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Students with Disabilities at Risk: Predictors of On-Time Graduation

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by

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DEDICATION

In dedication to my loved ones who prayed, consoled, motivated, listened, loved, placated, reassured, encouraged, and sometimes drank me though this. Know that my sincere appreciation and genuine gratefulness are yours Mom, Dad, Grandma, Kelly and Lauren.

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ABSTRACT

The deleterious effects of not completing high school in the United States and around the world in the current monetary, societal, and employment climate make efforts toward increasing graduation rates an imperative. The impetus for educational reform for improving graduation rates is even more salient for students with disabilities who graduate at lower rates than their peers without disabilities (Stetser & Stillwell, 2014). To provide the multi-tiered systems of support (MTSS) necessary to engage in this reform, data-systems with accurate and timely information are necessary. This research included construction of Hierarchical Generalized Linear Models to investigate the individual- and school-level predictor variables associated with on-time high school graduation for students with disabilities. To that end, the research examined the relationships among (1) individual student demographic background variables (2) individual academic and behavioral school related variables (3) school-wide characteristics of the schools that students in the research study attended and (4) on-time graduation as defined by the Federal Uniform Graduation Rate criteria. This research revealed significant relationships between on-time graduation and individual-level variables for students with disabilities including grade point average, attendance, and primary disability labels of Autism Spectrum Disorder and Intellectual Disabilities across grade levels. Additional significant predictors were found at specific grade levels (e.g., socio-economic status and education in a more restrictive environment). Implications for research to practice include a focus on early intervention prior to high school to increase odds of on-time graduation for students with disabilities and inclusion of additional variables for students with disabilities in Early Warning Systems (EWS). Additionally, customizing EWS

through analysis of predictor sensitivity for specific populations by school district or school was

discussed.

CHAPTER 1: INTRODUCTION

The children of today will become the leaders and laborers of the future, and quality education is imperative for these children to achieve their potential. A strong educational system results in a more successful, literate, and informed population that is better equipped for decision-making.

Former President Obama called for a "world-class education" for every child and set a goal for the United States to lead the world in college completion by 2020 (United States Department of Education, 2010). To achieve this goal efforts must include the over 6.4 million students with disabilities currently being educated in the United States (United States Department of Education, 2015a). Students with disabilities are no longer educated separately from students in general education. (Individuals with Disabilities Act, 2004; No Child Left Behind, 2001). Students with disabilities are part of the larger educational system with the same performance standards and requirements for instruction as all other students. The No Child Left Behind Act (NCLB, 2001) signifies the nation's commitment to a public school system that educates all children.

One indicator that can be used to monitor the progress toward a quality education system for all students is on-time graduation rates (Taylor et al., 2007). Low high school graduation rates result in reduced civic contributions, lower employment rates, and less fiscal support with which an economy can grow. This is particularly true for students with disabilities who already display lower academic achievement (Gleason & Dynarski, 2002; Wilson et al., 2011), and drop out at a rate of almost twice that of their non-disabled counterparts (Blackorby & Wagner, 1996).

Over 2.6 million students drop out of school each year, which is more than 7,000 students a day (Kena et al., 2014). Nationally 79% of all students graduated from high school on-time in 2011; and that means fewer than 4 out of every 5 students starting ninth grade for the first-time graduate in the expected four years (Stetser & Stillwell, 2014). The outcomes are more concerning for American Indian, Hispanic, Black, and economically disadvantaged students Moreover, students with disabilities have a lower on-time graduation rate than each of these groups with 59% graduating on-time in 2011 (Stetser & Stillwell, 2014).

Large numbers of students not completing high school have adverse effects on society that include the health care system, criminal justice system, and public assistance programs. Adults who did not complete high school have a higher likelihood of poor health (Archambault, Janosz, Fallu, & Pagani, 2009) and dependence on welfare (Belfield & Levin, 2007).

The National Longitudinal Transition Study-2 examined outcomes for young adults with disabilities. This study found that students with disabilities who complete high school are more likely to participate in community activities (Sanford et al., 2011) and are three times more likely to enroll in postsecondary education (Newman et al., 2009). Additionally, young adults with disabilities who dropped out of school had an increased likelihood of incarceration and unemployment (Sanford et al., 2011).

In addition to the societal impact, not completing high school has an adverse economic impact on the individual as well as the nation including individual taxpayers. The average annual income in 2009 for a student who did not graduate from high school was $19,540 while the average high school graduate earned $27,380 (Snyder & Dillow, 2010). The nation benefits from higher wage earners through increased purchasing power and the provision of greater tax revenue at the local, state, and national levels.

Twelve million students likely will drop out over the next decade, resulting in an economic loss to the nation of $1.5 trillion. The federal fiscal gains per additional high school graduate are approximately $115,000 over a lifetime (Belfield & Levin, 2007). The Alliance for Excellent Education (2011) estimates that if even half of the nation's high school dropouts in one school year were to graduate, it would result in approximately 54,000 jobs and an increase to the gross domestic product of approximately $9.6 billion. When students with disabilities do not graduate on-time it creates additional drains on state and national economies since students with disabilities cost significantly more to educate than students without disabilities. The additional expenditure for a student with a disability is estimated at $5,918 per student per year on average (Chambers, Shkolnik, Perez, 2003).

Resource Allocation for Student Success

Former President Obama's call for United States world-class education requires a wide range of quality instruction and intervention options to support student success and to increase on-time high school graduation rates. Students who struggle in school and are at risk for future failure will require early identification and instructional options, including interventions, to positively affect outcomes for students. This need for instruction, delivered in levels of varying intensity, has spawned the development of different instructional delivery systems, including multi-tiered systems of support (Goss & Andren, 2014). However, school systems have limited resources and must prioritize spending in a way that achieves the most impact with the fewest number of dollars. The most efficient and effective educational systems and practices use a data-based decision-making process to deliver just the right amount of instruction and interventions based on the needs of students (Hamilton et al., 2009).

Dynarski and Gleason (1998) describe a path students take toward eventual dropout with a series of possible points of intervention rather than dropout as a single high school event. The earlier students receive intervention, the easier it is to change their educational trajectory toward on-time graduation. The likelihood of success in increasing on-time graduation is exponentially greater as the time point(s) at which intervention occurs becomes earlier in student's educational career. Fewer resources are therefore required to reach the desired outcome of on-time graduation when intervention occurs at lower grade levels (Dynarski & Gleason, 1998).

Comprehensive dropout prevention planning requires early intervention to those at most risk for not graduating on-time, and this includes the accurate identification of student risk of dropout at earlier time points. Inaccurate targeting of the most at-risk students has resulted in many ineffective and fiscally inefficient attempts to intervene (Gleason & Dynarski, 1998; VanDerHeyden & Witt, 2003). Accurate targeting of the most at-risk students is the first and one of the most powerful steps leading to successful intervention (VanDerHeyden & Witt, 2003). "A large school system that invests in better data to support dropout prevention can obtain much better results for hundreds of thousands or even millions of dollars less than a similar system whose leaders decide to skip that step" (Jerald, 2006, p. 3).

Efforts to identify the most at-risk students must include students with disabilities. This is especially true now that schools are evaluated, in part, on the performance levels of specified diverse student groups, including students with disabilities (NCLB, 2001). This expectation of equal performance standards for all students places high expectations on schools and requires that schools use student-specific data to evaluate student progress to identify students at risk for failure as early as possible. The evaluation of these data allows teachers, schools, and districts to

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improve the development, implementation, and evaluation of instruction (Kennelly & Monrad, 2007).

Early Warning Systems

The need for early prediction of the students most at-risk for not graduating on-time has resulted in the use of Early Warning Systems (EWS) to allow for schools and school districts to plan allocation of resources for the neediest students at the earliest time points possible (Heppen & Therriault, 2008). The initial step in creating a program to increase graduation rates includes tracking and analyzing data that show early warning signs of students not completing high school (Kennelly & Monrad, 2007). EWS are used to inform data-based decision-making that targets resources to support students to change their estimated trajectories and to identify school climate issues. EWS reduce the enormous amounts of data to useful indicators easy for educators to use as part of a problem-solving process to provide multi-tiered systems of support (Gross & Andren, 2014).

Research out of the Chicago Consortium on School Research examined the factors present in ninth grade that predict high school graduation. Researchers identified course failures, grade point average, and absences as key factors that predict if students are on-track for graduation (Allensworth & Easton, 2007). Allensworth and Easton (2005) found that students who were on-track to graduate on-time at the end of ninth grade had at least the required credits to move to 10th grade and no more than one failing course grade. Other students were considered at-risk or off-track for on-time graduation. Seventy-eight percent of students designated as off-track did not graduate on-time. Data analysis revealed on-track status as a stronger predictor of high school graduation than demographic information and test scores combined (Allensworth & Easton, 2007).

A longitudinal study by Balfanz, Herzog, and Mac Iver (2007) found that 60% of students who would not graduate high school within one year of the expected date could be predicted using student data from sixth grade in the form of a warning system. The system utilized predictive indicators focused on behavior, attendance, and course failures.

Rationale of the Study

There are broad economic, social, and political benefits to quality education, and on-time high school graduation rates serve as a measure of the quality of educational systems. EWS that allow schools to predict which students will graduate on-time provide valuable data that can be used as part of a multi-tiered system of support to provide early intervention parsimoniously for the most at-risk students.

Many studies have examined risk factors for high school dropout and lack of on-time high school completion. Research has examined the student variables individually that predict high school graduation for students with and without disabilities including passing high stakes tests (Massey, 2010), school engagement (Reschly & Christenson, 2006), school mobility (Sinclair et al., 1994; Wagner, 1995), attendance (Balfanz et al., 2007), GPA, disciplinary suspension, grade retention (Zablocki & Krezmien, 2013), and race or ethnicity (Gonzalez, 2007; Zablocki, 2010). In addition, school variables that may predict graduation of students who attend that school have also been examined including test scores, rate of retaining students in the same grade, school attendance rate, suspension rate, and school ethnic make-up (Christle, Jolivette, & Nelson, 2007). Additional predictors specific to students with disabilities have also been studied including the setting the student is served in for Exceptional Student Education (Gonzalez, 2007), time educated with general education peers (Rudloff, 2015), and disability category (Gwynne, Lesnick, Hart, & Allensworth, 2009; Zablocki, 2010).

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Recently there have been longitudinal studies examining the factors that contribute to graduation and off-track status in high school. While many studies identify having a disability as a risk factor, few studies have examined the variables associated with high school graduation as a group of predictor variables within the students with disabilities population (Wilkins & Huckabee, 2014). Early Warning Systems (EWS) have been applied unilaterally, and separate EWS have not been examined for students with disabilities. There has not been a longitudinal examination of off-track status and on-time high school graduation for students with disabilities. In particular, studies have not described the relationship among off-track status starting in 6th grade, school-level variables, individual student variables, and on-time graduation for students with disabilities to identify the high yield indicators for on-time graduation in this population.

The following research question was examined: What is the relationship between student level variables (e.g., language proficiency, disability category) and school level variables (e.g., race/ethnic composition, school grade) and on-time graduation for students with disabilities?

CHAPTER 2: LITERATURE REVIEW

This chapter begins with a description of the risks associated with not graduating high school on-time and the risks for students with disabilities (SWD) in particular. The typical methods for identifying students at-risk are described followed by a discussion of the factors that indicate higher risk of not completing high school on-time or dropout with a focus on SWD. This chapter ends with a description of Early Warning Systems (EWS) that use risk factors within a system to predict if a student will graduate. The current use of EWS systems in schools is included.

SWD Defined

This study defines SWD as students having an identified Exceptional Student Education (ESE) disability or a disability under the Americans with Disabilities Amendments Act of 2008's section 504. Almost 6.5 million U.S. youth age 3 – 21 years or about 13% of all U.S. public school students in 2014 had an identified ESE disability (Snyder, de Bray, & Dillow, 2016). Additionally, another 1.5% of U.S. students in kindergarten through twelfth grade have been identified with a disability under the Americans with Disabilities Amendments Act of 2008's Section 504. The percentage of the overall student enrollment served under Section 504 varies widely among states from 0.4% in New Mexico and Wisconsin to 4.8% in New Hampshire (Advocacy Institute, 2015).

The Education for All Handicapped Children Act (EHA) was in place from 1975 to 1990. The EHA was reauthorized with a name change to the Individuals with Disabilities Act in 1990,

and was most recently reauthorized as the Individuals with Disabilities Improvement Act (IDEIA) in 2004. The IDEIA (2004) provides eligible students with disabilities ages 3 – 21 the right to a free and appropriate education based on individual needs in the least restrictive environment. ESE disabilities exist in sixteen categories in the state of Florida (Florida Department of Education, 2016). Students who qualify for ESE in the Gifted category are not included as part of this study.

Students qualifying with a disability under Section 504 have a substantially limiting disability that does not require an Individual Education Plan under the IDEIA (2004). A Section 504 plan is intended to provide protections against discrimination and allows for the inclusion of legally guaranteed accommodations. The purpose of these accommodations is to account for the disability to allow for maximum access to instruction and feedback (U.S. Department of Education Office of Civil Rights, 2015).

SWD At-Risk

Research has consistently shown that SWD graduate at lower rates than students without disabilities (Gwynne et al., 2009; Wagner, 1993). According to a 2010 report from the U.S. Department of Education, 75% of students graduated with a regular diploma in 2005, while only 46% of students identified with a disability under IDEIA graduated with a regular diploma the same year (Blackorby et al., 2010). During the 2012-2013 school year about 396,000 students ages 14 to 21 who qualified to receive services under IDEIA exited high school. Sixty-five percent of these students graduated with a regular diploma, 14% did not meet standards for graduation but received a special diploma or alternative certificate, 19% dropped out, 1.5% reached the maximum age for services, and less than 0.5% died (Snyder et al., 2016).

Methods for Identifying At-Risk Students

Students who struggle in school and are at risk for future failure will require early identification and instructional options, including interventions, to positively affect outcomes. This need for instruction, delivered in levels of varying intensity, has spawned the development of different instructional delivery systems, including multi-tiered systems of support (Gross & Andren, 2014). However, school systems have limited resources and must prioritize spending in a way that achieves the most impact with the fewest number of dollars. Traditionally referral by teachers was the most common method for identification of students at-risk. Teachers have the most contact with students during the school day and some research has demonstrated the accuracy of teacher evaluation of student academic and behavior functioning (Elliot, Huai, & Roach, 2007). However, other studies have found that teacher reports lack predictive accuracy for future student events including dropout (Ollendick, Greene, Weist, & Oswald, 1990; VanDerHeyden & Witt, 2005).

Ollendick, Greene, Weist, & Oswald (1990) found that teacher nominations of at-risk children overidentified the number of students who would have future difficulties. Although most of the students who later committed a criminal offense or dropped out of school were among those identified as at-risk by teachers, 84% of those nominated did not engage in these behaviors suggesting a high level of error in teacher nomination.

VanDerHayden and Witt (2005) found that teacher nomination was not as accurate as relying on data to screen for students at-risk. The researchers posit that teacher nomination is influenced by factors in the environment that make teacher referrals inaccurate when compared with data-based screening methods. Identifying only the most as-risk students allows for fewer resources to have a greater impact on student outcomes by targeting only those students who

would benefit most. Therefore, the use of data based on screening for at-risk students may be more cost effective and successful in changing directories for student outcomes.

