
<td>EL</td>
<td>9,353 (51.6 %)</td>
<td>8,762 (48.4 %)</td>
<td></td>
</tr>
<tr>
<td>SWD</td>
<td>10,944 (70.6 %)</td>
<td>4,551 (29.4 %)</td>
<td></td>
</tr>
<tr>
<td>ELD</td>
<td>1,096 (72.0 %)</td>
<td>426 (28.0 %)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>108,140 (50.4 %)</td>
<td>106,444 (49.6 %)</td>
<td></td>
</tr>
</tbody>
</table>
Achievement and Representation of ELD Students

Instruments

Students were given the regular version of Maryland State Assessment (MSA) in reading and mathematics as a high stakes assessment in grades three, four, five, and six. Raw scores were created, from which students were placed into state-devised categories of Basic, Proficient, or Advanced. These exams were created under NCLB and are being phased out due to the coming of the CCSS which will be accompanied by the PARCC assessments in the state of Maryland. The MSA’s were designed to measure performance at the student, teacher, school, district, and state level so that improvements can be made based on high-quality data. The exams were created by teachers, principals and school-system staff and then subjected to many rounds of review and psychometric controls (Maryland State Department of Education, 2014) giving them high content and face validity. Data for the AA-AAS were not available.

MSA Mathematics. The MSA mathematics exam is a measure of students’ mathematics comprehension (Maryland Department of Education, 2011). It was administered yearly to nearly all students in grades three through eight since 2004. The lowest one percent of all students takes an alternative or modified assessment, but the vast majority of all students take the regular MSA. The assessment is given over the course of two days. Each day of testing consists of three sessions which are proctored by teachers or other licensed professionals in schools.

There are four types of questions on the MSA mathematics, selected response (SR), brief constructed response (BCR), extended constructed response (ECR), and student-produced responses (SPR) (Maryland Department of Education, 2011). SR and SPR responses are scored by scanning in answer sheets. The BCR and ECR responses are scored by teams of readers who are trained in how to score these types of responses. Each ECR and BCR response is read by two readers and the readers must have a certain degree of agreement to assign a score. In cases where
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differences in score are greater than one point, a third expert reviewer is called in to decide on a
final score. Inter-rater reliability is high due to the amount of training that readers receive.

Based on their final score from all mathematics sections combined, students fall into one
of three categories, basic, proficient, or advanced. Table 7 summarizes cut scores for basic,
proficient and advanced by subject and grade level.

Table 7

_Cut Scores and Proficiency Levels for Reading and Mathematics State Assessments_

<table>
<thead>
<tr>
<th>Grade</th>
<th>Reading</th>
<th>Mathematics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Scale Score</td>
<td>Scale Score</td>
</tr>
<tr>
<td></td>
<td>Proficient</td>
<td>Advanced</td>
</tr>
<tr>
<td>3</td>
<td>388</td>
<td>456</td>
</tr>
<tr>
<td>4</td>
<td>371</td>
<td>437</td>
</tr>
<tr>
<td>5</td>
<td>384</td>
<td>425</td>
</tr>
<tr>
<td>6</td>
<td>381</td>
<td>421</td>
</tr>
</tbody>
</table>

This final score is then communicated to teachers, parents, school leaders and the
students themselves. The exam is usually administered in March with results data becoming
available in June or July. These data can be used by teachers to inform practices and by guidance
counselors to aid in placement of students. However, the main purpose of the scores historically
was to determine if schools made AYP. To make AYP, each school was required to have a
certain percentage of their students in each subgroup (White, Black, Hispanic, Asian, Native
American, FARMS, EL, and SWD) score proficient or higher in both reading and mathematics.
This requirement has been phased out since Maryland was granted flexibility to not have to meet
this requirement of NCLB.
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**MSA Reading.** The MSA reading exam is a measure of students’ reading comprehension (Maryland Department of Education, 2008). It is administered yearly to nearly all students in grades three through eight since 2004. The lowest one percent of all students takes an alternative or modified assessment, but the vast majority of all students take the regular MSA. The assessment is given over the course of two days. Each day of testing consists of three sessions which are proctored by teachers or other licensed professionals in schools.

The MSA reading exam featured two types of question SR and BCR. The SR questions are scored as either being correct or incorrect by machine. The BCR responses are scored by teams of readers who are trained in how to score these types of responses. Each BCR response is read by two readers and the readers must have a certain degree of agreement to assign a score. In cases where differences in score are greater than one point, a third expert reviewer is called in to decide on a final score. Inter-rater reliability is high due to the amount of training that readers receive.

**Data Collection**

The data was collected from many sources including 1) Maryland Longitudinal Data Systems compiled at the student level 2) yearly March administrations of the MSA, 3) IDEA Part B reporting databases, and 4) from the MSDE. These data was compiled over a ten year period and involved the work of many education professionals.

**Variables**

The independent variables that were examined were (1) the subgroups, and (2) subject. The subgroups were determined by special education status and EL status. Special education status was determined by whether or not students had an IEP. EL status was determined by whether or not a student was receiving Title III services. The subjects that were tested on the
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regular MSA were reading and mathematics. Table 8 summarizes the variables and their possible values.

Table 8

*Variables and Possible Values*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Possible Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subgroup</td>
<td>GenEd, SWD, EL, ELD</td>
</tr>
<tr>
<td>Subject</td>
<td>Reading, Mathematics</td>
</tr>
<tr>
<td>Grade</td>
<td>3, 4, 5, 6</td>
</tr>
<tr>
<td>Cohort</td>
<td>C1, C2, C3, C4</td>
</tr>
</tbody>
</table>

Data Analysis

The dependent variable was the achievement on the high stakes exams which was measured at more than two points in time. This necessitated the use of a repeated measures analysis. Raw scores and proficiency rates were used to measure achievement levels. The grade levels that were analyzed were grades three, four, five, and six.

The data was analyzed using SPSS version 21.0. Descriptive statistics were run including chi-square, one-way ANOVA, repeated-measures ANOVA. Disabilities were coded and separated by high incidence disabilities versus low incidence disabilities. Data was also coded into cohorts so that analyses could be run for the different cohorts, such as running a chi-square analysis comparing the three cohorts to ensure that they were similar and differences between subgroups were not a result of cohort differences.

When determining the risk of EL students being in special education two separate analyses were used. The first was to calculate the risk of EL students being referred into special
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education. This was accomplished by dividing the number of EL students who had an IEP, by the
total number of EL students and multiplying by 100. This yielded a percentage that represented
the risk of EL students having received special education services. This risk calculation was
performed for the overall population as well as for each individual cohort.

Risk ratio was also calculated to compare the risk of EL students with the risk for non-EL
students. This was performed by calculating the risk for EL students and then calculating the risk
for non-EL students. The EL risk was then divided by the non-EL risk. This resulted in a risk
ratio. If this number was greater than one it would indicate a greater risk for EL students of being
in special education and if the risk ratio were less than one it would indicate a lower risk ratio of
EL students being in special education. This was performed for the overall population as well as
for each individual cohort.

Design

In this study the research questions will be answered with two different research designs,
longitudinal and cross-sectional. The cross sectional design will be used to answer research
questions 1.1, 1.2, 2.1, 2.2, 3.1, 3.2, 4.1 and 4.2. Data will be analyzed from all four cohorts in
grade three only. This will allow all subjects to be compared at one specific point in time, third
grade. The longitudinal design will answer research questions 1.3, 1.4, 2.3, 2.4, 3.3, 3.4, 4.3 and
4.4. It will utilize only data from C1 and will track the same subjects over four years. Data from
grades three, four, five, and six will be used to determine if and how the achievement and
representation patterns change over time.
CHAPTER IV

Results

Research Question 1.0 - Mathematics

Research question 1.0 investigated how ELD students achieved in comparison to their GenEd, EL, and SWD peers in mathematics in elementary school. This research question was addressed through four sub-questions. All four cohorts had data available for grade three so all cohorts were used in the cross-sectional analysis performed in research questions 1.1 and 1.2. Only data from Cohort 1 was used for the longitudinal analysis performed in research questions 1.3 and 1.4.