Dynarski and Gleason (1998) found that progress for dropout prevention based on individual descriptive data overidentified students without need for the programs and underidentified students that might have benefited. Therefore, Dynarski and Gleason (1998) recommend multiple indicators of risk be used to identify students at-risk for dropout. The need for screening based on multiple sources of data to more clearly and comprehensively predict dropout has been established (Battin-Pearson et al., 2000). However, Suh and Suh (2007) suggest caution with comprehensive models of prediction that may be too broad or cumbersome to lead to effective intervention development. In addition, a longitudinal examination of data allows for identification of risk earlier in students' school careers when intervention is more effective (Alexander, Entwisle, & Kabbani, 2001; Dynarski & Gleason, 1998). Overall, to provide interventions to increase on-time graduation with the greatest effectiveness it is imperative that at-risk students are identified in the most accurate and timely manner possible; the use of data-based screening with multiple variables are required.

Risk Factors

No one risk factor accurately predicts dropout, and the accuracy of dropout prediction increases with the use of multiple factors. A number of studies have focused on the identification of risk factors that are associated with high school dropout (Allensworth and Easton, 2007; Hammond, Linton, Smink, & Drew, 2007; Hernandez, 2011; Wood, Kiperman, Esch, Leroux, & Truscott, 2017). In particular, the National Dropout Prevention Center (2007) compiled 21 studies that met rigorous criteria for analysis focused on factors influencing high school graduation or dropout over almost 30 years. This study categorized factors related to school

dropout into categories including individual, school, family, and community factors. The results of this study focused on the individual and family domains include 25 significant risk factors for dropout including having a learning disability or emotional disturbance (Hammond, Linton, Smink, & Drew, 2007). Other factors included areas of poor school engagement (poor attendance, low educational expectations, lack of effort, low commitment to school, no extracurricular participation), school performance (low achievement, retention/over age for grade), school behavior (misbehavior, early aggression), family background characteristics (low socioeconomic status, high family mobility, low education of parents, large number of siblings, not living with both natural parents, family disruption), and family engagement (low educational expectations, sibling dropped out, low contact with school, lack of conversations about school). The current study categorized the factors associated with dropout in a similar fashion.

While abundant research has focused on individual factors as predictors of high school completion or dropout, Bronfronbrenner (1979) explained how social systems (e.g., school) interact with individual factors and experiences to affect development and outcomes (e.g., graduation). Therefore, in addition to individual variables, recent studies have taken a more ecological approach analyzing the predictive power of variables related to the schools in which students are educated to account for both personal and contextual variables on outcomes for students (Goldschmidt & Lang, 1999; Speybroeck, Boonen, & Bilde, 2012; Rumberger, 1995; Rumberger & Thomas, 2000). Limited research has examined the complex interactions among individual- and school- level variables for not graduating from high school. To this end recent studies have examined both individual- and school-level factors longitudinally within the same prediction models to more closely examine the concurrent effects of individual and school related variables (Brundage, 2013; Wood et al., 2017).

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Risk Factors for SWD

Most of the research focused on risk factors associated with the lack high school completion or dropout has involved whole student populations rather than the risk factors for a specific subgroup such as students with disabilities (Hammond et al., 2007; Wood et al., 2017). Several studies have shown having a disability as related to high school dropout (Gwynne et al., 2009; Ingrum, 2006; Wagner, 1993). Few studies have focused on the risk factors specifically for SWD; but three longitudinal data sets have been utilized over the last decade to examine the risk factors for SWD dropping out of high school (Gwynne et al., 2009; Reschly and Christenson, 2006; Zablocki & Krezmien, 2013).

Using data from the National Longitudinal and Transitional Study 2 (NLTS2), Zablocki and Krezmien (2013) examined relationships between possible risk factors found in general population research and the relationship of those factors to dropout for SWD in particular. The research included data from a nationally representative sample of more than 11,000 SWD ages thirteen to seventeen from 2000 to 2010. In total 12.5% of students in this sample reported dropping out of high school. Logistic regression analysis of parent and student interview data and direct assessments were used to predict dropout using individual student background characteristics and academic related factors. The researchers found that increased odds of dropping out were associated with low academic achievement, grade retention, school suspension, emotional engagement, lower than average household income, and being female (Zablocki & Krezmien, 2013).

Also, using the NLTS2 data set of students receiving special education services Doren, Murray, and Gau (2014) examined individual and school-level variables using univariate and recursive multivariate logistic regression. This research identified the variables most predictive

of dropout for SWD in this sample including individual factors (grades, engagement in high risk behaviors), parent expectations, and quality of the students' relationship with teachers and peers.

Gwynne et al. (2009) utilized data from the Consortium on Chicago School Research to delineate indicators that increase risk of dropping out for students in special education and students two or more years behind academically. The possible indicators were examined for students in 9th grade with and without disabilities including learning disabilities, mild cognitive disabilities, and emotional disturbances. Students with physical/sensory disabilities and students with speech and language disabilities were not included in the analyses. The complete data set including all students (not solely SWD) found that 9th grade course failures, absences, grades, and on-track status were predictors of being at-risk of dropping out (Allensworth and Easton, 2007). Gwynne et al. (2009) found that the same indicators could be used for students with disabilities to predict risk of dropping out. In this study absences during the 9th grade year were the largest predictor of dropout.

Reschly and Christenson (2006) examined data from the National Educational Longitudinal Study for students identified by their parents as having a learning disability or serious emotional disturbance and average-achieving peers from eighth grade to twelfth grade. This study utilized a multivariate analysis of variance and stepwise linear regression to analyze demographic (grade retention, socioeconomic status, standardized test scores) and student engagement data to predict dropout. Data came from reports by students, parents, teachers, and school administrators. Although effect sizes were small, significant predictors of dropout for students with disabilities in this study included absences, behavior, retention, and perception of school warmth (Reschly & Christenson, 2006).

Research on the predictors of school dropout and the indicators associated with on-track status for graduation in the general student population is abundant (Brundage, 2013; Hammond et al., 2007; Rumberger & Thomas, 2000, Stillwell, Sable, & Plots, 2011). The longitudinal studies focused on students with disabilities described here as well as other correlational research have identified variables associated with graduation and specific to SWD populations as well as overall school populations. These variables can be categorized as individual risk factors that include unalterable demographic variables, other student variables, and school-level risk factors. Selected individual and school level variables are described in the following sections based on previous research of both populations of SWD and general populations.

Individual Risk Factors

Numerous studies have identified individual risk factors associated with not graduating on-time and dropout. These factors include both static demographic factors and malleable academic and behavioral factors. For the purposes of the current study, additional ESE specific factors are included.

Background Characteristics

Specific background characteristics including low socioeconomic status, ethnic or racial minorities, and English language learners have been associated in the literature with decreased odds of school completion for the general student population (Alexander et al., 2001; Battin-Pearson et al., 2000; Hernandez, 2011; Lopez, 2009; Stillwell et al., 2011). Gwynne et al. (2009) found that background factors including race, gender, socioeconomic status account for 20% of the performance gap between students with emotional disturbances and students with no identified disability. These factors explain 50% of the gap for students with mild cognitive disabilities (Gwynne et al., 2009). The research examining background characteristics that

predict high school graduation has garnered mixed results. Although there are correlations between background characteristics and the likelihood SWD dropping out of school, these characteristics frequently provide no unique predictive value as part of a logistic regression model that includes other salient predictors (Doren et al., 2014).

Socio-economic status. Findings of the National Longitudinal Transition Study of Special Education Students indicate that 68% of high school students with disabilities came from households with yearly incomes less than $25,000 as compared to 40% of their nondisabled peers (Wagner, 1995). According to the National Center for Educational Statistics (NCES), approximately 21% (10.9 million) of school age children were living in poverty in 2013. During the 2013/2014 school year over 25 million public school students were eligible for free or reduced lunch based on family size and income, which is over half of enrolled students nationwide (Snyder, et al., 2016).

Steinberg, Lin Blinde, and Chan (1984) summarized that almost every reviewed study that included a measure of socioeconomic status related to dropout found that students from lower SES families dropped out at a higher rate than students from higher income families. Additionally, longitudinal studies confirm the finding that experiencing poverty or coming from a low SES household is associated with lower graduation rates than students without similar experiences (Alexander, Entwisle, & Horsey, 1997; Hernandez, 2011). Brundage (2013) used multilevel regression analysis to examine longitudinal data and found SES level, as defined by eligibility for free and reduced lunch, to be a significant predictor of off-track status across several time points from sixth to tenth grade including the end of tenth grade (last time point measured).

For students with disabilities in particular, Ingrum (2006) utilized data from the National Longitudinal Survey of Youth for over 9000 students identified as having a learning disability to examine associations between SES and dropout rate. In this study, a learning disability was more broadly defined to include students with learning and/or attention problems that limit a student's daily activities or schoolwork. In this study students with learning disabilities (as defined) and students with lower SES dropped out at higher rates than learning disabled students with higher SES (Ingrum, 2006).

Zablock and Krezmien (2013) demonstrated that lower than average household income was associated with higher dropout rates for SWD. The researchers defined SES using reported household income defined across sixteen categories in $5000 increments (Zablock & Krezmien, 2013). In contrast, another study used a linear discriminant function with records for 313 students with learning disabilities and found no significant differences between high school graduates and noncompleters in terms of free or reduced lunch status (Kortering, Haring, & Klockars, 1992). Research by Doren et al. (2014) did not find any unique contribution of SES to the prediction of high school dropout for students with learning disabilities.

Racial/ethnic classification. During the 2013-2014 school year 17% of American Indian/Alaskan Native students, 15% of Black students, 13% of White students, 12% of students of two or more races, 12% of Hispanic students, 11% of Pacific Islander students, and 6% of Asian students ages 3 – 21 were served in U.S. schools under IDEIA (Snyder et al., 2016). Although there is some variance by state, the national percentage of students served under Section 504 of each race/ethnicity is commensurate with the percentage of students of each race/ethnicity in the overall enrollment for most race categories (e.g., 2.6% of total enrollment is students from two or more races and 2.5% of students with a 504 plan are from two or more

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races). However, analysis by state suggests persistent underrepresentation of Hispanic students and overrepresentation of White students (Advocacy Institute, 2015).

There is an abundance of research about school completion relative to ethnicity dating back to the 1980's (Snyder & Hoffman, 1995; Hess, 1986). The data have been mixed for the studies including the general population of students. Studies have found significant differences between the graduation rates for students from differing ethnic backgrounds (Hernandez, 2011; Rumberger, 2012; Rumberger & Thomas, 2000). However, when other background characteristics were controlled for, some studies found no significant differences (Carpenter & Ramirez, 2007; Rumberger, 1995).

For students with disabilities in particular, most research involving regression equations with multiple variables has found no significant relationship between race/ethnicity and whether or not a student graduates. Wood et al. (2017) found that when controlling for other student variables the only significant relationship between dropout and ethnicity was for Hispanic students. However, when school level variables were added race/ethnicity was not a significant predictor for any group (Wood, et al., 2017). Zablocki and Krezmien (2013) found that Black and Native American students dropout at higher rates than white students. However, in the logistic regression models used, ethnicity was not a significant predictor of dropout when other factors were considered. In addition, another study found no significant differences between White students with learning disabilities and students with learning disabilities from other races in terms of completing versus not completing high school (Kortering, et al., 1992). In his dissertation, Singleton (2014) used multiple regression analysis with data for students with disabilities in one school district in the 10th grade from 2006 – 2010 and found that ethnicity was

not a significant predictor of dropout. Doren et al. (2014) found that ethnicity does not uniquely contribute to the prediction of dropout for students with learning disabilities.

Language proficiency. Designation as limited English proficient or an English Language Learner (ELL) is defined by criteria set as part of No Child Left Behind (NCLB) of 2001. This designation takes into account information such as age, birthplace, ethnicity, native language, dominant language in home or community, migratory status, and limitations to educational achievement or participation in society. An estimated 4.5 million or 9.3 percent of the U.S. public school student population participate in programs for English Language Learners (Snyder et al., 2016).

Studies conducted with general populations that include SWD have found ELL achieve at lower rates academically and dropout at significantly higher rates than nonELL peers (Ruiz-de-Velasco & Fix, 2000; Gwynne, Pareja, Ehrlich, & Allensworth, 2012). Although research has not focused on students with disabilities who are also English Language Learners, Doren et al. (2014) found that language proficiency provided no unique contribution to the prediction of dropout within a prediction model for students with learning disabilities.

Unalterable student background characteristics have proven complicated and inconsistent predictors of high school graduation. The next section focuses on alterable factors that can be included as part of intervention strategies designed to change trajectories of outcomes for students.

Individual Academic and Behavioral Related Factors

Research has demonstrated the predictive power of several specific individual risk factors for the general population in relation to high school graduation. These factors include academic performance, absences, and behavior problems (Allensworth & Easton, 2007; Bowers, 2010;

Hernandez, 2011; Janosz, et al., 1997). However, these factors have been inconsistent in predicting whether or not SWD will graduate (Bear, Kortering, & Braziel, 2006; Doren et al., 2014; Reschley & Christianson, 2006; Zablocki & Krezmian, 2013)

Previous off-track status. Research out of the Chicago Consortium on School Research examined the factors present in ninth grade that predict high school graduation. Researchers identified course failures, grade point average, and absences as key factors that predict if students are on-track for graduation (Allensworth & Easton, 2007). Allensworth and Easton (2005) found that students who were on-track to graduate on-time at the end of ninth grade had at least the required credits to move to 10th grade and no more that one failing course grade. Other students were considered at-risk or off-track for on-time graduation. Seventy-eight percent of students designated as off-track did not graduate on-time. Data analysis revealed on-track status as a stronger predictor of high school graduation than demographic information and test scores combined (Allensworth & Easton, 2007).

Brundage (2013) found that the previous off-track status of a student predicted future off-track status at several time points from sixth to tenth grade. This includes 57% greater odds of being off-track at the end of tenth grade (last point measured in this study) if off-track at the end of sixth grade. In addition, the total number of semesters a student was considered off-track was a significant predictor of off- track status at the end of tenth grade (Brundage, 2013).

A longitudinal study by Balfanz et al., (2007) found that 60% of students who would not graduate high school within one year of the expected date could be predicted using student data from sixth grade in the form of a warning system. The system utilized predictive indicators focused on behavior, attendance, and course failures.

Gwynne et al. (2009) found ninth grade on-track status to be as predictive or more predictive of graduation within five years for students with disabilities than the general student population despite students with disabilities having lower overall graduation rates. Both course failures and absences showed strong relationships with graduation rates in this study.

Reading performance. Reading performance is used to make high stakes educational decisions for students including third grade reading scores determining promotion to fourth grade, and high school reading scores have been used to make decisions about graduation (International Reading Association, 1999).

Fifty-seven percent of third grade students and 55% of students taking the 10th grade test passed the Florida Comprehensive Assessment Test (FCAT) 2.0 in 2014 (last year FCAT was used) with a proficient score of 3 or above. Forty-seven percent of third grade students who qualify under Section 504 scored proficient or better on the third grade FCAT, and 52% of students who qualify under Section 504 scored proficient or better on the tenth grade FCAT in 2014. For students who qualified with a disability under IDEIA in any area other than gifted the statistics are much worse. Twenty-six percent of third grade students receiving ESE services and 24% of students taking the 10th grade test scored proficient or above on the FCAT (Florida Department of Education, 2015b).

The Early Warning! Why Reading Matters by the End of Third Grade report focuses on the importance of proficient reading by the end of third grade to allow students to acquire skills and access content that are necessary in subsequent grades (Fiester & Smith, 2010). Third grade reading scores are highly correlated with later reading success (Francis, Shaywitz, Stuebing, Shaywitz, & Fletcher, 1996).

Lesnick, George, Smithgall, and Gwynne (2010) analyzed the data for students in Chicago Public Schools. Researchers found a 45% rate of graduation within five years for students reading below grade level compared to 60% of students with grade level reading skills and 80% of students reading above grade level graduating within five years of entering high school. Hernandez (2011) summarized the research using reading skills to predict graduation stating that students struggling in reading make up approximately one-third of the total student population and comprise more than three-fifths of students who do not graduate.

For SWD in particular, several studies have found no significant differences between the academic achievement (e.g., scores on standardized individual measures of achievement) of students with disabilities who graduate and those who dropout (Bear et al., 2006; Blockorby & Kortering, 1991; Kortering et al., 1992). In particular, no significant differences between students with learning disabilities who are high school graduates and those who are noncompleters in terms of reading ability was found as measured by the Wide Range Achievement Test (Kotering, et al., 1992).

Grade point average (GPA). The preponderance of research has found grades to be a significant predictor of whether a student will graduate from high school (Allensworth & Easton, 2005; Balfanz, et al., 2007; Bowers & Sprott, 2012).

Students who dropout also report the primary reason for leaving school is low academic performance or failure (Bridgeland, Dilulio, & Burke Morison, 2008; Ekstrom, Goertz, Pollack, & Rock, 1986). Additionally, Johnson and Semmelroth (2010) found overall GPA to be the single strongest predictor of dropout. Bowers (2010) touted non-cumulative GPA as a better predictor of dropout than all other variables studied. Allensworth and Eaton (2007) found that

80% of graduates of Chicago Public Schools are predicted by GPA and a failing grade in any content area predicted dropout.

Research examining the relationship between GPA and graduation for SWD has also found GPA to be a significant predictor of graduation. Zablocki and Krezmien (2013) reported that the likelihood of dropout was 69% lower for students with disabilities who reported getting mostly As and Bs than students who reported having mostly Ds and Fs. Gwynne et al. (2009) found GPA to be a strong predictor of graduation within five years of entering high school for students in all special education categories. More than 83% of students with mild cognitive disabilities and 86% of students with learning disabilities with a GPA of 2.5 or higher graduated within five years. Conversely, only 25% - 33% of students with a 1.0 GPA or lower graduated in five years (Gwynne et al., 2009). Doren et al. (2014) examined grades as a possible predictor of dropout for students with learning disabilities. The grades variable was based on student, teacher, and school responses about whether the majority of student grades were As and Bs, Bs and Cs, Cs and Ds, or Ds and Fs. The researchers found that grades were a significant predictor of dropout and for each unit of grade increase odds for student dropout decreased by 96% in the final regression model (Doren et al., 2014).

Discipline incidents. Studies have demonstrated that discipline problems in school are associated with future dropout (Carpenter & Ramirez, 2007; Hickman & Garvey, 2006). In particular, behavior incidents occurring in sixth grade are predictive of eventual dropout (Balfanz et al., 2007; Jimerson, Egeland, Sroufe, and Carlson, 2000). Balfanz, Byrnes, and Fox (2012) analyzed data from more than 180,000 ninth grade students in Florida and found that each suspension incurred corresponded to a 20% decrease in the likelihood of on-time graduation.

Zablocki and Krezmien (2013) found that dropout for students with disabilities was three times as likely for students who reported ever being suspended or expelled.

Attendance. Research has found attendance to be a significant predictor of high school graduation (Balfanz et al., 2007; Gwynne et al., 2009). Researchers identified absences as one of the key factors that predict if students are on-track for graduation (Allensworth & Easton, 2007). A longitudinal study by Balfanz et al., (2007) found that 60% of students who would not graduate high school within one year of the expected date could be predicted using student data from sixth grade in the form of a warning system that included attendance. Gwynne et al. (2009) found attendance in the ninth grade showed a strong relationship with graduation rates.

School transitions. Several studies have linked changing schools even once for any reason other than promotion to the next grade with increased risk for not graduating from high school (Kaufman, Bradbury, & Owings, 1992; Gleason & Dynarski, 2002; Rumberger, 1995). Rumberger & Larson (1998) analyzed data from over 11,000 students in the NELS data set and found only 8% of students who never changed schools dropped out by twelfth grade compared to 25% of students with two or more school changes. In addition, the majority of students who dropped out changed schools at least once. With respect to SWD in particular, Kortering, Haring, and Klockars (1992) found the number of school transitions was significantly higher for students with learning disabilities who dropped out of school than for students with disabilities who graduated.

Additional Student Variables Associated with ESE

Disability category. During the 2013/2014 school year almost 6.5 million students were served under IDEIA with over 2.2 million being specific learning disabled and 1.3 million students having a speech or language impairment. Over 800,000 students were other health

impaired; 538,000 had an autism spectrum disorder label; 425,000 had an intellectual disability; and 354,000 had an emotional disturbance (Snyder et al., 2016).

Research indicates that students who qualify for ESE services with an emotional and behavioral label are less likely to graduate than other categories under IDEA (Smith, Manuel, Stokes, 2012; Wagner, 1991). In the National Longitudinal and Transitional Study 2, Zablocki and Krezmien (2013) found disability to be a significant predictor of dropout. The researchers found that students with an emotional behavior disability were more likely to dropout than students with a learning disabled label. Students with low incidence disabilities (hearing impairment, visual impairment, orthopedic impairment, autism spectrum disorder, traumatic brain impairment, multiple disabilities) were less likely to dropout than students with learning disabilities. However, predictive power was not significant when grades, suspension history, grade retentions, and emotional engagement were included in the logistic regression analysis (Zablocki & Krezmien, 2013).

Educated with general education peers. From the 1990-1991 to the 2013-2014 school year students age six to twenty–one served under IDEA who spent at least 80% of the school day with general education peers increased from 33% to 62%. In 2013, 87% of students with speech or language impairments, 68% of students with specific learning disabilities, and 65% students with other health impairments spent most of the school day with general education peers. Conversely, 49% of students with intellectual disabilities, 46% of students with multiple disabilities, and 33% of students with autism spectrum disorders spent less than 40% of the instructional day in classes with general education peers (Snyder et al., 2016).

Research focused on the time students with ESE are educated with general education peers has found better attendance, academic achievement, and behavior for students educated

with general education peers; these factors have been empirically linked to greater odds of graduation (Cosier, Cauton-Theoharis, & Theoharis, 2013; Rea et al., 2002). Dissertation research by Rudloff (2015) examined the percentage of time students with disabilities spend with their general education peers related to student success. The researcher found lower dropout rates associated with more time spent with general education peers. However, the increase in amount of time educated with peers in general education did not improve graduation rates for students with SWD in Georgia. Graduation rates for SWD remained stable as graduation rates for general education students increased when procedures changed requiring students with disabilities to spend at least 80% of instructional time with general education peers in Georgia (Goodman, Hazelkorn, Bucholz, Duffy, & Kitta, 2011).

Years of disability services. The long-term effects of the age at which students were identified with a disability or the number of years of services received related to the disability has not been a common topic of research. However, early intervention for both academic and behavioral difficulties has been shown to have greater positive impact on student outcome trajectories (Lewis & Sugai, 1999; Torgesen, 2004). Also, research has generally supported early intervention with children at-risk for disability (Cavanaugh, Kim, Wanzek, & Vaughn, 2004).

Dissertation research by Gilden (2014) found that the age a student first received ESE services for a learning disability was significantly correlated with standardized achievement test scores in high school. The later a student began receiving services, the higher the scores. No significant correlation was found between age of first services and graduation. However, the researcher posits that the low average age of first services (eight years old) may have affected this result.

School-Level Factors

Researchers from John's Hopkins University found that the school a student attends is a significant factor in whether or not the student graduates (Balfanz & Legters, 2004). The school-level variables outlined in this section have been cited as possible predictors of graduation or dropout. Several of the studies utilized multilevel regression frameworks to concurrently examine student- and school-level variables for a comprehensive view of the predictors of graduation using variables beyond demographic and other individual factors discussed previously (Goldschmidt & Wang, 1999; Rumberger, 1995; Rumberger & Larson; Rumberger & Thomas 2000). This type of comprehensive analysis of predictors for graduation may be especially important for SWD since Gwynne et al. (2009) found that students with disabilities often attend the weaker schools in the school district with lower levels of achievement.

School Stability Rate

The individual school transitions rate can be examined at the school level by using the percent of students present at the October count and also at the end-of-year count to examine the effects high school mobility has on a school and the likelihood of graduation for the students who attend. Rumberger and Thomas (2000) reported that schools serving students with high mobility have additional challenges in at-risk student identification and allocation of supports due to a constantly changing population. South, Haynie, and Bose 2007 analyzed data from the National Longitudinal study of Adolescent Health and found that students at high mobility schools had lower achievement and reported low affiliation and increased dropout.

Rates of Discipline Incidents

Kotok, Ikoma, and Bodovski (2016) examined relationships between school variables and dropout using structural equation modeling with the nationally representative High School

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Longitudinal Study of 2009. Researchers found that school discipline significantly predicted rates at which students in schools dropped out before the end of eleventh grade. In this study discipline was measured by administrator input about school problems such as verbal abuse of teachers, student bullying, drug issues, student physical conflict, and student disrespect of teachers.

Christle et al. (2007) utilized data from 196 high schools in Kentucky over two years to examine school level variables related to dropout rates through correlational analysis. In addition, the researchers used multivariate analysis to examine differences between the 20 schools reporting the highest dropout rate and the 20 schools reporting the lowest drop out rates for school variables. Researchers found significantly higher suspension rates at schools with higher dropout rates. Another study used data from students at over 1,000 schools in the National Education Longitudinal Study (NELS) data set and found that high discipline rates were correlated with higher dropout rates (Rumberger & Thomas, 2010).

School Socio-Economic Status (SES)

School-level SES can be defined as the percent of students attending a school who are eligible for free and reduced lunch. This data allows for analysis related to the concentration of students from low SES families. Christle et al. (2007) reported significant positive correlations between schools with higher SES and schools reporting lower dropout rates. Rumberger (1995) analyzed data from the NELS data set for schools and students in grades eight to ten. The research found that almost 75% of students who dropped out were educated in schools with concentrations of low SES students. Further analysis comparing the individual variables for students from high and low SES schools found that these individual factors had more predictive power in high SES schools. Follow-up research using a subset of the NELS data set for students

in grades 10 through 12 (Rumberger & Thomas, 2010) found school-level SES to be a significant predictor of dropout for students even when individual student variables were controlled. High SES schools had 40% lower dropout rates than average SES schools and 60% lower dropout rates than low SES schools (Rumberger & Thomas, 2010).

In a more recent study, Wood et al. (2017) analyzed the Educational Longitudinal Study of 2002 data for over 14,000 students from sophomore to senior year in high school using hierarchical generalized linear modeling to create a model to predict high school dropout that included individual variables (academic achievement, retention, sex, socioeconomic status, extracurricular involvement) and school variables (SES, school size). The researchers segmented the percentage of students attending each school that qualified for free and reduced lunch into seven ranges rather than high, average, and low ranges. Results showed that schools with higher SES percentages were predictive of dropout of students in that school (Wood et al., 2017).

School Racial/Ethnic Composition

Results of studies have generally shown school racial/ethnic composition to be a significant predictor of dropout. Balfanz and Legters (2004) found that across the nation schools with races/ethnicities other than White in the majority were five times more likely to have weak promoting power (ratio of the number of seniors in a high school to the number of freshman four years earlier) than schools in which White students were the majority. Christle et al. (2007) utilized data over a two-year period to examine school level variables related to dropout rates through correlational analysis and found a negative correlation between dropout rates and percentage of White students.

Two studies utilizing data from the NELS data set found that students educated in schools with less racially diverse populations (under 40% from races other than White) drop out at lower

rates than students in more ethnically diverse schools (Rumberger, 1995; Rumberger & Thomas, 2000). However, another study using data from the same source used multilevel regression defining race/ethnicity in terms of a percentage of White, Black, and Hispanic students rather defining ethnically diverse as percentage of the nonWhite population found no racial/ethnic effect for dropout for students in grades ten through twelve (Goldschmidt & Wang, 1999). The researchers did find that higher percentages of Hispanic students in a school was predictive of students in those school dropping out in eighth through tenth grade. Differences in the results of this study compared to others may be due to the differences in defining the predictor variable.

School Grade

Measuring school accountability for student outcomes, including school grades, is used to indicate a school's success in preparing students for life, career, and college (Smith, Droddy, & Guarino, 2011). Gwynne et al. (2012) reported that at least for one subset of students (Hispanic students in Chicago Public Schools) the quality of the school a student attends is the most salient predictor of graduation. The researchers conducted a longitudinal study from ninth grade to one year after expected graduation for ELL and found that the primary predictor for differences in graduation among the categories of ELL (newly designated ELL, long-term ELL, and previously ELL) was the school students attended.

Brundage (2013) used multilevel regression analysis using school- and individual-level factors to predict off-track status for students across time points from sixth to tenth grade. School grade was the only school-level factor that was a significant predictor at any time point. In this study students attending the lowest performing schools with the lowest grades were more likely to be off-track for graduation at the end of ninth grade (only time point measured due to lack of factor variability).

School grades have been issued in Florida as an indicator of school quality since 1999 (Florida Department of Education, 2014a). Florida school grading practices have changed several times. Currently schools earn points toward grades for achievement in language arts, math, science, and social studies as measured by Florida Standards Assessments and End of Course Exams. Points are earned for both the percent of students proficient in each area and for learning gains in language arts and math. Additional points can be earned for meeting learning gains criteria from previous to current year scores in language arts and math for students in the lowest 25%. Prior to the 2014/2015 school year, the Florida Comprehensive Assessment Test (FCAT) was used to assess proficiency and learning gains. Additionally, high school grades include school graduation rate and college and career acceleration (college and dual enrollment and industry certification). The range of points required for each letter grade (A, B, C, D, F) are assigned during the fall after each school year (Florida Department of Education, 2014a).

School Engagement

Engagement as a school-level factor provides an indicator of engagement and involvement in the context within which students are educated. However, most research related to school engagement and dropout has focused on the variable as a predictor at the individual rather than the school level (Croninger & Lee, 2001; Lee & Burkam, 2003; Reschly and Christenson, 2006). Research has identified student perceptions of their relationships with teachers and peers as a predictor of school completion for general student populations (Croninger & Lee, 2001; Archambault et al., 2009, Lee & Burkam, 2003). In addition, research on SWD in particular has found that measures of engagement including relationships with teachers and other students, emotional engagement, and behavioral engagement significantly contributed to the

prediction of whether or not an SWD graduates (Doren et al., 2014; Reschly & Christenson, 2006; Zablocki & Krezmien, 2013).

Reschly and Christenson (2006) used data from the NELS data set to examine the relationship between school engagement and dropout for students with learning disabilities and behavioral disorders in middle school and high school. Engagement in this study was defined with data from parents and students in three areas: behavioral engagement (behavior, preparation, tardiness, absences, skipping class, homework, and extracurricular activities), psychological/interpersonal engagement (school warmth and interaction with teachers), and cognitive engagement (utility and boredom at school). The researchers found that even when variables such as socioeconomic status, achievement test scores, and grade retention were accounted for engagement was a significant predictor of school completion. Zablocki and Krezmien (2013) examined emotional engagement in education with a six-item Likert Scale survey. The survey asked questions about satisfaction with school, school enjoyment, and relationships with teachers and peers. Each standard deviation increase in emotional engagement resulted in a 27% lower likelihood of dropping out of school.