Research question 1.1 asked if ELD students performed significantly below GenEd, SWD and EL students on mathematics high stakes tests in Maryland in grade three. In mathematics, GenEd students scored the highest, with a mean scale score of 426.32, followed by EL students with a mean scale score of 399.55, SWD with a mean scale score of 390.06, and ELD students with a mean scale score of 375.41 (see table 9). All differences between groups were statistically significant at the ($F(3, 214580) = 6,283.30, p < .001$) as shown in Table 10. This finding demonstrates ELD students to be achieving significantly below all other groups, with the greatest mean difference (50.91 points) between GenEd and ELD students. ELD students in these four cohorts combined at grade three scored an average of 24.14 points below EL students and 14.65 points below SWD on the grade three high stakes reading test in Maryland.
Achievement and Representation of ELD Students

Table 9

Cross-Sectional MSA Math Scores in Third Grade for all Cohorts Combined, Comparing FARMS and Non-FARMS

<table>
<thead>
<tr>
<th>Group</th>
<th>FARMS M (SD)</th>
<th>Non-FARMS M (SD)</th>
<th>Combined M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GenEd</td>
<td>409.50 (38.70)</td>
<td>437.61 (38.52)</td>
<td>426.32 (40.98)</td>
</tr>
<tr>
<td>EL</td>
<td>396.59 (34.29)</td>
<td>410.89 (35.72)</td>
<td>399.55 (35.07)</td>
</tr>
<tr>
<td>SWD</td>
<td>377.67 (41.02)</td>
<td>402.72 (46.06)</td>
<td>390.06 (45.35)</td>
</tr>
<tr>
<td>ELD</td>
<td>373.10 (36.87)</td>
<td>384.30 (40.41)</td>
<td>375.41 (37.88)</td>
</tr>
</tbody>
</table>

Table 10

Cross-Sectional MSA Math Scores in Third Grade for all Cohorts Combined, ANOVA results

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>31,417,884.50</td>
<td>3</td>
<td>10,472,628.17</td>
<td>6,283.30*</td>
</tr>
<tr>
<td>Within Groups</td>
<td>357,649,340.48</td>
<td>214,580</td>
<td>1,666.74</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>389,067,224.98</td>
<td>214,583</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .001

Research question 1.2 investigated if ELD students performed significantly below their peers on mathematics high stakes tests in Maryland in grade three, controlling for FARMS. In mathematics, ELD non-FARMS students had a mean scale score of 384.30 which was higher than their ELD-FARMS peers who had a mean scale score of 373.10 (see Table 9). The difference between the groups was statistically significant \(F(1, 1520) = 22.04, p < .001\). See Table 11.
Achievement and Representation of ELD Students

Table 11

Cross-Sectional MSA Math Scores in Third Grade for all Cohorts Combined Comparing FARMS and Non-FARMS, ANOVA results

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>31,198.22</td>
<td>1</td>
<td>31,198.22</td>
<td>22.04*</td>
</tr>
<tr>
<td>Within Groups</td>
<td>2,151,732.65</td>
<td>1,520</td>
<td>1415.61</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2,182,930.88</td>
<td>1,521</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < .001

Research question 1.3 investigated if the achievement level of ELD students on mathematics high stakes tests changed over time between grades three through six. Only Cohort 1 had data for all four years for this analysis. Mean scale scores for mathematics across grades for all groups are presented in Table 12.

Table 12

Longitudinal Mathematics MSA Scores for Cohort 1

<table>
<thead>
<tr>
<th>Group</th>
<th>Grade Level</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3rd M (SD)</td>
<td>4th M (SD)</td>
<td>5th M (SD)</td>
<td>6th M (SD)</td>
<td></td>
</tr>
<tr>
<td>GenEd</td>
<td>432.74 (40.05)</td>
<td>441.95 (42.63)</td>
<td>434.4 (37.70)</td>
<td>422.62 (35.93)</td>
<td></td>
</tr>
<tr>
<td>EL</td>
<td>408.27 (33.20)</td>
<td>413.17 (35.72)</td>
<td>412.52 (32.13)</td>
<td>403.26 (29.12)</td>
<td></td>
</tr>
<tr>
<td>SWD</td>
<td>405.05 (41.64)</td>
<td>412.06 (44.35)</td>
<td>409.47 (38.83)</td>
<td>400.25 (34.58)</td>
<td></td>
</tr>
<tr>
<td>ELD</td>
<td>393.75 (34.98)</td>
<td>397.96 (36.45)</td>
<td>400.42 (29.96)</td>
<td>393.25 (28.94)</td>
<td></td>
</tr>
</tbody>
</table>
Achievement and Representation of ELD Students

Table 13 presents mixed model ANOVA analysis results. The difference between groups was statistically significant, \((F(3, 43114) = 379,856.70, p < .001)\).

Table 13

*Longitudinal MSA Math Scores, Mixed Model ANOVA Results*

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between-Subjects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>3</td>
<td>4,423,572.80</td>
<td>379,856.70*</td>
</tr>
<tr>
<td>Error</td>
<td>43,114</td>
<td>5,024.81</td>
<td></td>
</tr>
<tr>
<td><strong>Within-Subjects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test</td>
<td>3</td>
<td>72,196.06</td>
<td>220.41*</td>
</tr>
<tr>
<td>Test x Group</td>
<td>9</td>
<td>24,958.25</td>
<td>76.20*</td>
</tr>
<tr>
<td>Error</td>
<td>129,342</td>
<td>327.555</td>
<td></td>
</tr>
</tbody>
</table>

*p < .001

The achievement gap between ELD students and their peers in mathematics increased from grade three to grade four and then decreased between grades four and five and grades five and six. The achievement gap was highest in grade four, followed by grade three, then grade five and was the smallest in grade six. In grade six, the achievement gap between ELD students and SWD was found not to be statistically significant. All other gaps were statistically significant at the \(p < .01\) or \(p < .001\) level. Table 14 and Figure 1 summarize these data.
Table 14

Mean Achievement Gap Differences Between ELD Students and Other Groups on Longitudinal Mathematics MSA Scores for Cohort 1

<table>
<thead>
<tr>
<th>Group</th>
<th>Grade Level</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
<th>6th</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>GenEd</td>
<td>37.8**</td>
<td>42.6**</td>
<td>32.6**</td>
<td>28.9**</td>
<td></td>
</tr>
<tr>
<td>EL</td>
<td>12.4**</td>
<td>13.3**</td>
<td>10.4**</td>
<td>9.0**</td>
<td></td>
</tr>
<tr>
<td>SWD</td>
<td>9.8*</td>
<td>12.4**</td>
<td>7.4**</td>
<td>6.4</td>
<td></td>
</tr>
</tbody>
</table>

* $p < .01$
** $p < .001$

Figure 1. Longitudinal MSA Mathematics Mean Scale Scores in Grades Three through Six for GenEd, EL, SWD, and ELD students.
Research question 1.4 investigated if the achievement level of ELD students on mathematics high stakes tests changed over time across grades three through six, controlling for FARMS. Only Cohort 1 had data for all four years for this analysis. Mean scale scores for mathematics across grades for all groups are presented in Table 15. Table 16 presents the between group mixed model ANOVA results. The difference between groups was statistically significant \( F (1, 200) = 17.41, p < .001 \).