To analyze engagement as a school level factor Kotok et al. (2016) examined the relationship between school climate and dropout using structural equation modeling with data from the high school longitudinal study of 2009. Researchers found that school attachment was a significant predictor of dropout prior to the end of eleventh grade. School attachment was measured based on student input related to whether they could talk to teachers about problems, feelings of school pride, and feelings of school safety.

This section describes the school-level variables that relate to and may predict on-time graduation for general school populations. These factors are not currently part of EWS focused

on individual-level variables. However, school- and individual- level factors analyzed in concert may provide a more comprehensive prediction model for on-time graduation to inform school and district decision-making. This researcher did not find studies focused on school-level factors as predictors for graduation for SWD.

Early Warning Systems

EWS are being used in schools in many places throughout the country to identify the students most at risk of not graduating from high school. This allows schools to provide targeted intervention for only the students who need it most thus improving graduation rates while balancing program costs. The use of EWS data to make data-based decisions allows schools, districts, and states to use a multi-tiered system support for students most at-risk for not completing high school.

Recently several studies have engaged longitudinal analyses to follow cohorts of students over time to determine the factors that indicate when a student is no longer on-track for graduation. One such study was conducted by Balfanz et al. (2007) using data for over 12,000 students from sixth grade to one year beyond expected graduation. The authors used multivariate logistic regression controlling for each of the other early warning variables to examine the unique power of each variable to predict graduation. Poor attendance, poor behavior (as rated by teachers on the end of year report card), a failing grade in math, and a failing grade in English all served as predictors for not graduating. The final model allows for identification in sixth grade of 60% of students who not graduate within one year of the expected date.

In her dissertation, Brundage (2013) used data from one Florida school district from the 2007/2008 school year to the 2011/2012 school year to examine factors that predict off-track status within an EWS. This research utilized multilevel logistic regression modeling to allow for

analysis of both individual- and school-level factors in the same model. This research found that racial/ethnic designation as Hispanic and SES Level were the most consistent demographic predictors of off-track status across time points from sixth through tenth grades. GPA in middle school, ODRs in high school, and previous off-track status also predicted future off-track status in this study (Brundage, 2013).

This research proposes using variables associated with prediction of whether or not a student graduates on-time similar to those in the dissertation by Brundage (2013). The proposed study will use similar data analysis procedures with data from the same source as Brundage to examine the factors that may foster or prevent on-time graduation for SWD. The proposed study will focus on on-time graduation rather than on-track status and focus on SWD rather than the general enrollment student population. Nonmalleable background characteristics and individual school related factors as well as school-level variables will be explored. The purpose of the data analysis will be to determine a model of the factors most predictive of on-time graduation and determine the efficacy of EWS data use in data-based decision making and support provision for SWD services.

CHAPTER 3: METHODS

The purpose of this study is to investigate the variables hypothesized to contribute to the failure to graduate on time for students with disabilities. This chapter includes an outline of the research design with descriptions of the proposed participants, study variables, and analyses used to answer the research question.

Research Design

A retrospective longitudinal causal-comparative research design was used to answer the research question utilizing secondary analysis of existing data in an archival data set from one Florida school district.

Participants

District Characteristics

This study includes data from one central Florida school district that is in the top 60 largest school districts nationwide. During the 2013/2014 school year the school district included 44 elementary, 15 middle, 13 high, and 7 charter schools along with a virtual school and 4 educational centers in both rural and suburban communities. According to the 2013-2014 District of Pasco County Fact Sheet (2013) there were 68,904 students district-wide with 13,929 enrolled in exceptional student education programs. Fifty-two percent of students were from low SES households and the graduation rate was 88.5%. The target district is a growing school district with the largest growth in minority students in the state of Florida from 2000 to 2010

(Fiorentino, 2011). The school district added two elementary schools, one middle school, two high schools, and one virtual school from 2007 - 2014. The growing student population increased by over 4300 students from 2005 to 2009. (Fiorentino, 2011).

The target school district encompasses one Florida county with an estimated 497,909 residents, while the largest city in the county has an estimated 15,842 residents (United States Census Bureau, 2015). The racial make-up of the county is 89.1% white, 5.8% black, .4% American Indian or Alaskan Native, 2.5% Asian, .01% Native Hawaiian or other Pacific Islander, and 2.1% two or more races. The 2010 population was 622.2 residents per square mile. The median household income in the county is $45,064, while the median household income in the largest city in the county is $29,882 (United States Census Bureau, 2015).

Student Characteristics

The participants include 692 students with disabilities who were in sixth grade during the 2007/2008 school year. There were 4,423 total sixth-graders enrolled in the district during the 2007/2008 school year. Participant data was included in the study if the student was part of the 2007/2008 sixth-grade cohort, had an Individual Education Program or a 504 plan in during that school year, and was present in the district at least five out of the seven years covered by the study. Data for students who did not enter ninth grade in the fall of 2010 were eliminated because those students were no longer members of the target cohort. Additionally, data for students who transferred out of the district prior to the end of twelfth grade or graduation were removed from the study due to missing data for the outcome variable. When school-level data was unavailable, student data were removed from the study due to the requirements of the data analysis. School level data was missing for students attending alternate placements such as

juvenile justice. Descriptive statistics for participants in middle school are reported in table 1 and

for high school in table 2.

Table 1. Participant Descriptives: Middle School

Variable	6th		7th		8th	
	n	%	n	%	n	%
On-time graduation	443	68.2	449	67.3	456	66.9
White	585	90.0	601	90.1	615	90.2
Black	43	6.6	41	6.1	43	6.3
Hispanic	110	16.9	116	17.4	119	17.4
Asian	9	1.4	10	1.5	10	1.5
Native American	32	4.9	31	4.6	33	4.8
Multiracial	23	3.5	24	3.6	24	3.5
SES level	396	60.9	409	61.3	423	62.0
Language proficiency level	37	5.7	41	6.1	42	6.2
Specific learning disabled	291	44.8	295	44.2	305	44.7
Intellectually disabled	28	4.3	31	4.6	33	4.8
Emotional behavioral disability	31	4.8	31	4.6	32	4.7
Other health impaired	21	3.2	23	3.4	22	3.2
Speech impaired	24	3.7	26	3.9	26	3.8
Language impaired	36	5.5	36	5.4	36	5.3
Autism spectrum disorder	12	1.8	15	2.2	18	2.6
504	188	28.9	192	28.8	191	28.0
Other disability	13	2.0	13	1.9	13	1.9
3rd grade FCAT level 1 or 2 10th grade FCAT[1] level 1 or 2	350	53.9	345	68.0	354	68.6
Ever <80 of week with general education peers	275	42.3	297	44.5	354	68.6
Total n	650	100.0	667	100.0	682	100.0

Note. SES = socioeconomic status; FCAT= Florida Comprehensive Achievement Test.

Table 2. Participant Descriptives: High School

Variable	9th		10th		11th		12th	
	n	%	*n*	%	*n*	%	*n*	%
On-time graduation	458	66.2	449	71.8	444	75.4	447	77.2
White	623	90.0	566	90.6	539	91.5	527	91.0
Black	44	6.4	42	6.7	37	6.3	39	6.7
Hispanic	119	17.2	108	17.3	103	17.5	101	17.4
Asian	10	1.4	10	1.6	10	1.7	10	1.7
Native American	34	4.9	31	5.0	32	5.4	29	5.0
Multiracial	34	3.5	20	3.2	18	3.1	18	3.1
SES level	431	62.3	373	59.7	354	60.1	346	59.8
Language proficiency level	41	5.9	40	6.4	37	6.3	37	6.4
Specific learning disabled	305	44.1	269	43.0	248	42.1	247	42.7
Intellectually disabled	37	5.3	37	5.9	33	5.6	35	6.0
Emotional behavioral disability	32	4.6	24	3.8	25	4.2	24	4.1
Other health impaired	23	3.3	21	3.4	20	3.4	19	3.3
Speech impaired	26	3.8	25	4.0	22	3.7	21	3.6
Language impaired	36	5.2	34	5.4	32	5.4	31	5.4
Autism spectrum disorder	19	2.7	19	3.0	18	3.1	18	3.1
504	194	28.0	178	28.5	173	29.4	166	28.7
Other disability	13	1.9	12	1.9	12	2.0	12	2.1
3rd grade FCAT level 1 or 2	357	68.7	319	51.1	297	67.8	292	67.4
10th grade FCAT[1] level 1 or 2	410	72.4	397	63.6	380	72.3	376	72.3
Ever <80 of week with general education peers	330	47.7	293	46.9	281	47.8	287	48.9
Total *n*	692	100.0	625	100.0	589	100.0	579	100.0

Note. SES = socioeconomic status; FCAT= Florida Comprehensive Achievement Test.

Variables

This study used variables at both the individual student and school levels that have been demonstrated in previous research to have an effect on high school completion and/or EWS off-track status for high school graduation for students with and without disabilities. All variables were either outcome or predictor variables and are defined in this chapter.

Outcome Variable: On-Time Graduation

Since the 1970's several methods have been used to calculate graduation rates. For this study, the Federal Uniform Graduation Rate was used. According to federal guidelines the Federal Uniform Graduation Rate is the percentage of students who graduate with a standard diploma within four years of entering school in ninth grade. This calculation replaced the former National Governor's Association calculation used previously (Title I, 2008). Each of the individual and school level predictors were examined in relation to on-time graduation for the participating cohort of students with disabilities. This categorical outcome variable was coded according to whether or not the student graduated by the expected time in the spring of 2014 (0 = no, 1 = yes).

Predictor Variables: Individual-Level

Data were collected for each student with disabilities for analysis related to the variable. The definitions for each of the individual variables with data coding criteria in parentheses are as follows:

- Off–track Status: The total number of semesters designated as off-track in sixth through 12th grades (continuous variable 0 through 14) for each student was used as a possible predictor for the on-time graduation. Previous research has found that off-

track status within an EWS can predict future off-track status (Brundage, 2013) and can predict the students who will not graduate from high school (Gwynne et al., 2009; Allensworth & Easton, 2007).

The school district participating in this study has used an EWS in an effort to increase on-time graduation rates since the 2010/2011 school year to the present in high schools and since the 2012/2013 school year in middle schools. The EWS used by the participating district categorized students in one of three levels based on district collected data. Level 1 was considered on-track for on-time graduation. Level 2 indicated that the student was at-risk for being off-track for on-time high school graduation. Level 3 was equated with off-track status with respect to on-time high school graduation. The participating school district relied on previous research (e.g., Heppen & Therriault, 2008) to define on- and off-track status in high school. See Table 1 for specific indicator information. The middle school EWS indicators differ from the high school indicators and were based on the National High School Center indicators. (National High School Center, 2012). The off-track status for middle school was obtained using class failures, absences, and discipline referrals. See Table 3 for specific indicator information. Off-track status was retroactively calculated based on the criteria in Table 1 for the study participants' middle school years because the EWS was not in place at the time study participants attended middle school. For the purposes of the proposed study, both Levels 1 and 2 (on-track and at-risk categories) in the participating school district EWS are considered on-track and Level 3 are considered off-track.

Table 3. District EWS Level Criteria

Level	Criteria
High school	
Level 1 (on-track)	Grade of C or higher in all courses 2.5 or higher GPA Meets all credit requirements 4% (of instructional time) or fewer Absences per semester
Level 2 (at-risk)	Lacking 1 graduation requirement 2.0-2.49 GPA 1 credit behind 5% or more absences per semester
Level 3 (off-track)	Failing 1 or more classes <2.0 GPA 3 credits behind 10% or more absences per semester
Middle school	
Level 1 (on-track)	Failing 0 classes <10% absences 1 or fewer discipline referrals
Level 2 (at-risk)	Failing 0 classes 10% or fewer absences 2-3 or fewer discipline referrals
Level 3 (off-track)	Failing 1 or more classes 10% or more absences 4 or more discipline referrals per semester

Note. Students were considered off-Track if they met one or more of the criteria for Level 3 at each level.

- Reading at Third and 10th Grade: The Florida Comprehensive Assessment Test (FCAT) scores were used as the third and 10th grade reading scores. The FCAT is a summative evaluation tool given to all Florida students in grades three through ten to assess student achievement of expected state standards in reading, math, writing, and science. Scores on this criterion-referenced assessment are reported in five categories from one to five. A category one score indicates an inadequate level of success with state standards, and a category five indicates mastery with the highest-level standards content. According to the Florida Department of Education (2012) the Cronbach's alpha reliability estimate for grade three in 2003 (when the students were administered the FCAT) of .89 was above the .70 acceptability criterion suggested by Nunnaly (1994). The FCAT 2.0 replaced the FCAT to better align with state standards starting in 2011. The Cronbach's alpha reliability estimate of the FCAT 2.0 was a .89 in grade 10 (Florida Department of Education, 2012).

  Third grade students scoring an FCAT level one in reading may have been required to be retained. Middle and high school students scoring at levels one and two in reading and math were required to take remediation courses. Third and 10th grade reading variables were categorized as students who scored at a level one, students who scored at a level two, or students who scored at a level three and above on the FCAT reading section during their third and 10th grade years (0 = Level 3+; 1 = Level 2; 2 = Level 1). Studies have found links between third grade standardized test scores in reading and high school graduation rates (Hernandez, 2011, Lesnick et al., 2010).

  Students were required to pass the 10th grade FCAT to graduate unless they met the alternative option of achieving a specified score on the ACT or SAT

corresponding to a passing FCAT score. If students did not pass the 10th grade FCAT, they could retake the 10th grade FCAT in fall and spring of their 11th and 12th grade years until they passed. Student with disabilities pursuing a standard diploma were required to take the FCAT assessment in the in 10th grade. However, students with disabilities could qualify for a waiver of the requirement to pass the FCAT to graduate if the student's Individual Education Program team determined that the FCAT could not accurately measure the abilities of the student (Florida Department of Education, 2014b). Subedi and Howard (2013) found that an average of math and reading FCAT development scaled scores in high school was a significant predictor of graduation status for at-risk students.

- Discipline Incidents: Discipline incidents refer to the number of suspensions and the number or office discipline referrals (ODRs) per year in middles and high school. The number of suspensions and the number of ODRs were treated as continuous predictor variables. Behavioral referrals and school suspensions have been shown as predictors of off-track status and high school dropout for students overall (Balfanz et al., 2007; Brundage, 2013; Hickman & Garvey, 2008; Stearns & Glennie 2006). Zablocki and Krezmien (2013) found that dropout was three times more likely for students with disabilities that reported ever being suspended or expelled.

- Middle School GPA: Student semester grades for each course in grades six through eight were converted to grade point average (GPA) based on a five-point scale ranging from an A equal to 4.0 to an F equal to a 0 and then averaged across all courses in a semester resulting in one overall score (0 = 2.0 or above, 1 = less than 2.0). The middle school GPA was calculated per year and not cumulative across years

as in high school. Middle school GPA has limited research as part of EWS. Noncumulative middle school GPA has been demonstrated to predict student off-track status (Brundage, 2013) and lack of school completion (Bowers, 2010).

- School Transitions: Any change in school location that was not the result a change in school boundaries or promotion (e.g., family relocation, district assignment) to the next school level were considered school transitions (K-5th total number; 6th-8th total number; 9th-10th total number). Although school transitions have not been examined for the population of students with disabilities specifically, several studies have found that even one school transition can decrease the likelihood of high school graduation in the general student population (Gleason & Dynarski, 2002; Rumberger & Larson, 1998; Rumberger & Thomas, 2000).