Table 15

*Longitudinal Mathematics MSA Scores for Cohort 1, ELD Students Only*

<table>
<thead>
<tr>
<th>Group</th>
<th>3rd ( M (SD) )</th>
<th>4th ( M (SD) )</th>
<th>5th ( M (SD) )</th>
<th>6th ( M (SD) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>FARMS</td>
<td>389.42 (32.99)</td>
<td>393.14 (34.83)</td>
<td>395.88 (28.54)</td>
<td>388.29 (27.37)</td>
</tr>
<tr>
<td>Non-FARMS</td>
<td>407.27 (37.83)</td>
<td>413.00 (37.65)</td>
<td>414.59 (30.15)</td>
<td>408.73 (28.48)</td>
</tr>
</tbody>
</table>

Table 16

*Longitudinal MSA Math Scores Between-Subjects Effects, ELD Students Only, Controlling for FARMS*

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>95,624,748.79</td>
<td>1</td>
<td>95,624,748.79</td>
<td>30,357.75*</td>
</tr>
<tr>
<td>Between Groups</td>
<td>54,830.54</td>
<td>1</td>
<td>54,830.54</td>
<td>17.41*</td>
</tr>
<tr>
<td>Error</td>
<td>629,985.69</td>
<td>200</td>
<td>3,149.93</td>
<td></td>
</tr>
</tbody>
</table>

*p < .001

The mean difference in achievement of ELD FARMS students and their non-FARMS peers in mathematics was 17.85 in third grade, 19.86 in fourth grade, 18.71 in fifth grade, and
Achievement and Representation of ELD Students

20.44 in sixth grade. ELD non-FARMS peers achieved higher across all grades. The gap increased 14.5% between third and sixth grade.

Research question 1.0 investigated how ELD students achieved in comparison to their GenEd, EL, and SWD peers in mathematics in elementary school. Results indicated that the achievement gap between ELD students and their peers between grade three and six narrows across grades three and six for mathematics. The gap between EL FARMS and EL non-FARMS increased slightly between grades three and six. This indicated that FARMS students fall slightly further behind their peers in mathematics in the state of Maryland as they progress from grade three to grade six.

Research Question 2.0 – Reading

Research question 2.0 investigated how ELD students achieved in comparison to their GenEd, EL, and SWD peers in reading in elementary school. This research question was addressed with four sub-questions. All four cohorts had data available for grade three so all cohorts were used in the cross-sectional analysis performed in research questions 2.1 and 2.2. Only data from Cohort 1 was used for the longitudinal analysis performed in research questions 2.3 and 2.4.

Research question 2.1 investigated whether ELD students performed significantly below GenEd, SWD, and EL students on reading high stakes tests in Maryland in grade three. In reading, GenEd students scored the highest, with a mean scale score of 431.15, followed by EL students with a mean scale score of 405.34, SWD with a mean scale score of 402.97 and ELD students with a mean scale score of 391.52 (see Table 17). All differences between groups were statistically significant \( F (3, 214580) = 5,190.32, p < .001 \) as shown in Table 18. The results indicate ELD to be achieving significantly below all other groups, with the largest mean
Achievement and Representation of ELD Students

difference, 39.63 points coming between GenEd and ELD students. ELD students in these four cohorts scored an average of 13.82 points below EL students and 11.45 points below SWD on the grade three high stakes reading test in Maryland.

Table 17

Cross-Sectional MSA Reading Scores in Third Grade for all Cohorts Combined, Comparing FARMS and Non-FARMS

<table>
<thead>
<tr>
<th>Group</th>
<th>FARMS M (SD)</th>
<th>Non-FARMS M (SD)</th>
<th>Combined M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GenEd</td>
<td>414.54 (35.37)</td>
<td>442.29 (37.00)</td>
<td>431.15 (38.81)</td>
</tr>
<tr>
<td>EL</td>
<td>403.16 (28.42)</td>
<td>413.72 (30.38)</td>
<td>405.34 (29.15)</td>
</tr>
<tr>
<td>SWD</td>
<td>394.31 (33.94)</td>
<td>411.82 (38.93)</td>
<td>402.97 (37.52)</td>
</tr>
<tr>
<td>ELD</td>
<td>390.35 (30.35)</td>
<td>396.05 (32.37)</td>
<td>391.52 (30.85)</td>
</tr>
</tbody>
</table>

Table 18

Cross-Sectional MSA Reading Scores in Third Grade for all Cohorts Combined, ANOVA results

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between</td>
<td>22,423,102.80</td>
<td>3</td>
<td>7,474,367.60</td>
<td>5,190.32*</td>
</tr>
<tr>
<td>Groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within</td>
<td>309,008,199.54</td>
<td>214,580</td>
<td>1,440.60</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>331,431,302.34</td>
<td>214,583</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < .001

Research question 2.2 investigated whether ELD students performed significantly below their peers on reading high stakes tests in Maryland in grade three, controlling for FARMS. In reading, ELD non-FARMS students had a mean scale score of 396.05 which was higher than their ELD-FARMS peers who had a mean scale score of 390.35 (see Table 17). The difference
Achievement and Representation of ELD Students

between the groups was statistically significant \((F(1, 1520) = 8.55, p < .005)\) as shown in Table 19.

Table 19

**Cross-Sectional MSA Reading Scores in Third Grade for all Cohorts Combined Comparing FARMS and Non-FARMS ELD students, ANOVA results**

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>8,093.29</td>
<td>1</td>
<td>8,093.29</td>
<td>8.55*</td>
</tr>
<tr>
<td>Within Groups</td>
<td>1,439,518.66</td>
<td>1,520</td>
<td>947.05</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1,447,611.95</td>
<td>1,521</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*\(p < .005\)

Research question 2.3 investigated whether the achievement level of ELD students on reading high stakes tests changed across time between grades three through six. Only Cohort 1 had data for all four years. Mean scale scores for reading across grades for all groups are presented in Table 20.

Table 20

**Longitudinal Reading MSA Scores for Cohort 1**

<table>
<thead>
<tr>
<th>Group</th>
<th>Grade Level</th>
<th>(3^{rd}) M (SD)</th>
<th>(4^{th}) M (SD)</th>
<th>(5^{th}) M (SD)</th>
<th>(6^{th}) M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GenEd</td>
<td></td>
<td>433.48 (37.43)</td>
<td>427.26 (38.35)</td>
<td>438.50 (36.85)</td>
<td>422.1 (34.29)</td>
</tr>
<tr>
<td>EL</td>
<td></td>
<td>411.24 (26.36)</td>
<td>401.32 (27.84)</td>
<td>413.19 (28.33)</td>
<td>400.19 (27.99)</td>
</tr>
<tr>
<td>SWD</td>
<td></td>
<td>412.69 (35.14)</td>
<td>400.98 (36.70)</td>
<td>412.25 (36.32)</td>
<td>396.12 (34.59)</td>
</tr>
<tr>
<td>ELD</td>
<td></td>
<td>406.09 (26.43)</td>
<td>391.67 (30.28)</td>
<td>404.12 (37.58)</td>
<td>387.58 (30.80)</td>
</tr>
</tbody>
</table>
Achievement and Representation of ELD Students

Table 21 presents the mixed model ANOVA analysis results. The difference between groups was statistically significant, $(F(3, 43283) = 451,473.29, p < .001)$.