- Language Proficiency: Language proficiency was coded according to district designation as an English Language Learner at any time during the student's educational career from kindergarten to twelfth grade (0 = no, 1 = yes). Gwynne et al. (2012) reported that students who are or have been designated as ELL graduated at lower rates than the national average.

- SES Level: Socioeconomic Status (SES) was coded based on whether or not the student has qualified for free or reduced lunch (0 = no, 1 = yes) in sixth grade. Reschly and Christenson (2006) demonstrated that higher SES levels were associated with lower odds of dropping out of school for students with learning disabilities and Zablocki and Krezmien (2013) found that lower than average household income was associated with higher rates of dropout for students with emotional behavior disabilities. Several studies have demonstrated the predictive power of student SES

for school non-completion for students in general (Alexander et al., 1997; Battin-Pearson et al., 2000; Hernandez, 2011; Rumberger, 1995).

- Racial/Ethnic Classification: Parent report on kindergarten through twelfth grade school enrollment forms were used as the data source for racial and ethnic classification. Reports indicate one of the following categories: White, Black, Hispanic, Asian, Native American and Multi-racial. For the purposes of the proposed study Asian, Native American, and Multi-racial will be categorized as other due to predicted small sample sizes (White 0 = no, 1 = yes; Black 0 = no, 1 = yes; Hispanic 0 = no, 1 = yes; other 0 = no, 1 = yes). Data have been mixed with respect to the relationship between race and high school graduation for the general population and for students with disabilities in particular. Although some studies have found significant differences between the graduation rates of students from differing ethnic backgrounds (Rumberger & Thomas, 2000; Zablocki and Krezmien, 2013), other studies have found no unique contributions of race when other variables are taken into account (Carpenter & Ramirez, 2007; Rumberger, 1995; Kortering, et al., 1992).

- Disability Category: Disability category was coded as the primary Exceptional Student Education disability category (based on the Individual Education Program or Section 504 Plan of the Rehabilitation Act of 1973 in sixth grade). The possible categories are specific Learning Disabilities (SLD), Emotional Behavioral Disability (EBD), Intellectual Disability (InD), Language Impaired (LI), Speech Impaired (SI), Autism Spectrum Disorder (ASD), 504, and other. (SLD 0 = no, 1 = yes; EBD 0 = no, 1 = yes; InD 0 = no, 1 = yes; OHI 0 = no, 1 = yes; LI 0 = no, 1 = yes; SI 0 = no, 1 = yes; ASD 0 = no, 1 = yes; 504 0 = no, 1 = yes; other 0 = no, 1 = yes).

Zablocki and Krezmien (2013) found disability to be a significant predictor of dropout. The researchers found that students with an emotional behavior disability were more likely to dropout than students with a learning disabled label. Students with low incidence disabilities (hearing impairment, visual impairment, orthopedic impairment, autism, traumatic brain impairment, multiple disabilities) were less likely to dropout than students with learning disabilities. However, predictive power was not significant when grades, suspension history, grade retentions, and emotional engagement were included in the logistic regression analysis (Zablocki & Krezmien, 2013).

- Time Educated with General Education Peers: According to the Florida Department of Education (2015a), a regular class indicates that students with disabilities are educated with their general education peers at least 80% of the week. If a student is educated in a resource room they spend between 40% and 80% of the week being educated with general education peers. Lastly, a separate class indicates that students are educated with general education peers less that 40% of the time (80% or more = 0, <80% =1). Studies have found a relationship between high school graduation for students with disabilities and increased time educated with general education peers (Rudloff, 2015; Goodman et.al., 2011).

- Years of disability services: The years of disability services is continuous variable of the number of years a student has had an Individual Education Program or a 504 Plan for kindergarten through grade twelve.

Predictor Variables: School-Level

Variables that predict whether or not a student graduates from high school are apparent both at the individual level and the school level (Rumberger & Thomas, 2000); and thus both are essential for creating an accurate predictive model of on-time graduation. School-level data were collected for all high schools in the participating school district and analyzed to determine predictive power for the on-time graduation outcome variable. The definition for each of these variables follows:

- School Stability Rates: The school stability rate represents the rate at which students remain in the same school throughout the school year and in this study was the percentage of students from the October membership count for the Florida Department of Education who were still present in the end-of-year count. School stability rates have been found to be predictive of student dropout (Rumberger & Thomas, 2000; South, Haynie, and Bose, 2007).

- School Suspension Rates: The suspension rates per 100 students each year (07/08-09/10) in each middle and each year in each high school (10/11-13/14) were used to indicate school rates of discipline. Both Christle et al. (2007) and Goldschmidt and Wang (1999) found a significant relationship between school discipline rates and increased high school dropout rates.

- School SES: The school SES level is the percent of students eligible for free and reduced lunch school-wide as determined by the Florida Department of Education based on parent application and qualification. The school SES level was calculated each year (07/08-09/10) in each middle school and each year in each high school (10/1-13/14). Schools with higher percentages of students from low-income

households have been associated with increased dropout (Lamote et al., 2012; Rumberger & Thomas, 2000).

- School Racial/Ethnic Composition: The percentage of non-white students school-wide was provided for each school each year by the Florida Department of Education. The percentage of racially and ethnically non-white students was calculated each year (07/08-09/10) in each middle school and each year in each high school (10/11-11/12). Researchers have found a significant relationship between school-level racial and ethnic composition and high school dropout (Rumberger 1995; Rumberger & Thomas, 2000; Christle et al., 2007).

- School Grade: The Florida Department of Education (2014a) determined school grades each year using an algorithm based on FCAT student achievement and student learning gains, graduation rates for all students and those at-risk, participation and performance in accelerated curricula, and post-secondary readiness as variables. This study breaks down the A through F grades into three parts to allow for analysis (0 = A-B; 1 = C; 2 = D-F). Although Florida school grades have not been previously included in studies examining predictors of on-time graduation, measures of school quality and performance have been linked to school non-completion rates (Gwynne et al., 2012). Brundage (2013) used a similar data set to the proposed study of students with and without disabilities. She found that school grade predicted future off-track status at the only one time point included in the study due to lack of variability in the variable (end of ninth grade). Thus school grades are important potential predictors for the purpose of this study.

- School 10th grade FCAT: Percent of students in each high school who scored a three or higher on the reading FCAT in the spring of tenth grade was used as a predictor. The FCAT and the levels are described in the individual variables section. Christle et al. (2007) reported that schools with higher dropout rates had lower test scores on the California Test of Basic Skills. Subedi and Howard (2013) found that an average of math and reading FCAT development scaled scores in high school was a significant predictor of graduation status for at-risk students. However, when the researchers examined FCAT as a school level variable only the interaction of FCAT school results and African-American designation was significant.

- School Engagement: For this study school engagement is defined using the Gallup Student Poll. The Gallup Student Poll is a twenty-question survey focused on engagement, hope, and well-being; and used to obtain actionable data from students in grades five through twelve. For this purpose, engagement focuses on student involvement with school activities and enthusiasm for school. Hope focuses on student expectation and optimism for the future. Data are collected via web-based, five-point Likert Scale questions in the fall of each school year. The results are available at a school level by grade (not by individual student results) and intended to predict future success, and allow educators to focus student education on meaningful school participation with increased academic engagement and hope for the future (Lopez, Agrawal, & Calderon, 2010). According to the Pasco County Schools website (2016), data from the Gallup Student Poll are used to inform progress toward the school district's mission to provide a world- class education for all students. The poll was first administered to the proposed participants in the 2013/2014 school-year

and thus only data from that year (i.e., participant's 12th grade year) was used to determine the school engagement variable for the proposed study. The grand mean (the mean of the means for all six items in the index on a 1-to-5 scale) for both the Engagement and Hope Indexes were hypothesized as predictor variables. The questions from these indexes are included in Appendix A.

The Gallup Poll Technical Report (Lopez, Agrawal, & Calderon, 2010) describes four main studies that have examined the internal consistency, factor structure, and predictive validity of the Gallup Student Poll. The 2008 Gallup Student Poll Pilot utilized data from 198 9th grade students. The Hope Index was internally consistent (Cronbach's Alpha = .74) and the six items in the scale loaded on a single factor (Eigenvalue = 2.69). The Engagement Index had questionable internal consistency (Cronbach's Alpha = .58) with the sole outlier variable of having a best friend included and better internal consistency (Cronbach's Alpha = .63) when this factor was removed. The five-factor model loaded on one single factor (Eigenvalue = 1.95). The Hope Index was predictive of attendance, credits earned first semester of 9th grade, and 9th grade first semester GPA. The five-item Engagement Index significantly predicted credits earned first semester of 9th grade, and 9th grade first semester GPA (Lopez, Agrawal, & Calderon, 2010).

In 2009 Gallup Student Poll data from over seventy thousand students in grades five through twelve in 335 schools. This study found that both the Engagement and Hope Indexes are internally consistent with Cronbach's Alphas of .71 and .76, respectively (Lopez, Agrawal, & Calderon, 2010). Additionally, in May 2009 data from 328 students ages 13 to 18 were collected via email and through the United

States Postal Service (18% completion rate). In this study both the Engagement Index and Hope Index displayed internal consistency with Cronbach's Alphas of .70 and .65, respectively (Lopez, Agrawal, & Calderon, 2010).

The online Gallup Student Poll was piloted with almost 250,000 students from 905 schools in grades five through twelve in 2009. The Engagement and Hope Indexes were each internally consistent with Cronbach's Alphas of .72 and .78, respectively (Lopez, Agrawal, & Calderon, 2010). The five items of each scale loaded on a single factor with Eigenvalues of 2.39 for the Engagement Index and 2.89 for the Hope Index. Concurrent validity was established with the Hope Index being strongly correlated with the Strengths Self-Efficacy Scale (Tsai, Zhao, Chaichanasakul, Flores, & Lopez, 2014) and the SOC-4H measure (Zimmerman et al., 2007; Gestsdottir et al., 2009) at 0.6 or higher. The Engagement Index was strongly correlated with another measure of engagement developed by Gallup (Lopez, Agrawal, & Calderon, 2010). In addition to these studies, a panel of experts reviewed the scales and determined that scales were appropriately measured and comprehensive (Lopez, Agrawal, & Calderon, 2010).

Measures of school engagement and school warmth have been found to correlate with and in some cases predict high school graduation for students with and without disabilities (Reschly & Christenson, 2006; Zablocki & Krezmien, 2013; Croninger & Lee, 2001; Lee & Burkam, 2003).

Procedures

Obtaining the Database

Archival data was obtained from the data management system of one school district in central Florida for each of the variables described in this chapter. Data are specific to students with disabilities who were in the sixth grade during the 2007/2008 school-year through the 12th grade year in 2013/2014 school year. Each of the students was assigned an identification number for the study allowing for identifying information to be removed. Data was exported into Excel format and screened to ensure all recorded values are within the possible range of responses. Much of the data used for this study was also used for a dissertation focused on variables predicting off-track status from sixth to tenth grade (Brundage, 2013).

Data Collection and Entry

Enrollment forms were used to collect data for individual variables including SES and racial/ethnic classification. Other individual-level variable data were recorded on school-level reporting forms and entered into the district data system by school-based data entry operators. These data include disability category, third grade reading proficiency levels, discipline records of number of suspensions and office discipline referrals, language proficiency levels, special education and 504 plan eligibility, retention, and GPA. Additional Exceptional Student Education variables including years of disability services and time educated with general education peers were obtained from an additional district data system in which information is input by ESE case managers for each student. The FCAT scores provided by the Florida Department of Education were verified and entered by the district research and evaluation department. To increase accuracy of data entry, the research and evaluation department complied

with mandatory review of student data on approximately a quarterly basis. Errors were provided to the school-based data entry operators for verification and correction.

Table 4 describes the data collected including collection time points and how each was coded for the study.

Data Analysis Procedures

Multilevel logistic regression modeling was used to answer the research question. Logistic regression was chosen to examine the relationship between several hypothesized predictors and the dependent variable of on-time graduation. Logistic regression allows for the violation of the assumption of normally distributed error variances in other models such as Ordinary Least Squares (OLS) regression. Logistic regression supports analyses and predictions for dichotomous variables that are not normally distributed (Peng, Lee, & Ingersoll, 2002) such as on-time graduation in the proposed study. This type of regression analyzes independent variable relationships to log odds of the dichotomous outcome variable rather than the variable itself (Peng, Lee, & Ingersoll, 2002). To allow for interpretation and to provide a more simplistic description of the relationship between variables, the logistic regression coefficients were calculated as odds ratios that indicate the probability of on-time graduation.

The multilevel analysis was chosen due to the nested nature of individual students instructed within schools. This nested data violates the assumption of independence in other models. Multilevel modeling accommodates hierarchical structures and allows for simultaneous analysis of variables at different levels (e.g., students and schools) (Maas & Hox, 2005).

Logistic regression has been used in studies to examine the predictor variables for students with disabilities completing high school (Reschly & Christenson 2006; Zablocki &

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Table 4. Variable Coding

Variables	Coding methodology	Coding value	Time point collected
	Dependent Variable		
On-time graduation	Graduated spring 2015	N/Y=0/1	End of 12th grade
	Independent Variables		
Individual-level			
On/Off Track Status	Total Number of semesters with Off-Track status	Total	Total number 6th–12th grade
Attendance	Percentage of absences each semester	Percent	6th–12th grade
3rd and 10th grade reading	Reading FCAT Level (1-5) in 3rd Reading FCAT Level (1-5) in 10th	Level 3+=0 Level 2=1 Level 1=2	3rd and 10th
Discipline/behavior incidents	Number of ODR's per semester	Total	6th-12th grade
	Number of suspensions per semester	Total	6th–12th grade
Grade point average (GPA)	GPA per semester	Total	Per semester 6th–12th grade
School transitions	Number of transitions per school level	Total	K–5th 6th–8th 9th–12th
Language proficiency	English language learner	N/Y=0/1	K–12th
SES	Eligibility for free or reduced lunch	N/Y=0/1	6th
Racial/ethnic classification	White Black Hispanic Asian Native American Multi-racial	N/Y= 0/1 N/Y= 0/1 N/Y= 0/1 N/Y= 0/1 N/Y= 0/1 N/Y= 0/1	6th

Table 4 (Continued)

Variables	Coding methodology	Coding value	Time point collected
Disability category	SLD	N/Y= 0/1	12th
	EBD	N/Y= 0/1	
	InD	N/Y= 0/1	
	OHI	N/Y= 0/1	
	LI	N/Y= 0/1	
	ASD	N/Y= 1/1	
	504	N/Y= 0/1	
	Other	N/Y= 0/1	
	Multiple disabilities	N/Y= 0/1	
Time educated with general education peers	Ever served less than 80% of week with general education peers	N/Y= 0/1	K–12th
Years of disability services	Number of school years with an IEP or 504	Total	6th–12th
School level			
School suspension rates	Number of Suspensions per 100 Students per School per Year	Rate for middle school each year	6th–8th
		Rate for high school each year	9th–12th
School stability rate	Percentage of Students Present at October Count Present at End-of-Year Count	Percentage for middle school each year	6th–8th
		Percentage for high school each year	9th–12th
School SES	Percentage of Students Eligible for Free and Reduced Lunch School-wide each Year	Percentage for middle school each year	6th–8th
		Percentage for high school each year	9th–12th
School racial/ethnic composition	Percentage of Non-White Students each year	Percentage for middle school each year	6th–8th
		Percentage for high school each year	9th–12th

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Table 4 (Continued)

Variables	Coding methodology	Coding value	Time point collected
School grade	Florida School Letter Grade	A-B=0 C=1 D-F=2	Each year per school 6th–12th grade
School 10th grade FCAT	Percentage of students scoring an FCAT level 3 or higher in reading	Percentage during 10th grade year	10th
School engagement	School level Gallup student engagement	Grand mean	12th
	School level Gallup student hope	Grand mean	12th

Krezmien, 2013). Multilevel logistic regression modeling has also been used to predict the likelihood of Off-track status (Brundage, 2013).