Table 21

*Longitudinal MSA Reading Scores, Mixed Model ANOVA Results*

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between-Subjects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>3</td>
<td>1,881,739,051</td>
<td>451,473.29*</td>
</tr>
<tr>
<td>Error</td>
<td>43,283</td>
<td>4,168.00</td>
<td></td>
</tr>
<tr>
<td>Within-Subjects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test</td>
<td>3</td>
<td>166,030.29</td>
<td>473.67*</td>
</tr>
<tr>
<td>Test x Group</td>
<td>9</td>
<td>10,443.29</td>
<td>29.79*</td>
</tr>
<tr>
<td>Error</td>
<td>129,849</td>
<td>350.52</td>
<td></td>
</tr>
</tbody>
</table>

*p < .001

The achievement gap of ELD students and their peers in reading was largest in grade four, followed by grade six, grade five, and was smallest in grade three. All achievement gaps between ELD students and SWD, EL students, and GenEd students were found to be statistically significant, with $p < .001$ in eight of the twelve comparisons, $p < .01$ in three of the twelve comparisons and $p < .05$ for the gap in third grade between ELD students and SWD. Table 22 and Figure 2 summarize these data.
Achievement and Representation of ELD Students

Table 22

Achievement Gap between ELD Students and Other Groups on Longitudinal Reading MSA

Scores for Cohort 1

<table>
<thead>
<tr>
<th>Group</th>
<th>Grade Level</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
<th>6th</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>GenEd</td>
<td>27.4***</td>
<td>35.6***</td>
<td>34.4***</td>
<td>34.5***</td>
<td></td>
</tr>
<tr>
<td>EL</td>
<td>5.1**</td>
<td>9.6***</td>
<td>9.1***</td>
<td>12.6***</td>
<td></td>
</tr>
<tr>
<td>SWD</td>
<td>6.6*</td>
<td>9.3***</td>
<td>8.2**</td>
<td>8.5**</td>
<td></td>
</tr>
</tbody>
</table>

* p < .05
** p < .01
*** p < .001

Figure 2. Longitudinal MSA Reading Mean Scale Scores in Grades Three through Six for GenEd, EL, SWD, and ELD students.
Achievement and Representation of ELD Students

Research question 2.4 investigated how the achievement level of ELD students on reading high stakes tests changed over time between grades three through six, controlling for FARMS. Only Cohort 1 had data for all four years. Mean scale scores for reading across grades for all groups are presented in Table 23. Table 24 presents the between subjects mixed model ANOVA results. The difference between groups was statistically significant ($F(1, 199) = 3.52, p < .001$).

Table 23

*Longitudinal Readings MSA Scores for Cohort, ELD Students Only*

<table>
<thead>
<tr>
<th>Group</th>
<th>Grade Level</th>
<th>3rd M (SD)</th>
<th>4th M (SD)</th>
<th>5th M (SD)</th>
<th>6th M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FARMS</td>
<td>404.30 (26.73)</td>
<td>389.84 (28.81)</td>
<td>402.59 (27.29)</td>
<td>385.80 (30.82)</td>
<td></td>
</tr>
<tr>
<td>Non-FARMS</td>
<td>411.67 (24.90)</td>
<td>397.35 (34.15)</td>
<td>408.90 (26.86)</td>
<td>393.10 (30.34)</td>
<td></td>
</tr>
</tbody>
</table>

Table 24

*Longitudinal MSA Reading Scores Between-Subjects Effects, ELD Students Only, Controlling for FARMS*

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>94,477,497.02</td>
<td>1</td>
<td>94,477,497.02</td>
<td>44,150.57*</td>
</tr>
<tr>
<td>Between Groups</td>
<td>7,524.78</td>
<td>1</td>
<td>7,524.78</td>
<td>3.52</td>
</tr>
<tr>
<td>Error</td>
<td>425,838.73</td>
<td>199</td>
<td>2,139.89</td>
<td></td>
</tr>
</tbody>
</table>

* $p < .001$
Achievement and Representation of ELD Students

The mean achievement gap between ELD FARMS students and their non-FARMS peers in reading was 7.37 in third grade, 7.51 in fourth grade, 6.31 in fifth grade, and 7.30 in sixth grade. ELD non-FARMS peers achieved higher in all grades. The gap between ELD-FARMS and ELD non-FARMS in reading achievement on high stakes tests in Maryland remained similar between third and sixth grades.

Research question 2.0 investigated how ELD students achieved in comparison to their GenEd, EL, and SWD peers in reading in elementary school. ELD students achieved significantly below their GenEd, EL, and SWD peers in all grades in Maryland on high stakes reading tests. The achievement gap between ELD students and their peers in reading high stakes test scores was smallest in third grade. ELD FARMS students achieved significantly below their ELD non-FARMS peers in all grades in Maryland on high stakes reading tests.

Research Question 3.0 - Representation

Research question 3.0 investigated if EL students were disproportionately represented in special education programs in the state of Maryland in elementary school. This research question was addressed with four sub-questions. All four cohorts had data available for grade three which were used in the cross-sectional analysis performed for research questions 3.1 and 3.2. Only data from Cohort 1 was used in the longitudinal analysis performed in research questions 3.3 and 3.4.

Research question 3.1 investigated whether EL students were disproportionately represented in special education programs in the state of Maryland in grade three. When all four cohorts’ data were combined, 7.8% of EL students were receiving special education services while 7.9% of non-EL students receiving special education services. EL students in Cohorts 1 and 2 had slightly higher percent receiving special education services, less than one percent, than non-EL students. In Cohort 3, the percent was the same for each EL and non-EL students and in
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Cohort 4 the percent of students receiving special education services was slightly higher for EL students than for non-EL students, less than one percent. Table 25 summarizes these data.

Table 25

Percent of Students Receiving Special Education Services in Grade Three by EL Status, Cross Sectional Analysis

<table>
<thead>
<tr>
<th>EL Status</th>
<th>Cohort</th>
<th>All Cohorts</th>
</tr>
</thead>
<tbody>
<tr>
<td>EL</td>
<td>6.5 %</td>
<td>6.7 %</td>
</tr>
<tr>
<td></td>
<td>8.4 %</td>
<td>9.0 %</td>
</tr>
<tr>
<td></td>
<td>7.8 %</td>
<td></td>
</tr>
<tr>
<td>Non-EL</td>
<td>7.3 %</td>
<td>7.6 %</td>
</tr>
<tr>
<td></td>
<td>8.4 %</td>
<td>8.5 %</td>
</tr>
<tr>
<td></td>
<td>7.9 %</td>
<td></td>
</tr>
</tbody>
</table>

Research question 3.2 investigated whether EL students were disproportionately represented in special education programs in the state of Maryland in grade three, controlling for FARMS. When all cohorts were combined, the percent of students receiving special education services was similar, 7.8% for EL FARMS and 7.7% for EL non-FARMS students in grade three. Cohorts 1, 3 and 4 all had a slightly higher percent of students being in special education for EL non-FARMS students and Cohort 2 had 0.9% higher percent of students being in special education for EL FARMS students. Table 26 summarizes these data.

Table 26

Percent of EL Students Receiving Special Education Services in Grade Three by FARMS status, Cross-Sectional Analysis

<table>
<thead>
<tr>
<th>FARMS Status</th>
<th>Cohort</th>
<th>All Cohorts</th>
</tr>
</thead>
<tbody>
<tr>
<td>FARMS</td>
<td>6.4 %</td>
<td>6.9 %</td>
</tr>
<tr>
<td></td>
<td>8.3 %</td>
<td>9.0 %</td>
</tr>
<tr>
<td></td>
<td>7.8 %</td>
<td></td>
</tr>
<tr>
<td>Non-FARMS</td>
<td>6.9 %</td>
<td>6.0 %</td>
</tr>
<tr>
<td></td>
<td>8.6 %</td>
<td>9.2 %</td>
</tr>
<tr>
<td></td>
<td>7.7 %</td>
<td></td>
</tr>
</tbody>
</table>
Achievement and Representation of ELD Students

Research question 3.3 investigated if the representation of EL students changed in special education programs in the state of Maryland changed between grades three and six. Representation did change slightly between grades three and six. In grade three, there were 6.5% receiving special education services for EL students while in sixth grade there were 7.1% receiving special education services. This is an increase of 9.23% change over time in the percent of EL students receiving special education services. The percentage changed from 6.5% to 7.1%, which is a gain of 9.23%. Table 27 summarizes these data.

Table 27

Percent of EL Students Receiving Special Education Services by Grade and Cohort,
Longitudinal Analysis

<table>
<thead>
<tr>
<th>EL Status</th>
<th>Grade</th>
<th>Grade</th>
<th>Grade</th>
<th>Grade</th>
<th>3 - 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>EL</td>
<td>6.5%</td>
<td>6.2%</td>
<td>6.7%</td>
<td>7.1%</td>
<td>+0.6%</td>
</tr>
<tr>
<td>Non-EL</td>
<td>7.3%</td>
<td>6.9%</td>
<td>7.1%</td>
<td>7.1%</td>
<td>-0.2%</td>
</tr>
</tbody>
</table>

Research question 3.4 investigated whether the representation of EL students changed in special education programs in the state of Maryland changes between grades three and six, controlling for FARMS. For both EL FARMS and EL non-FARMS students, the percent of students receiving special education services increased slightly between grades three and six. For EL FARMS students, the percent of students receiving special education services increased from 6.4% in third grade to 6.9% in sixth grade. For EL non-FARMS students, the percent of students receiving special education services increased from 6.9% in third grade to 7.8% in sixth grade. EL non-FARMS students’ percent chance of receiving special education services
Achievement and Representation of ELD Students

was 0.5% higher than their EL FARMS peers in third grade and this gap increased to 0.9% in sixth grade. Table 28 summarizes these data.

Table 28

Percent of EL Students Receiving Special Education Services in Grade Three through Six by FARMS status, Longitudinal Analysis

<table>
<thead>
<tr>
<th>FARMS Status</th>
<th>Grade</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>3-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>FARMS</td>
<td></td>
<td>6.4%</td>
<td>6.0%</td>
<td>6.9%</td>
<td>6.9%</td>
<td>+0.5%</td>
</tr>
<tr>
<td>Non-FARMS</td>
<td></td>
<td>6.9%</td>
<td>6.9%</td>
<td>7.4%</td>
<td>7.8%</td>
<td>+0.9%</td>
</tr>
</tbody>
</table>

Research question 3.0 investigated if EL students were disproportionately represented in special education programs in the state of Maryland in elementary school. The data indicated that disproportionate representation was not occurring. In third grade there was only a 0.1% difference in percent of students receiving special education services between EL and non-EL students. This gap closed over time with the biggest difference in representation coming in third grade and becoming progressively smaller each year. There was only a 0.1% difference in percent of students receiving special education services for EL FARMS when compared to EL non-FARMS students. In third grade, the EL representation in special education percentage was less than the non-EL percentage; by sixth grade the representation was similar at 7.1%. For EL FARMS students, the percentage representation in special education was less than the EL non-FARMS percentage. Therefore EL students were not disproportionately represented in special education programs in the state of Maryland in grade three. EL students also were not disproportionately represented when controlling for FARMS status.
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Research Question 4.0 - Risk

Research question 4.0 investigated whether EL students were at a higher risk of receiving special education services compared to their non-EL peers in Maryland in elementary school. This research question was addressed with four sub-questions. All four cohorts had data available for grade three so all cohorts were used in the cross-sectional analysis performed in research questions 4.1 and 4.2. Only data from Cohort 1 was used in the longitudinal analysis performed in research questions 4.3 and 4.4.

Research question 4.1 investigated if EL students at a higher risk for receiving special education services when compared to their non-EL peers in the state of Maryland in grade three. When data from all four cohorts were combined, EL students have a risk ratio of 0.99. This indicates that they have the same risk as their non-EL peers for receiving special education services. In Cohorts 1 and 2, there was a risk ratio of less than one for EL students which indicates a slightly decreased risk of receiving special education services. In Cohort 3 the risk ratio was 1.0 which indicates similar risk for receiving special education services, while Cohort 4 had a risk ratio of 1.06 which indicates a very slightly increased risk for being in special education. Table 29 summarizes these data.

Table 29

<table>
<thead>
<tr>
<th>Grade</th>
<th>Cohort</th>
<th>All Cohorts</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0.89</td>
<td>0.88</td>
</tr>
<tr>
<td></td>
<td>1.00</td>
<td>1.06</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.99</td>
</tr>
</tbody>
</table>

Research question 4.2 investigated if EL students were at a higher risk for receiving special education services when compared to their non-EL peers in the state of Maryland in
Achievement and Representation of ELD Students

grade three, controlling for FARMS. Data from all four cohorts was used. EL FARMS students were at a reduced risk of receiving special education services compared to non-EL FARMS students, with a risk ratio of 0.80. EL non-FARMS students were at an elevated risk of receiving special education services compared to their non-EL, non-FARMS peers, with a risk ratio of 1.16. Table 30 summarizes these data.

Table 30

<table>
<thead>
<tr>
<th>FARMS Status</th>
<th>Cohort</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>All Cohorts</th>
</tr>
</thead>
<tbody>
<tr>
<td>FARMS</td>
<td>0.75</td>
<td>0.74</td>
<td>0.78</td>
<td>0.84</td>
<td>0.80</td>
<td></td>
</tr>
<tr>
<td>Non-FARMS</td>
<td>1.08</td>
<td>0.92</td>
<td>1.26</td>
<td>1.33</td>
<td>1.16</td>
<td></td>
</tr>
</tbody>
</table>

Research question 4.3 investigated whether the risk changed for EL students receiving special education services when compared to their non-EL peers between grades three and six in the state of Maryland. The risk ratio for Cohort 1 increased from 0.89 in grade three, to 0.90 in grade four, to 0.94 in grade five and 1.00 in grade six. This increasing trend indicated that EL students began in third grade having a slightly decreased risk for receiving special education services, but by sixth grade had a similar risk for receiving special education services as their non-EL peers. Table 31 summarizes these data.
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Table 31

*Risk Ratio of EL Students Receiving Special Education Services by Grade*

<table>
<thead>
<tr>
<th>Grade</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Ratio</td>
<td>0.89</td>
<td>0.90</td>
<td>0.94</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Research question 4.4 investigated if the risk for EL students receiving special education services when compared to their non-EL peers changed between grades three and six in the state of Maryland, controlling for FARMS. The risk ratio for FARMS students decreased across grades three and six, from 0.93 in grade three to 0.88 in grade six. The risk ratio for EL non-FARMS students receiving special education services increased across grades three and six, from 1.08 in grade three to 1.24 in grade six. The gap in risk ratios between EL FARMS and EL non-FARMS students widened across grades three and six, this gap was 0.15 in grade three and increased to 0.36 in grade six. Table 32 summarizes these data.

Table 32

*Risk Ratio of EL Students Being in Special Education by Grade and FARMS Status, Longitudinal Analysis*

<table>
<thead>
<tr>
<th>FARMS Status</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td>FARMS</td>
<td>0.93</td>
</tr>
<tr>
<td>Non-FARMS</td>
<td>1.08</td>
</tr>
</tbody>
</table>

Research question 4.0 investigated whether EL students were at a higher risk of receiving special education services compared to their non-EL peers in Maryland in elementary school.
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The risk ratio of EL students being in special education was 0.99 which indicated that there was similar risk among EL and non-EL students for receiving special education services. In the longitudinal analysis, the risk did increase slightly with grade, going from 0.89 in grade three to 1.00 in grade six. EL FARMS students had a lower risk of receiving special education services across grades. In grade three, 0.80, when compared to EL non-FARMS students, 1.16. This gap increased slightly across grades three and six, in cohort one the gap went from 0.15 in grade three to 0.36 in grade six.
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Chapter V

Discussion

This chapter is focused on interpreting and analyzing the findings of the study. Major findings for each of the research questions are presented in the first section. This is followed by a discussion of the results in relation to theories and findings of previous research. Implications for theory and practice follow, along with application of findings, limitations of the study, and recommendations for future research.