Descriptive Statistics

Descriptive statistics including means, standard deviations, skew, and kurtosis were conducted for the proposed continuous variables in the study. However, the majority of the variables in this study are categorical and non-normally distributed. Thus, descriptive statistics did not provide meaningful information.

Analysis for Assumptions

Additional analyses were conducted to ensure that the assumptions for logistic regression were met. Logistic regression has one main assumption of independent observations with independent error or multicolinearity (Peng, Lee, & Ingersoll, 2002). Chi-Square analyses were used to determine if there is a significant relationship between any of the proposed predictor variables and on-time graduation. Chi-Square analyses are frequently used when variables are categorical. The Chi-Square tests was used to determine if the variables are statistically dependent by measuring how well the distribution of the data in the study match the expected distribution if the variables are independent. Pearson product moment and phi coefficients were calculated to ensure that the assumption of multicollinearity was not violated. These analyses determined if independent variables are highly correlated resulting in problematic effects on regression statistic estimations (Pedhazur, 1997).

Model Construction

Model construction began with no predictor variables specified to serve as a baseline for comparison. The intra-class correlation (ICC) was calculated based on this unconditional model.

The next models did not fix the intercepts to allow for the intercepts to vary. Level 1 variables were entered in groups and individually. The first block entry was student background characteristic variables (SES, Language Proficiency, and Racial Classification), followed by academic and behavioral variables (Attendance, Third Grade Reading, GPA, Discipline Incidents, and School Transitions), Off-Track Status followed by the disability-specific hypothesized predictors (Disability Category, Time Educated With General Education Peers, and Years of Disability Services). The first variables entered for level 2 were school demographic characteristics (School SES and School Racial/Ethnic Composition), followed by the academic and behavioral variables (School Grade, School Suspension Rates, School Stability Rate, 10th Grade Reading, Student Engagement). Adjustments were made to the models based on model convergence and to make outcomes most clearly interpretable. All adjustments are explained in chapter four.

Research Question

What is the relationship between student level variables (e.g., language proficiency, disability category, etc.) and school level variables (e.g., racial/ethnic composition, school grade, etc.) and on-time graduation for students with disabilities?

A two-level logistical regression model with both individual level and school level independent variables was used to predict the likelihood of on-time graduation.

CHAPTER 4: RESULTS

The purpose of this study was to investigate the factors that were hypothesized to contribute to whether a student graduates from high school on-time. In addition, this study examined how early in the students' educational careers these factors demonstrated influence on on-time graduation. This chapter focuses on the answer to the posed research question and how the question was answered. This chapter begins with descriptive statistics for the study variables and the methods for the multilevel model construction. The chapter concludes with the results of the multilevel analysis used to answer the research question.

Descriptive Statistics

The frequency of the number of times off-track at each grade level was examined and is provided in Table 5. Means and standard deviations for continuous variables at the individual-level are provided in Table 6 and at the school-level in Table 7. The mean percentage of absences across grades ranged from 4.31% at 11th grade to 7.95% at 12th grade. For middle school grades the mean GPA ranged from 2.51 in eighth grade to 2.55 in sixth grade, and in high school grades the range was from 2.23 in ninth grade to 2.71 in 12th grade. The average number of ODRs across grades ranged from .83 in 11th grade to 3.22 in ninth grade. The number of semesters students were off-track and the years of ESE services are both cumulative from sixth to 12th grade. Therefore, the number of semesters off-track increased across the grades from an average of .07 in sixth grade to an average of 5.13 in 12th grade. The mean total years of ESE services increased from 3.56 in sixth grade to an average of 7.29 in 12th grade.

Table 5. Number of Participants by Number of Semesters Off-Track

Number of semesters off-track	6th	7th	8th	9th	10th	11th	12th
0	344	278	214	166	127	98	79
1	155	118	121	90	90	72	62
2	150	89	82	88	57	49	47
3		90	75	65	52	54	45
4		92	66	64	50	40	50
5			65	61	56	45	38
6			59	50	47	43	44
7				51	49	50	43
8				57	48	40	51
9					23	38	25
10					26	25	25
11						19	33
12						16	13
13							15
14							9
Total *n*	649	667	682	692	625	589	579

Table 6. Individual-Level Variables Means and Standard Deviations

Predictor	6th	7th	8th	9th	10th	11th	12th
Attendance[a]	6.81	7.49	7.31	7.15	5.99	4.31	7.95
	(7.43)	(7.79)	(8.41)	(9.05)	(7.06)	(5.89)	(9.64)
GPA	2.55	2.54	2.51	2.23	2.43	2.45	2.71
	(.84)	(.87)	(.90)	(3.22)	(.89)	(.79)	(.70)
ODRs	2.41	2.98	2.77	3.22	2.16	.83	1.16
	(5.59)	(6.63)	(6.24)	(7.53)	(5.01)	(.21)	(3.23)
Off-track[b]	0.70	1.40	2.13	3.09	3.71	4.48	5.13
	(.82)	(1.48)	(2.04)	(2.67)	(3.11)	(3.56)	(3.90)
Elementary transitions	0.31	0.32	0.32	0.32	0.28	0.29	0.29
	(.63)	(.64)	(.64)	(.64)	(.58)	(.62)	(.61)
Middle transitions	0.12	0.12	0.13	0.13	0.12	0.11	0.12
	(.37)	(.36)	(.38)	(.38)	(.36)	(.35)	(.36)
High transitions	NA	NA	NA	0.09	0.04	0.07	0.07
				(.33)	(.22)	(.30)	(.31)
Years with ESE services[c]	3.56	4.30	4.34	5.13	5.85	6.56	7.29
	(3.20)	(2.45)	(3.58)	(4.01)	(4.44)	(4.92)	(5.32)
Total student *n*	650	667	682	692	625	589	579

[a] Percent Absences

[b] Number of semesters off track from sixth grade semester 1

[c] Cumulative over educational career

Table 7. School-Level Variables Means and Standard Deviations

Predictor	Overall	6th	7th	8th	9th	10th	11th	12th
School stability[a]	97.95	99.38	98.77	99.17	96.77	96.67	96.93	
	(1.40)	(1.72)	(1.37)	(1.16)	(1.40)	(1.11)	(1.63)	
School suspension	22.98	24.76	25.74	30.62	22.85	21.93	16.27	18.69
rates	(11.09)	(12.88)	(14.04)	(17.08)	(10.45)	(7.93)	(6.87)	(8.36)
School % eligible	52.40	48.28	52.49	56.22	50.67	52.81	52.82	53.49
for FRL	(16.27)	(15.23)	(16.72)	(16.90)	(14.75)	(16.17)	(16.20)	(17.94)
School % non-White	29.23	24.62	25.36	29.79	29.66	31.04	31.77	32.38
	(11.05)	(11.67)	(11.61)	(11.28)	(10.81)	(10.57)	(10.74)	(10.66)
School engagement	3.79	NA	NA	NA	3.79	3.78	3.79	3.78
Gallup	(.08)				(.07)	(.09)	(.07)	(.09)
School Hope Gallup	4.37	NA	NA	NA	4.37	4.37	4.37	4.37
	(.06)				(.06)	(.07)	(.05)	(.07)
School 10th grade	47.25	NA	NA	NA	46.94	47.23	47.35	47.48
FCAT	(10.22)				(10.06)	(10.30)	(10.27)	(10.24)
Total student n	692	650	667	682	692	625	589	579
Total school n	29	15	15	15	14	13	13	14

[a] 12th grade school stability not reported due to errors in data for 12th grade students

Skewness and kurtosis values were examined for each of the variables and histograms for level two variables were examined for normality. At each grade level skewness and kurtosis of the school-level variable values were within the acceptable range of -2.0 to +2.0. A visual inspection of histograms for school-level variables revealed approximately normal distribution for variables other than percentage of students qualifying for free or reduced lunch price (SES) and school race/ethnicity. The skewness for SES ranged from -.409 to -.250 and kurtosis ranged from -1.670 to -1.404. The skewness for school race/ethnicity ranged from .199 to .496 and kurtosis ranged from -1.182 to -1.084.

The overall mean school stability rate is 97.95% which corresponds to 98% of students at a school at the beginning of the year were at the same school at the end of the year. The overall rate for school suspensions was 22.98 per 100 students and ranged from 16.27 suspensions per 100 students in 11th grade to 30.62 in 8th grade. The mean percentage of students eligible for a free or reduced lunch price was 52.40. The overall percentage of non-white students was 52.40%

and varied by grade from 24.62% in 6th grade to 32.38% in 12th grade. The average percentage of students scoring a three or higher on the reading FCAT in 10th grade was 47.25%. The grand means for the Gallup Poll for both engagement and hope were collected only in 12th grade for each school. Thus, when reported as a measure for a school across high school grades, the grand means for engagement and hope remained fairly consistent averaging 3.79 and 4.37, respectively. The Gallup Poll scores range from a low of one to a high of five.

The ranges and distributions of the study variables were examined for questionable variable ranges, distributions, or variance. The district information technology consultant was contacted with any questionable data to verify accuracy. The correlation matrix was examined to determine relationships between variables and check for multicollinearity.

The school stability variable for 12th grade had errors that could not be verified. Thus, this data was not used in analysis. Predictor variables that are highly correlated can cause multicollinearity. GPA for semester one and semester two were highly correlated with correlation coefficients ranging from .674 in 12th grade to .832 in 9th grade. Similarly, attendance at semester one and semester two were highly correlated with correlation coefficients ranging from .553 in 12th grade to .631 in 9th grade. Therefore, the semester two variables for both GPA and attendance were used in analyses. Additionally, suspension and ODR data was highly correlated at with correlation coefficients ranging from .425 in 12th grade to .800 in 7th grade. The suspension variable was omitted from the study because ODRs are part of the current Early Warning System data in the target school district.

Correlations and phi coefficients (for categorical variables) were examined to determine the relationships between variables and check for multicolinearity. Correlations between each of the predictor variables and on-time graduation for each grade level are displayed in Table 8.

Table 8. Correlations of Predictor Variables with On-Time Graduation

				r			
Variable	6th	7th	8th	9th	10th	11th	12th
Level 1							
White	.048	.058	.071	.058	.053	-.004	.016
Black	.009	.019	.003	.011	-.017	.018	-.002
Hispanic	.026	.025	.012	.026	.004	.004	.011
Asian	.053	.033	.034	.035	.023	.014	.009
Native American	.033	.016	.014	.021	.012	-.020	.012
Multiracial	.005	-.003	-.001	.002	.033	.056	.050
Language proficiency	-.018	-.008	-.014	-.002	-.025	-.014	-.026
SES level	-.167**	-.166**	-.172**	-.178**	-.130**	-.152**	-.152**
Attendance	-.291**	-.257**	-.290**	-.355**	-.297**	-.328**	-.240**
3rd grade reading[a]	-.147**	-.148**	-.146**	-.148**	-.162**	-.156**	-.148**
10th grade reading[a]	NA	NA	NA	-.262**	-.272**	-.258**	-.265**
K–5 transitions	-.061	-.066	-.057	-.053	.003	-.004	-.003
6–8 transitions	-.084*	-.117**	-.076*	-.091*	-.073	-.039	-.052
9–12 transitions	NA	NA	NA	-.177**	-.099*	-.127**	-.113**
GPA	.297**	.284**	.271**	.379**	.201**	.164**	-.046
ODRs	-.192**	-.192**	-1.62**	-.279**	-.224**	-.229**	-.196**
Total N off-track	-.002	.035	.037	.046	.067	.028	.017
SLD	.102**	.112**	.113**	.124**	.163**	.208**	.201**
InD	-.230**	-.241**	-.262**	-.265	-.325**	-.358**	-.380**
EBD	-.049	-.059	-.050	-.046	-.023	-.036	-.032
OHI	.031	.044	.040	.047	.058	.064	.077
LI	.006	.011	.013	.016	.009	.015	.020
ASD	-.090*	-.131**	-.156**	-.160**	-.200**	.219**	-.235**
504	-.002	-.002	.023	.018	.017	-.012	.008
SI	.046	.058	.059	.061	.055	.071	.083
Other disability	.050	.052	.053	.054	.062	.055	.050
Served with general education peers	-.109**	-.125**	-.156**	-.161**	-.157**	-.189**	-.200**
Years with ESE services	-.053	-.035	-.068	-.081*	-.101*	-101*	-.110**
Level 2							
School race	.098*	.118**	.115**	.102**	.071	.082*	.078
School SES	-.164**	-.202**	.182**	-.208**	-.151**	-.146**	-.126**
School stability	.088*	.118**	.042	.115**	.144**	.047	
School suspensions	-.160**	-.163**	.145**	-.166**	-.130**	-.130**	-.037
School grade	NA	NA	NA	.190**	.117**	.111**	.096*
School 10th grade FCAT	NA	NA	NA	.094*	.132**	.085*	.112**
School Engagement Gallup	NA	NA	NA	.196**	.161**	.186**	.183**
School Hope Gallup	NA	NA	NA	-.262**	-.272**	-.258**	-.265**

Note. NA= variable was not measured at that time point.

[a] The variables 3rd Grade Reading and 10th Grade Reading were scaled such that higher scores represent lower actual reading scores on the Florida Comprehensive Achievement Test (e.g., lowest score possible of Level 1 was dummy coded as a 2, Level 2 was coded as a 1, Levels 3+ were coded as a 0).

*Significant at the .05 level. **Significant at the .01 level.

Weak relationships were noted for variables such as all racial groups and language proficiency. Significant relationships for individual-level variables were found for GPA, ODRs, SES, FCAT reading scores, SES, attendance, ASD, InD, and ever served less than 80% of time with general education peers. Significant correlations with on-time graduation were found for all school-level variables at more than one grade level.

Multi-Level Analyses

Model Construction

Hierarchical Generalized Linear Models (HGLMs) were constructed using HLM 7 (Raudenbush, Bryk, & Congdon, 2010) statistical package to answer the research question. Because the outcome variable is binary, the Bernoulli distribution was used with the Penalized Quasi-Likelihood estimation method. The log odds of on-time graduation were estimated through transformation of the variables using a logit function to linear relationships. Missing data were accounted for using listwise deletion at the individual level. There were no missing data for the school-level variables. No discernable pattern for missing data was detected.

To ensure the appropriateness hierarchical methods, the intraclass correlation coefficient (ICC) was calculated for each grade level. The ICC provides a measure of the degree to which student data is nested within schools. Higher levels of nesting are indicated by greater ICCs. Due to the use of a binary outcome variable, the alternate ICC formula suggested by Snijders and Boskers (1999) $\rho_I = \tau_{00}/(\tau_{00} + \pi^2/3)$ was used with each unconditional model. The ICCs for each grade level were above zero and multi-level models are suggested for ICCs greater than 0 (O'Connell & McCoach, 2008).

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Research Question

What is the relationship between student level variables (e.g., language proficiency, disability category, etc.) and school level variables (e.g., racial/ethnic composition, school grade, etc.) and on-time graduation for students with disabilities?

Level-1 Model

The extent to which identified individual student and school-level variables predict on-time graduation were investigated using two-level models. The final model results for each grade level are in Tables 7 and 8.