Major Findings

**Research question 1.0.** The first major research question investigated how ELD students in elementary school performed on mathematics high stakes test(s) in Maryland compared to their GenEd, EL, and SWD peers. It was answered with four sub-questions which analyzed the question from a cross-sectional and longitudinal approach. The subjects were also disaggregated by FARMS status to further investigate any differences that might have been occurring between populations.

Research question 1.1, the cross-sectional analysis, investigated if ELD students from four birth year cohorts performed significantly below GenEd, SWD and EL students on mathematics high stakes tests in Maryland in grade three. In grade three, ELD students scored 1.25 standard deviations below GenEd students, 0.67 standard deviations below EL students and 0.33 standard deviations below SWD. This indicates a significant deficit for ELD students on the first high stakes mathematics test that they took in their academic experience.

Research question 1.2, a cross-sectional analysis, investigated if ELD students from four birth year cohorts performed significantly below their peers on mathematics high stakes tests in Maryland in grade three, controlling for FARMS. Regardless of group, FARMS students scored
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significantly lower than their non-FARMS peers. This indicated that being eligible for the FARMS program added a layer of disadvantage. This disadvantage was so pronounced that ELD non-FARMS students scored higher than SWD FARMS students. SWD non-FARMS students scored significantly higher than EL FARMS students. EL non-FARMS students scored higher than GenEd FARMS students. This reproduced the trend that being FARMS eligible is a predictor of lower scores and not being eligible for FARMS is a predictor of higher scores within a student group.

When controlling for FARMS on the mathematics high stakes test in third grade, the difference between ELD and SWD was smaller. ELD FARMS students scored only 0.10 standard deviations below their SWD FARMS peers, compared to 0.33 standard deviations before controlling for FARMS. This indicates that if a student is both eligible for FARMS and has a disability, also being an English learner is not an additional disadvantage. When comparing ELD FARMS to their GenEd FARMS and EL FARMS peers, there were no changes in results when controlling for FARMS in grade three mathematics average high stakes test scores.

Research question 1.3, the longitudinal analysis, investigated if the achievement level of ELD students on mathematics high stakes tests changed over time between grades three and six. ELD students closed the achievement gap between grades three and six. The gap between ELD and GenEd students closed by 25%, between ELD and EL students by 25% and between ELD and SWD by 35%. This narrowing in the achievement gap was evidence that measures being taken in schools were successful in helping ELD students make gains in relation to their peers.

Research question 1.4, a longitudinal analysis, investigated if the achievement level of ELD students from one birth year cohort on mathematics high stakes tests changed over time between grades three through six, controlling for FARMS. The gap between ELD FARMS and
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ELD non-FARMS students on high stakes mathematics tests increased slightly between grades three and six. ELD FARMS students were 0.47 standard deviations below ELD non-FARMS in third grade, but the gap increased to 0.73 standard deviations in sixth grade. This indicated that the ELD FARMS students fell slightly further behind in mathematics achievement as they progressed from grade three to grade six. The gap between GenEd FARMS, EL FARMS and SWD FARMS students and their respective non-FARMS peers on high stakes mathematics tests did not change significantly between grades three and six.

**Research question 2.0.** The second major research question investigated how ELD students scored on high stakes tests in comparison to their GenEd, EL, and SWD peers for reading in elementary school. It was answered with four sub-questions which analyzed the question from a cross-sectional and longitudinal approach. The subjects were also disaggregated by FARMS status to further investigate any differences that might have been occurring between populations.

Research question 2.1, a cross-sectional analysis, investigated if ELD students from four birth year cohorts performed significantly below GenEd, SWD and EL students on reading high stakes tests in Maryland in grade three. The results indicated that ELD students scored significantly below their GenEd, EL, and SWD peers. While this pattern was similar to the result from the mathematics high stakes tests in research question 1.0, in reading the gaps between ELD students and their peers were slightly smaller in third grade. In grade three, ELD students performed 1.02 standard deviations below GenEd students, 0.51 standard deviations below EL students and 0.26 standard deviations below SWD.

Research question 2.2, a cross-sectional analysis, investigated if ELD FARMS students from four birth year cohorts perform significantly below their non-FARMS peers on reading
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high stakes tests in Maryland in grade three, controlling for FARMS. When controlling for FARMS, ELD scores on reading high stakes tests were again similar to the pattern in mathematics described above. Regardless of student grouping, FARMS students scored significantly lower on high stakes tests compared with their non-FARMS peers. Similar to the mathematics results, being eligible for FARMS placed students at a significant disadvantage. ELD non-FARMS students scored higher than SWD FARMS students. SWD non-FARMS students scored higher than EL FARMS students. EL non-FARMS students scored less than one point below GenEd FARMS students despite the fact that before disaggregating for FARMS GenEd scored 28 points higher than EL students.

In third grade, ELD FARMS students scored only 0.14 standard deviations below their SWD FARMS peers, compared to 0.25 standard deviations before controlling for FARMS. This follows the pattern that was observed in mathematics where students with a disability who are also FARMS students only decrease their achievement by a small amount if they have a disability.

Research question 2.3, the longitudinal analysis, investigated if the achievement level of ELD students on reading high stakes tests changed over time between grades three and six. The achievement gap between ELD students and their GenEd, EL, and SWD peers widened between grades three and six. This is the opposite of the trend seen in mathematics. The gap between ELD and GenEd students on reading high stakes test scores widened by 25%, between ELD and EL students by 145%, and between ELD and SWD by 29%. This widening of the achievement gap indicated that ELD students are falling further behind in reading as they progress from grade three to grade six in the state of Maryland.
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Research question 2.4, a longitudinal analysis, investigated if the achievement level of ELD students from one birth year cohort on reading high stakes tests changed over time between grades three through six, controlling for FARMS. The gap between ELD FARMS and ELD non-FARMS students on high stakes reading tests remained similar between grades three and six. The gap between the average scores for ELD FARMS versus ELD non-FARMS was 7.37 in third grade and 7.30 in sixth grade. This indicated that the achievement gap on reading high stakes tests between ELD FARMS students and ELD non-FARMS students was not changing between grades three and six. The gap between GenEd FARMS, EL FARMS and SWD FARMS students and their respective non-FARMS peers on high stakes reading tests did not change significantly between grades three and six.

Research question 3.0. The third major research question investigated if EL students were disproportionately represented in special education programs in Maryland in elementary school. It was answered with four sub-questions which analyzed the question from a cross-sectional and longitudinal approach. The subjects were also disaggregated by FARMS status to further investigate any differences that might have been occurring between populations. The combined results from the four sub-questions all indicate that there was not significant disproportionality in EL representation in special education programs.

For research question 3.1, the cross-sectional analysis, the results indicated that there was not significantly disproportionate representation in grade three. The proportional difference between EL students in special education programs and non-EL students in special education programs was 0.1%. This analysis had more than 214,000 participants and was a very strong indicator that disproportionality was not occurring at third grade in Maryland.
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Research question 3.2, a cross-sectional analysis, investigated if EL students were disproportionately represented, after controlling for FARMS in grade three in the state of Maryland. The proportional difference between EL FARMS students in special education programs and EL non-FARMS students in special education programs was 0.1%. These two results, from research questions 3.1 and 3.2, together provided strong evidence that EL students were well represented in special education programs in third grade in the state of Maryland, not over-represented, nor under-represented.

Research question 3.3, the longitudinal analysis, investigated if the representation of EL students in special education programs from one birth year cohort changed in the state of Maryland between grades three and six. In grade three, the EL and non-EL groups began with a slight separation in representation, 6.5% to 7.3% respectively. By sixth grade, this gap was closed as both groups had 7.1% of students receiving special education services. EL students had a slight increase, by 0.6% and non-EL students had a slight decrease, 0.2%. These relatively small gaps and changes indicated a stable pattern of representation that was not disproportionate.

Research question 3.4 was a longitudinal analysis of EL representation in special education programs in the state of Maryland, controlling for FARMS status. Results indicated that the proportional difference between EL FARMS students in special education programs and EL non-FARMS was 0.5%. This gap increased slightly to 0.9% in sixth grade. This increase was small but again indicated that there was not significant disproportionality occurring for EL students in special education programs in the state of Maryland in elementary school when the data was analyzed at any grade level 3-6, regardless of FARMS status.

Research question 4.0. The fourth major research question investigated if EL students were at a higher risk for receiving special education services compared to their non-EL peers in
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Maryland in elementary school. It was answered with four sub-questions which analyzed the question from a cross-sectional and longitudinal approach. The subjects were also disaggregated by FARMS status to further investigate any differences that might have been occurring between populations.

Research question 4.1, a cross-sectional analysis, investigated if EL students from four birth year cohorts were at a higher risk for receiving special education services when compared to their non-EL peers in the state of Maryland at grade three. The data unequivocally showed that in third grade there was no higher risk for EL students receiving special education services in the state of Maryland. The risk ratio was calculated to be 0.99. This data included over 214,000 students and is a very strong indicator that EL students in Maryland were not at an elevated risk of receiving special education services when compared to their non-EL peers.

Research question 4.2, a cross-sectional analysis, investigated if EL students from four birth year cohorts were at a higher risk for receiving special education services when compared to their non-EL peers in the state of Maryland at grade three, controlling for FARMS. Results indicated that the EL FARMS students had a lower risk of receiving special education services in third grade, 0.80 risk ratio, when compared to their non-EL FARMS peers. This indicated that if a student was FARMS and EL they were at a slightly lower risk of receiving special education services. EL non-FARMS students had a slightly elevated risk of receiving special education services in third grade, 1.16 risk ratio, when compared to their non-EL non-FARMS peers. This indicated that a non-FARMS EL student was at a very slightly increased risk of receiving special education services.

Research question 4.3 was a longitudinal design to investigate if EL students from one birth year cohort were at a higher risk of receiving special education services when compared to
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their non-EL peers, and if the risk changed between grades three and six in the state of Maryland. There was a small increase in risk between grade three and grade six from a risk ratio of 0.89 to 1.00. This indicated that the risk for EL students receiving special education services compared to their non-EL peers was largely unchanged between grades three and six.

Research question 4.4 was a longitudinal analysis to investigate if the EL students from one birth year cohort were at a higher risk of receiving special education services when compared to their non-EL peers, and if the risk changed between grades three and six in the state of Maryland, controlling for FARMS. The risk ratio for EL FARMS students decreased slightly between grades three and six, from 0.93 to 0.88. However, the risk ratio for EL non-FARMS students increased between grades three and six, from 1.08 to 1.24. These two changes together were the framework of the widening of the gap in risk ratios between EL FARMS and EL non-FARMS from 0.15 in third grade to 0.36 in sixth grade. This change indicated that by sixth grade, if a student was eligible for FARMS, being an EL student slightly reduced the risk of receiving special education services and being a non-EL student slightly increased the risk of receiving special education services.

In summary the major findings of this study included that in both reading and mathematics ELD students scored significantly below their GenEd, EL, and SWD peers at grades three through six. The one exception to this finding was that ELD non-FARMS students scored slightly higher than SWD FARMS students in both reading and mathematics. The difference between the ELD students and other groups changed between grades three and six, widening in mathematics and narrowing in reading. The findings for representation summarily indicated that there is proportionate representation in Maryland for EL students in special
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education programs. All differences in proportionate representation and risk were small between the EL and non-EL groups in grades three through six, including when controlling for FARMS.

Implications for Theory and Practice

**ELD Achievement.** ELD students have two factors that significantly reduce their chances of performing well on high stakes tests, they are English learners and they have a disability. Since nearly 60% of ELD students are also FARMS students, many have three predictors of low achievement on high stakes assessments. The results of this study confirmed those predictions and found the ELD students performed significantly below their GenEd, EL, and SWD peers in grades three through six on reading and mathematics high stakes tests in the state of Maryland. In reading, the gap widened between grades three and six, whereas in mathematics the gap narrowed between grades three and six.

Liu et al. (2005) performed a research study conducted on middle and high school ELD students in Minnesota. That study found that ELD students achieve low, significantly lower than GenEd, EL, and SWD. The results of the current study support Liu et al.’s findings. However, the Liu et al. study had an \( n = 221 \) whereas this study had an \( n = 1,522 \) and therefore this study may be more reliable. A similarity is that both studies used data from the state level, with Liu et al. using Minnesota data while this study used data from the population of the state of Maryland. The current study added on to prior research results by including elementary students and longitudinal analyses.

This current study also supported Solari, Petscher, and Folsom (2014). They analyzed data from a Florida high stakes reading assessment on over 1,000,000 students in grades 3-10 and found that ELD students scored significantly below their GenEd, EL, and SWD peers. This finding mirrors what was found in the current study. Solari, Petscher, and Folsom (2014) also
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found that being FARMS eligible was a significant disadvantage to students with ELD FARMS students scoring lower than their ELD non-FARMS peers. This finding is of great importance since 44.5% of the population in this study, over 90,000 students, was FARMS eligible. That finding was also supported by the current study; the current study added the longitudinal analysis to show how students progress over time.

**ELD Representation.** There have been many studies conducted on showing that EL students are disproportionally represented (Artiles & Harry, 2006; Nguyen, 2012; Park, 2014). Those studies found that representation varied among states, with some states having over-representation of EL students in special education programs and other states having an under-representation of EL students in special education programs (Nguyen, 2012). In particular, states that had a very high EL population tended to over-represent and states that had a very low EL population tended to under-represent (Park, 2014). Maryland falls into neither of those categories, having neither a very high nor a very low EL population and so would not be predicted to have an over-representation or an under-representation of EL students in special education programs. The results of this study were in alignment with the Nguyen (2012) study because Maryland did have proper representation of EL students in special education programs.

Chu and Flores (2012) found that the EL population, and therefore the ELD population, was growing faster than the overall school population. They found that between 1991 and 2011 the overall school population increased by 12% but the percentage of students that were EL students increased by 105% (Chu & Flores, 2012). This study also found that the EL population was increasing faster than the overall population. The overall Maryland school population increased by 1.6% percent between the first birth year cohort and the fourth birth year cohort. However, the EL population increased by 32.9% between the first birth year cohort and the
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fourth birth year cohort. This indicated that the EL population had growing needs that must be addressed by the school systems.

Artiles and Harry (2006) claimed there to be over-representation in some districts and in some schools. Those findings were not substantiated or disproven by the current study since they were beyond the scope of the research questions. The current study only investigated representation at the state level. The data that were used for this study did not identify the district or specific schools that each student attended, so answering those questions would not have been plausible.

**ELD Identification.** The findings of this study indicated that there was not significant disproportionality in relation to EL students receiving special education services in the state of Maryland in elementary school. This implied that the process that was being used to identify EL students for special education services was working well and did not need a major overhaul. There could still be some districts within Maryland that were over-representing and some that were over-representing, but that was beyond the scope of this study. Maryland could use this data to show that it has an exemplary method for identifying EL students for receiving special education services and offer assistance to states that were having difficulties with their special education identification process and representation statistics for EL students.

If the data were available at the school and district levels, it would be beneficial to know which schools and districts were over-representing or under-representing EL students in special education programs. Once the districts were identified they could be given targeted support to modify their identification process of ELD students, such as technical or financial assistance. They may need to update how students are referred to special education, or offer more specialized and focused training for teachers who have many EL students.
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Application of Findings

ELD students need the supports that are required by law in the form of special education teachers, accommodations, and specially trained EL teachers. Even with these supports ELD students are struggling to keep up with their peers. If the supports were to be taken away, ELD students would likely fall further behind as they move through school. The high stakes assessments are typically only given in English, therefore it is important for EL and ELD students to learn English as quickly as possible so that they can be fairly assessed. Having highly trained EL teachers and teachers who specialize in ELD students would enable ELD students to become fluent in English so that their abilities can be accurately measured by high stakes assessments.