An unconditional model without predictor variables was run for each grade level. Next, the group of level-1 background variables was added to the unconditional model with intercepts allowed to vary, but slopes were fixed. When slopes were allowed to vary for background variables, the models did not converge. The level-1 background variables included:

- SES Level: The current or historical designation as a student eligible for free or reduced lunch (0 = no, 1 = yes)

- Language Proficiency: The current or historical (K-10th) designation as an English Language Learner (0 = no, 1 = yes)

- Racial/Ethnic Classification: The designation as one of six categories, White, Black, Hispanic, Asian, Native American and Multiracial as determined by parent reports on school enrollment forms K-10th. Dummy variables were created to represent the racial/ethnic classification (White 0 = no, 1 = yes; Black 0 = no, 1 = yes; Hispanic 0 = no, 1 = yes; Asian 0 = no, 1 = yes; Native American 0 = no, 1 = yes; Multi-Racial 0 = no, 1 = yes)

The level-1 student academic and behavioral variables were entered next with slopes and intercepts allowed to vary unless otherwise indicated. The student academic and behavioral variables included:

- Attendance: The percent of absences per semester. The second semester percent was used in the models.

- GPA: The reported GPA was used in ninth through twelfth grades. However, in grades sixth through eighth, for each course, grades were calculated in a non-cumulative way (calculated only for each year instead of across years as is done for high school) with the GPA based on five-point scale (0-4.0 where an A = 4.0, B = 3.0, C = 2.0, D = 1.0, F = 0.0). Only second semester GPA was included in the models.

- Discipline Incidents: The number of office discipline referrals (ODRs) per school year (total number)

- School Transitions: The total number of times the student has changed schools for reasons other than school promotion or district changes such as opening of a new school that alters attendance zones at elementary, middle and high school (K-5th total number; 6th-8th total number; 9th-12th total number);

- Reading at 3rd and 10th Grade: The Florida Comprehensive Assessment Test (FCAT) 3rd and 10th grade reading score originally reported in five categories from one to five with higher levels indicating a higher level of achievement and level 3 indicating proficiency (0 = level 3+, 1 = level 2, 2 = level 1)

The next variables entered included the number of semesters off-track and the disability specific variables which were added with intercepts allowed to vary and fixed slopes. These variables include:

- Total number of Off-Track Statuses: The total number of semesters designated as Off-track in 6th through 12th grades (continuous variable 0 through 14)

- Disability Category: Disability category was coded as the primary Exceptional Student Education disability category (based on the Individual Education Program or Section 504 Plan of the Rehabilitation Act of 1973 in sixth grade). The possible categories are specific Learning Disabilities (SLD), Emotional Behavioral Disability (EBD), Intellectual Disability (InD), Language Impaired (LI), Speech Impaired (SI), Autism Spectrum Disorder (ASD), 504, and other. (SLD 0 = no, 1 = yes; EBD 0 = no, 1 = yes; InD 0 = no, 1 = yes; OHI 0 = no, 1 = yes; LI 0 = no, 1 = yes; SI 0 = no, 1 = yes; ASD 0 = no, 1 = yes; 504 0 = no, 1 = yes; other 0 = no, 1 = yes).

- Time Educated with General Education Peers: According to the Florida Department of Education (2015a), a regular class indicates that students with disabilities are educated with their general education peers at least 80% of the week. If a student is educated in a resource room they spend between 40% and 80% of the week being educated with general education peers. Lastly, a separate class indicates that students are educated with general education peers less that 40% of the time (80% or more = 0, 40%-79% =, less than 40% = 2).

- Years of ESE services: The years of ESE services is continuous variable of the number of years a student had an Individual Education Program up until the year of each model.

Level-2 Model

School demographic and academic/behavioral variables were added to the level one model for each grade. The school-level variables included:

- School SES: The school SES level is determined by the State of Florida and is the percentage of students eligible for free and reduced lunch school-wide. The School SES level was calculated each year (07/08-09/10) in each middle school and each year in each high school (10/11-13/14)

- School Racial/Ethnic Composition: The percentage of non-white students school-wide is provided for each school each year by the Florida Department of Education. The percentage of racially and ethnically non-white students was calculated each year (07/08-09/10) in each middle school and each year in each high school (10/11-13/14).

- School Stability Rates: The percentage of students from the Florida Department of Education October membership count who were still present in the second semester end-of-year count (07/08-13/14 school years)

- School Grade: The school grade is determined each year by the Florida Department of Education. For the purpose of this study, school grade was broken into three categories of schools earning grades of A-B, those earning a C, or those earning grades of D-F (0 = A-B, 1 = C, 2 = D-F)

- School Rates of Discipline Incidents: The suspension rates per 100 students each year (07/08-09/10) in each middle school and each year in each high school (10/11-13/14).

- School Engagement and School Hope: The Engagement and Hope Scales of the Gallup Student Poll grand mean (the mean of the means for all six items in the index on a 1-to-5 scale) for both the Engagement and Hope Indexes. The poll was only give

to this cohort of students in the fall of 2013, but used in each for each high school

(10/11-13/14) in the model.

During model construction, difficulty with convergence required reexamination of variable variance and the percentage of missing data. The variance in the school grade school-level variable differed by grade level. In grade seven there were only As and Bs and in grades eleven and twelve there were few Cs and no Ds or Fs. Therefore, the variable of school grade was removed for those grade levels. In addition, the third and tenth grade reading individual-level variables were missing data across grade levels. Thus, these two variables were removed from model construction. Additionally, difficulty converging the 11th and 12th grade models resulted in some variables being left out of the model due to apparent complex correlations with other variables. For both the eleventh and twelfth grade models school-level 10th grade FCAT and Gallup Poll results for hope and engagement were not included in the model. In twelfth grade the level one disability category variables of OHI, SI, and SLD as well as school level suspension data were also removed from the model.

The full model tested for predicting on-time graduation for each grade-level from sixth to eighth grade is as follows:

$\eta_{ij} = \gamma_{00} + \gamma_{01}$(School Stability$_j$) + γ_{02}(School Suspension Rates$_j$)+ γ_{03}(School SES $_j$)$_j$+ γ_{04}(School Racial/Ethnic Composition$_j$)+ γ_{05}(School Grade$_j$)+ γ_{10}(Language Proficiency$_{ij}$)+ γ_{20}(SES$_{ij}$) γ_{30}(Attendance$_{ij}$) + γ_{40}(Black$_{ij}$) + γ_{50}(Hispanic$_{ij}$) + γ_{60}(Asian$_{ij}$) + γ_{70}(Native American$_{ij}$) + γ_{80}(MultiRacial$_{ij}$) + γ_{90}(GPA$_{ij}$)+ γ_{100}(ODR$_{ij}$)+ γ_{110}(Off-track$_{ij}$)+ γ_{120}(K-5 Transitions$_{ij}$)+ γ_{130}(6-8 Transitions$_{ij}$)+ γ_{140}(SLD$_{ij}$)+ γ_{150}(InD$_{ij}$)+ γ_{160}(EBD$_{ij}$)+ γ_{170}(OHI$_{ij}$)+ γ_{180}(LI$_{ij}$)+ γ_{190}(ASD$_{ij}$)+ γ_{200}(SI$_{ij}$)+ γ_{210}(Other Disability$_{ij}$)+ γ_{220}(Served With Peers$_{ij}$)+ γ_{230}(ESE Years$_{ij}$)+ u_{0j}+ $u_{1j}{}^1$(Attendance)+ $u_{2j}{}^1$(GPA)+ $u_{3j}{}^1$(ODR)+ $u_{4j}{}^1$(k-5 transitions)+ $u_{5j}{}^1$(6-8 transitions)+ $u_{6j}{}^1$(9-12 transitions)

The u_{0j} designates the slopes allowed to vary which were attendance, GPA, ODR, and all levels of transitions variables in grades six to eight.

The full model tested for predicting on-time graduation for each grade-level from ninth to 12th grade is as follows:

$\eta_{ij} = \gamma_{00} + \gamma_{01}$(School Stability$_j$) + γ_{02}(School Suspension Rates$_j$) + γ_{03}(School SES$_j$) + γ_{04}(School Racial/Ethnic Composition$_j$) + γ_{05}(School Grade$_j$)+ γ_{06}(School 10th FCAT$_j$)+ γ_{07}(Engagement Gallup$_j$)+ γ_{08}(Hope Gallup$_j$)+ γ_{10}(Language Proficiency$_{ij}$)+ γ_{20}(SES$_{ij}$) γ_{30}(Attendance$_{ij}$) + γ_{40}(Black$_{ij}$) + γ_{50}(Hispanic$_{ij}$) + γ_{60}(Asian$_{ij}$) + γ_{70}(Native American$_{ij}$) + γ_{80}(MultiRacial$_{ij}$) + γ_{90}(GPA$_{ij}$)+ γ_{100}(ODR$_{ij}$)+ γ_{110}(Off-track$_{ij}$)+ γ_{120}(K-5 Transitions$_{ij}$)+ γ_{130}(6-8 Transitions$_{ij}$)+ γ_{140}(9-12 Transitions$_{ij}$)+ γ_{150}(SLD$_{ij}$)+ γ_{160}(InD$_{ij}$)+ γ_{170}(EBD$_{ij}$)+ γ_{180}(OHI$_{ij}$)+ γ_{980}(LI$_{ij}$)+ γ_{200}(ASD$_{ij}$)+ γ_{210}(SI$_{ij}$)+ γ_{220}(Other Disability$_{ij}$)+ γ_{230}(Served With Peers$_{ij}$)+ γ_{240}(ESE Years$_{ij}$)+ u_{0j}+ $u_{1j}{}^1$(Attendance)+ $u_{2j}{}^1$(GPA)+ $u_{3j}{}^1$(ODR)+ $u_{4j}{}^1$(k-5 transitions)+ $u_{5j}{}^1$(6-8 transitions)+ $u_{6j}{}^1$(9-12 transitions)

The u_{0j} designates the slopes allowed to vary which were attendance, GPA, ODR, and all levels of transitions variables. However, in 10th and 12th grades all levels of transitions being allowed to vary caused a lack of convergence and thus the slopes for these variables were fixed.

In these equations η_{ij} is the log-odds of graduating on-time for student i in school j; γ_{00} is the average log-odds of graduating on-time across level-2 units; γ_{01}. . .γ_{08} are school-level effects and γ_{10}. . .γ_{240} are individual-level effects across schools.

Sixth Grade

In the final model, none of the school-level predictors were significant. The reported β_j are on the logit scale which ranges from negative infinity to positive infinity with positive numbers indicating greater likelihood of being off track. Odds ratios less than 1.0 indicate a decreased likelihood of on-time graduation. SES Level ($\beta_9 = -.64$, odds ratio $= .53$, $t = -2.52$, $p = .012$), attendance ($\beta_9 = -.09$, odds ratio $= .91$, $t = -3.70$, $p = .003$), GPA ($\beta_9 = .70$, odds ratio $= 2.02$, $t = 3.65$, $p = .003$.), InD ($\beta_9 = -2.35$, odds ratio $= .09$, $t = -3.27$, $p = .001$), and ASD ($\beta_9 = -2.54$, odds ratio $= .08$, $t = 2.85$, $p = .005$), were significant predictors in sixth grade of on-time graduation. The significant negative relationship between SES and on-time graduation indicates

Table 9. Sixth through 8th-Grade Time Points Parameter Estimates

Variable	6		7		8	
	β (*SE*)	*OR* (*CI*)	β (*SE*)	*OR* (*CI*)	β (*SE*)	*OR* (*CI*)
Intercept	1.28		1.24		1.24	
	(.35)		(.37)		(.38)	
Level 1						
Black	0.51	1.65	0.58	1.77	47.0	1.61
	(.49)	(.63,4.34)	(.53)	(.63,5.00)	(.52)	(.58,4.48)
Hispanic	-0.03	0.97	-0.09	0.91	0.01	1.01
	(.35)	(.48,1.94)	(.36)	(.44,1.87)	(.36)	(.50,2.06)
Asian	1.82	6.20	1.97	7.20	2.44	11.43
	(1.24)	(.54,71.69)	(1.42)	(.44,117.35)	(1.47)	(.64,204.72)
Native American	-0.08	0.92	0.11	1.12	-0.17	0.85
	(.53)	(.33,2.60)	(.54)	(.39,3.24)	(.52)	(.30,2.37)
Multiracial	-0.15	0.86	-0.37	0.69	-0.22	0.81
	(.63)	(.25,2.96)	.66	(.19,2.52)	(.68)	(.21,3.08)
GPA	.070**	2.02	0.87*	2.38	0.61**	1.83
	(.19)	(1.33,3.07)	(.25)	(1.40,4.03)	(.16)	(1.29, 2.60)
Language proficiency	-0.21	0.81	-0.17	0.85	-0.17	0.84
	(.52)	(.29,2.23)	(.50)	(.32,2.25)	(.50)	(0.32,2.23)
ODRs	-0.04	-0.04	-0.03	0.97	-0.03	0.97
	(.04)	(.96)	(.03)	(.91,1.03)	(.68)	(.92,1.03)
SES Level	-0.64*	0.53	-0.44	0.64	-0.53	0.59
	(.25)	(.32,.87)	(.26)	(.39,1.07)	(.26)	(0.36,.98)
Attendance	-0.09**	0.91	-0.05*	0.95	-0.08**	0.92
	(.03)	(.86,.96)	(.02)	(.90,.99)	(.02)	(.88,.96)
K–5 transitions	0.21	1.23	0.20	1.22	0.19	1.21
	(.29)	(.66,2.30)	(.29)	(.66,2.25)	(.28)	(.66,2.21)
6–8 transitions	-0.25	0.78	-0.30	0.74	-0.29	0.75
	(.45)	(.29,2.07)	(.37)	(.33,1.66)	(.37)	(.34,1.68)
Semesters off-track	-0.10	0.91	0.01	1.01	0.05	1.05
	(.14)	(.69,1.19)	(.08)	(.87,1.17)	(.06)	(.94,1.17)
SLD	0.69	1.99	0.55	1.73	0.59	1.80
	(.35)	(1.00,3.97)	(.38)	(.82,3.65)	(.42)	(.79,4.11)
InD	-2.36**	0.09	-2.90**	0.05	-2.98**	0.05
	(.72)	(.02,.39)	(.76)	(.01,0.25)	(.82)	(0.01,.26)
EBD	0.47	1.59	-0.11	0.90	0.18	1.20
	(.62)	(.47,5.38)	(.61)	(.27,2.99)	(.65)	(.33,4.31)
LI	0.23	1.26	0.27	1.30	0.31	1.37
	(.58)	(.40,3.96)	(.61)	(.40,4.26)	(.64)	(.39,4.78)
OHI	0.38	1.46	0.14	1.15	0.44	1.55
	(.71)	(.36,5.87)	(.75)	(.26,5.08)	(.84)	(.299,8.07)
ASD	-2.54**	0.08	-3.17**	0.04	-3.17**	0.04
	(.88)	(.01,.46)	(.95)	(.01,.27)	(.92)	(0.01,0.26)
SI	0.72	2.05	0.69	1.99	1.09	2.98
	(.70)	(.52,8.11)	(.69)	(.52,7.69)	(.80)	(.62,14.33)
Other disability	0.38	1.47	0.06	1.06	0.44	0.88
	(.91)	(2.44,8.82)	(.98)	(.16,7.24)	(.84)	(0.14,5.61)
Served with general education peers	-0.14	0.86	-0.19	0.83	-0.23	0.76
	(.21)	(.54,1.37)	(.18)	(.56,1.22)	(.17)	(.53,1.10)
Years with ESE services	0.04	1.04	0.05	1.05	0.08	1.08
	(.07)	(.90,1.20)	(.06)	(.93,1.18)	(.06)	(.96,1.22)