High Stakes Testing Choices. During the current study, almost all students in the state of Maryland were required to take the MSA- Mathematics and MSA-Reading assessments in grades three through six (MSDE, 2014). Notable exemptions are for EL students who are in their first year in a U.S. school and students who have severe disabilities. For these students, there was the Alt-MSA, which was an alternate assessment based on alternate achievement standards (AA-AAS) (NCEO, 2013). As the PARCC assessments are implemented, the MSA will cease to be given, but the Alt-MSA will continue to be given because there are no alternate or modified versions of the PARCC assessments. This means that the difference between the assessment that is given to the exempt EL students in their first year in a U.S. school and the assessment that the vast majority of the school population are given will be very large. Schools and school districts must be increasingly careful to properly identify students as having a disability or not having a disability to prevent students from being inappropriately tested.
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Based on the results of this study, it appears that the procedures that the state of Maryland had been using to identify which students should take the regular assessment and which students should take the alternate assessment were being used correctly. Being an EL student was a disadvantage to students in the current study as they consistently scored below their GenEd peers. Also, being a SWD was a disadvantage as they consistently scored below their GenEd and EL peers. Given those two results, if ELD students are being properly identified and selected for the assessments, the ELD students should be scoring below the GenEd, EL, and SWD groups. This was the case in all grades in both subjects indicating that current policies in the state may have been appropriate and useful.

**Reporting Issues.** There have been multiple studies conducted that have found there to be issues with states reporting data on ELD students (Albus, Thurlow, & Liu, 2009; Thurlow, Bremer & Albus, 2011). The main issues have been that reporting was inconsistent and that states did not report data. In both studies mentioned above, Maryland was one of the states that did not report regular assessment data disaggregated for ELD students. This study has shown that the data were available which could have been disaggregated to report ELD student achievement. This is likely true for many other states who have not reported data viewed as “optimal.” With the advent of the PARCC assessments, results should become more transparent and easily searchable. De-identified assessment data should be disaggregated and reported at the school, district and state levels, for the 15 states participating in PARCC. This would allow for more targeted training in teacher preparation programs and in-service trainings in school districts to prevent disproportionality from occurring.

**Teacher Preparation.** Teacher preparation is a critical issue because the population of EL and ELD students has continued to grow. ELD students are a group of students with unique
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needs that in an ideal scenario should have a special education teacher and a general education teacher in each of their classes. This would be in addition to taking special EL classes with a trained EL teacher. Having their EL teacher also prepared for working with special education students would be beneficial to ELD students. This is an area of certification that does not currently exist in Maryland (MSDE, 2015) and would be beneficial to add as the EL population continues to grow.

**Increasing Numbers of Immigrants.** The percent of the U.S. population termed immigrants has steadily increased; in 1970 it was 4.7% and in 2013 it was 13.1% of the population (Migration Policy Institute, 2015). This trend was reflected in the current study through the increasing number and percent of the student population that were EL students. Between the first and the fourth cohort, the overall school population increased by 1.6% while the share of the population that was EL students increased by 32.9%. This indicated that the EL student population was becoming increasingly visible in Maryland’s public schools.

Establishing teacher preparation programs with additional certifications in EL specialties, such as teaching ELD students, is an important step before the EL population becomes too large to manage with the current teaching population. It takes years to properly prepare a teacher, to develop courses, and policies. Modifications to the current structure of teacher preparation should begin now to address the trend of increasing immigration and the increasing numbers of EL students.

**Limitations of the Study**

There are several limitations in this study. One limitation of this study is that it only used data from the state of Maryland, limiting generalizability to other states or countries. States
similar to Maryland in population, demographics, and policies may have limited generalizability, but this study applied only to Maryland.

The study also only included data from grades three through six. Any findings were specific to students in those grades. The results may hold true for students in grade kindergarten through second or from grade seven through twelve, but those conclusions cannot be reached by using data on grades three through six only.

Another limitation is this study only included test score data from the MSA. With the advent of the CCSS and the PARCC assessments, the results may change. Maryland began full implementation of the PARCC assessment in the 2014-2015 school year and the regular MSA is no longer being used. The Alt-MSA assessments were still being used.

One limitation imposed by the data was that the researcher only had data for the regular state assessment. Maryland used the Alt-MSA for its lowest achievers, such as some ELD students, but those data were not available. It would have been beneficial to have the results from the Alt-MSA to examine how those students performed relative to their peers and to know how many ELD students took that assessment. The Alt-MSA data would have allowed comparison of the ELD students to the SWD group because only students that have disabilities took the Alt-MSA.

The gate-keeper mechanism for deciding which students did or did not take the MSA was unknown for the data that were used. Whether students were permitted to simply opt out, or if a higher or lower percentage of students took the MSA each year was also not known. This mechanism may have changed over time as well as there may have been a change in policy by the Maryland State Department of Education during the four years that data for this study was collected.
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Limiting the representation sections of this study was the depth of information about each subject, specifically in regard to the school and district that each student came from. Overall representation was not disproportionate, but there may have been schools and districts that did have misrepresentation. However, since data was not available at the school and district level, an analysis of this kind was not possible.

Further limitations include that the data did not have the same number of tracking years for each cohort. Cohort one had four years of data, while cohort two had three years of data, cohort three had two years of data, and cohort four has only one year of data. Ideally, there would have been the same amount of data for each cohort so that more conclusions could be reached and generalized across all grades.

Missing students were not included in the data and could not be identified. De-identified data were obtained from the State of Maryland’s records only for those students with complete testing data; if a student did not take grade three MSA Math or Reading they were not included. The number of students in each cohort decreased between grades three and four, between grades four and five, and between grades five and six. If a new student arrived to Maryland in grade four, they would not have been included in this study, since only students who took the MSA in grade three were eligible for these longitudinal data sets.

Recommendations for Future Research

The representation section of this study could be further expanded by investigating the representation among the disability categories. That expansion was beyond the scope of this study, but would be informative to practitioners and trainers who could design training to focus on certain aspects of the identification of EL students for special education programs.
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An expansion of this study could be performed using data for grade 7-12. Notably, this study only used data from grades three through six, it would be beneficial to get more information on the achievement and representation of ELD students as they progress through the public school system from grade three through grade twelve. This study could also be repeated yearly to ensure that, as the EL population continues to grow, the representation in special education programs remains proportionate.

Given that the MSA is no longer the high stakes assessment that is given in the state of Maryland, having been replaced by the PARCC assessments, this study could be repeated using data from the PARCC instead of the MSA. Specifically data from the first year of the full implementation of the PARCC assessments could be compared to the MSA results to determine if the PARCC is producing similar results to that of the MSA. Since the PARCC is given in 15 states in the 2015-16 school year, this will allow for a better determination of how ELD students are doing nationwide.

The MSA was not available to be given in any language other than English during the study (MSDE, 2011). The only option for students whose first language was not English was to take the assessment in English. This may help to explain why EL students score below GenEd students and why ELD students score below SWD whose first language is English. Testing students in their first language on high stakes state tests is extremely challenging and costly, especially considering the wide array of languages that are spoken besides English (Artiles & Harry, 2006). At a minimum, when identifying students for an IEP, the assessment should be conducted in the student’s dominant language along with using multiple information sources. Additional evidence, besides test results can come from informal measures such as interviews, observations, questionnaires, language samples, storytelling and teacher rating (Miller, 2011).
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School staff must be careful when identifying EL students because any assessment given in the student’s non-native language can cause falsely low achievement scores and the student would appear to be disabled when the student is not.
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