Table 9 (Continued)

Variable	6		7		8	
	β (*SE*)	*OR* (*CI*)	β (*SE*)	*OR* (*CI*)	β (*SE*)	*OR* (*CI*)
Level 2						
School stability	-0.13	0.88	0.10	1.10	0.01	1.01
	(.12)	(.67,1.17)	(.13)	(.83,1.46)	(.22)	(.61,1.67)
School suspension	0.00	1.00	0.01	1.01	-0.01	0.95
rates	(.02)	(.96,1.05)	(.02)	(.97,1.06)	(.01)	(.96,1.03)
School % eligible	-0.04	0.96	-0.03	0.97	-0.02	0.98
FRL	(.02)	(.93,1.00)	(.02)	(.94,1.01)	(.02)	(.94,1.02)
School % non-	-0.01	.99	0.00	1.00	0.01	1.01
White	(.02)	(.95,1.03)	(.02)	(.97,1.04)	(.02)	(.96,1.06)
School grade	-1.26	0.29			-0.06	0.94
	(.60)	(.07,1.20)			(.83)	(.14,6.18)

Table 10. Ninth through 12th-Grade Time Points Parameter Estimates

	9		10		11		12	
Variable	β (*SE*)	*OR* (*CI*)	β (*SE*)	*OR* (*CI*)	β (*SE*)	*OR* (*CI*)	β (*SE*)	*OR* (*CI*)
Intercept	0.95		1.92		1.60		6.08	
	(.36)		(1.92)		(.69)		(1.83)	
Level 1								
Black	0.45	1.57	0.04	1.04	-0.29	0.75	0.54	1.72
	(.44)	(.66,.70)	(.64)	(.29,3.66)	(.74)	(.17,3.24)	(2.29)	(.02,155.54)
Hispanic	-0.00	1.00	-0.00	0.99	-0.07	0.94	-1.60	0.20
	(.30)	(.55,1.81)	(.46)	(.40,2.43)	(.52)	(.34,2.61)	(1.13)	(.02,1.86)
Asian	2.04	1.70	1.75	5.74	1.69	5.42	-1.18	0.31
	(1.12)	(.86,69.14)	(2.03)	(.11,308.44)	(1.65)	(.21,138.58)	(4.33)	(.00,1549.57)
Native American	-0.12	0.89	-0.07	0.93	0.17	1.18	3.65	38.30
	(.44)	(.38,2.11)	(.59)	(.29,2.97)	(.70)	(.30,4.74)	(3.01)	(.10,14440.78)
Multiracial	-0.06	0.94	0.24	1.28	0.34	1.42	4.29	73.32
	(.58)	(.30,2.95)	(.88)	(.23,7.23)	(1.06)	(.18,11.45)	(3.49)	(.08,71541.468)
GPA	0.52**	1.68	0.76**	2.15	0.83**	2.30	-1.53	0.22
	(,17)	(1.16,2.45)	(.20)	(1.38,3.35)	(.23)	(1.40,3.79)	(1.14)	(.02,2.53)
Language proficiency	-0.21	0.81	-0.49	0.61	-0.87	0.42	-2.51	0.08
	(.44)	(.34,1.92)	(.59)	(.19,1.97)	(.70)	(.11,1.65)	(1.52)	(.00,1.63)
ODRs	-0.03	0.97	-0.03	0.97	-0.06	0.94	-0.07	0.94
	(.02)	(.93,1.01)	(.06)	(.85,1.11)	(.13)	(.71,1.25)	(.23)	(.57,1.54)
SES level	-0.17	0.84	-0.25	0.78	-0.15	0.86	-0.34	0.71
	(.21)	(.55,1.29)	(.30)	(.43,1.41)	(.36)	(.42,1.77)	(.93)	(.11,4.46)
Attendance	-0.05**	0.96	-0.06*	0.94	-0.12	0.89	-0.03	0.97
	(.02)	(.92,.99)	(.04)	(.87,1.02)	(.06)	(.77,1.02)	(.08)	(.81,1.16)
K–5 transitions	0.05	1.05	0.35	1.42	0.59	1.81	2.47**	10.57
	(.20)	(.68,1.63)	(.25)	(.86,2.35)	(.46)	(.66,5.00)	(.95)	(1.60,70.17)
6–8 transitions	0.00	1.00	-0.08	0.92	0.59	1.81	1.47	4.00
	(.33)	(.49,2.05)	(.42)	(.40,2.11)	(.79)	(.32,10.15)	(1.59)	(.16,98.14)
9–12 transitions	-0.72	0.49	0.01	1.01	-0.50	0.61	0.03	1.22
	(.48)	(.17,1.39)	(.57)	(.33,3.10)	(.77)	(.11,3.26)	(1.81)	(.03,44.70)
Semesters off-track	0.03	1.04	0.06	1.06	0.06	1.06	0.17	1.19
	(.03)	(.97,1.11)	(.04)	(.97,1.16)	(.47)	(.97,1.16)	(.12)	(.96,1.47)
SLD	0.67*	1.96	1.32	3.75	1.92*	6.80	1.50	4.46
	(.39)	(.91,4.25)	(.65)	(1.05,13.48)	(.90)	(1.16,40.04)	(1.51)	(0.23,87.32)
InD	-2.37**	0.09	-3.33**	0.04**	-3.73**	0.02	-6.51**	0.00
	(.68)	(.03,.36)	(.98)	(.01,.25)	(1.31)	(.00,.31)	(2.05)	(.00,.25)
EBD	0.33	1.39	0.59	1.80	0.33	1.38	-0.24	0.78
	(.59)	(.44,4.39)	(.86)	(.33,9.78)	(1.05)	(.18,10.90)	(1.91)	(.02,33.89)
LI	0.39	1.48	0.76	2.13	1.15	4.89	2.80	16.46
	(.68)	(.48,4.56)	(.88)	(.38, 12.07)	(1.38)	(.51,46.68)	(2.13)	(25,1098.18)
OHI	0.42	1.52	0.67	1.95	1.42	4.12	1.52	0.67
	(.68)	(.40,5.73)	(.94)	(.31,12.48)	(1.44)	(.24,69.74)	(.40,5.73)	(.94)
ASD	-2.24**	0.11	-3.19**	0.04	-2.50*	0.08	-5.43**	0.00
	(.77)	(.02,.48)	(1.06)	(.01,.33)	(1.22)	(.01,.91)	(2.06)	(.00,.25)
SI	0.67	1.96	1.38	3.97	1.61	5.05	0.96	2.62
	(.60)	(.60,6.41)	(.97)	(.60,26.49)	(1.33)	(.37,68.69)	(3.63)	(.00,3334.862)
Other disability	0.58	1.78	1.51	4.51	0.97	2.63	1.35	3.86
	(.79)	(.38,8.35)	(1.38)	(.30,67.89)	(1.59)	(.11,60.37)	(2.47)	(.030,503.444)
Served with general education peers	-0.03	0.97	-0.07	0.93	-0.33	0.72	-1.43*	0.24
	(.14)	(.74,1.27)	(.23)	(.56,1.54)	(.24)	(.43,1.23)	(.61)	(.07,.79)
Years with ESE services	-0.01	0.99	-0.01	0.99	-0.02	0.98	0.02	1.02
	(.05)	(.90,1.09)	(.07)	(.86,1.14)	(.09)	(.82,1.17)	(.15)	(.75,1.38)
Level 2								
School stability	-0.05	0.95	-0.01	0.99	-0.10	0.91		
	(.17)	(.59,1.54)	(.02)	(.94,1.04)	(.25)	(.48,1.72)		
School suspension rates	-0.01	0.99	-0.02	0.98	-0.04	0.96		
	(.02)	(.93,1.05)	(.03)	(.90,1.06)	(.06)	(.83,1.11)		
School % eligible FRL	-0.02	0.98	0.17	1.18	-0.00	1.00	-0.04	0.96
	(.02)	(.93,1.03)	(.33)	(.47,2.95)	(.02)	(.95,1.07)	(.04)	(.87,1.01)
School % non-White	-0.05	0.95	-0.03	0.97	-0.01	0.99	0.10	1.11
	(.03)	(.88,1.03)	(.04)	(.86,1.10)	(.03)	(.93,1.07)	(.05)	(.99,1.24)

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Table 10 (Continued)

Variable	9		10		11		12	
	β (SE)	OR (CI)	β (SE)	OR (CI)	β (SE)	OR (CI)	β (SE)	OR (CI)
School engagement Gallup	-0.91 (.39)	0.40 (.14,1.19)	-0.01 (.04)	0.99 (.89,1.10)				
School Hope Gallup	-2.85 (3.08)	0.06 (.00,301.06)	-0.20 (.49)	0.82 (.21,3.20)	-0.50 (11.14)	0.61 (.17,2.23)		
School 10th reading	3.00 (4.20)	20.06 (.00,2312942.98)	-0.10 (3.66)	0.91 (.00,23610.71)			-0.04 (.08)	0.97 (.81,1.15)
School grade	-0.04 (.04)	0.96 (.86,1.07)	-0.75 (6.23)	0.47 (.00,15568342.39)				

that being eligible for free or reduced lunch price is associated with being .53 times less likely or 47% less likely to graduate on-time than students who did not qualify for free or reduced lunch prices. In addition, more days absent resulted in lower odds of graduating on-time. A student who attended 1% fewer days was .91 times less likely to graduate on-time. The significant positive relationship between sixth grade GPA and on-time graduation indicates that for every one unit increase in GPA students are 2.02 times more likely to graduate on-time or have an 102% greater likelihood of graduating on-time. The significant negative relationship between having a primary exceptionality of InD and graduating on-time and having a primary exceptionality of ASD and on-time graduation suggest that a primary InD or ASD label is associated with being less likely to graduate on time than students in the primary disability category reference group of 504.

Seventh Grade

In the final model, none of the school-level predictors were significant. Attendance ($\beta_9 = -.05$, odds ratio = .95, $t = -2.40$, $p = .031$), GPA ($\beta_{12} = .87$, odds ratio = 2.38, $t = 3.52$, $p = .003$), InD ($\beta_{12} = -2.90$, odds ratio = .05, $t = -3.82$, $p < .001$), and ASD ($\beta_{12} = -3.17$, odds ratio = .04, $t = -3.33$, $p < .001$) were significant individual-level seventh-grade predictors of on-time graduation. The significant negative relationship between attendance and graduating on-time denotes that for each percentage point increase in the number of absences students were .95 times less likely to graduate on-time. The significant positive relationship between eighth grade GPA and on-time graduation indicates that for every one unit increase in GPA students are 2.38 times more likely or have an 138% greater likelihood of graduating on-time. The significant negative relationship between having a primary exceptionality of InD and graduating on-time and having a primary exceptionality of ASD and on-time graduation suggest that a primary InD or ASD label is

associated with being less likely to graduate on time than students in the primary disability category reference group of 504.

Eighth Grade

In the final model, none of the school-level predictors were significant. Attendance (β_9 = -.08, odds ratio = .92, t = -4.08, p = .001), GPA (β_{12} = .61, odds ratio = 1.83, t = 3.69, p =.002), InD (β_{12} = -2.98, odds ratio = .05, t = -3.62, p <.001), and ASD (β_{12} = -3.17, odds ratio = .05, t = -3.43, p <.001) were significant eighth-grade individual-level predictors of on-time graduation. The significant negative relationship between attendance and graduating on-time indicates that a 1% increase in absences is associated with .92 times lower likelihood of on-time graduation. The significant positive relationship between eighth grade GPA and on-time graduation indicates that for every one unit increase in GPA students are 1.83 times more likely or have an 83% greater likelihood of graduating on-time. The significant negative relationship between having a primary exceptionality of InD and graduating on-time and having a primary exceptionality of ASD and on-time graduation suggest that a primary InD or ASD label is associated with being less likely to graduate on time than the primary disability category reference group of 504. Having a primary exceptionality of either InD and ASD indicate 95% lower odds of graduating on-time.

Ninth Grade

In the final model, none of the school-level predictors were significant. Attendance (β_9 = -.07, odds ratio = .93, t = -3.36, p = .006), GPA (β_{12} = .83, odds ratio = 2.30, t = 4.09, p =.002), SLD (β_{12} = 1.08, odds ratio = 2.94 t = 2.13, p <.034), InD (β_{12} = -2.90, odds ratio = .06, t = -3.28, p =.001), and ASD (β_{12} = -2.68, odds ratio = .07, t = -2.88, p =.004) were significant ninth-grade individual-level predictors of on-time graduation. The significant negative relationship between attendance and graduating on-time indicates that for each 1% increase in absences, students are

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.93 times less likely to graduate on-time. The significant positive relationship between ninth grade GPA and on-time graduation indicates that for every one unit increase in GPA students are 2.30 times more likely or have 130% greater likelihood of graduating on-time. The significant negative relationship between having a primary exceptionality of InD and graduating on-time and having a primary exceptionality of ASD and on-time graduation suggest that a primary InD or ASD label is associated with being less likely to graduate on time than the primary disability category reference group of 504. However, the significant positive relationship between a primary exceptionality of SLD and on-time graduation indicates that having a primary exceptionality of SLD is associated with a 2.94 times greater likelihood of on-time graduation than the students in the disability reference group (504).

Tenth Grade

In the final model, none of the school-level predictors were significant. GPA (β_{12} = .83, odds ratio = 2.30, t = 4.09, p =.002), SLD (β_{12} = 1.08, odds ratio = 2.94 t = 2.13, p =.034), InD (β_{12} = -2.90, odds ratio = .06, t = -3.28, p =.001), and ASD (β_{12} = -2.68, odds ratio = .07, t = -2.88, p =.004) were significant 10th grade individual-level predictors of on-time graduation. The significant positive relationship between tenth grade GPA and on-time graduation suggests that for every one unit increase in GPA students are 2.30 times more likely or have 130% greater likelihood of graduating on-time. The significant negative relationship between having a primary exceptionality of InD and graduating on-time and having a primary exceptionality of ASD and on-time graduation suggest that a primary InD or ASD label is associated with being less likely to graduate on time than the primary disability category reference group of 504. However, the significant positive relationship between a primary exceptionality of SLD and on-time

graduation indicates that having a primary exceptionality of SLD is associated with a 194% greater likelihood of on-time graduation students in than the disability reference group (504).

Eleventh Grade

In the final model, none of the school-level predictors were significant. GPA (β_{12} = .83, odds ratio = 2.30, t = 3.64, p =.003), SLD (β_{12} = 1.92, odds ratio = 6.80, t = 2.13, p =.034), InD (β_{12} = -3.73, odds ratio = .02, t = -2.86, p =.004), and ASD (β_{12} = -2.50, odds ratio = .08, t = -2.05, p =.041) were significant 11th grade individual-level predictors of on-time graduation. The significant positive relationship between 11th grade GPA and on-time graduation suggests that for every one unit increase in GPA students are 2.30 times more likely or have 130% greater likelihood of graduating on-time. The significant negative relationship between having a primary exceptionality of InD and graduating on-time and having a primary exceptionality of ASD and on-time graduation suggest that a primary InD or ASD label is associated with being less likely to graduate on time than the primary disability category reference group of 504. However, the significant positive relationship between a primary exceptionality of SLD and on-time graduation indicates that having a primary exceptionality of SLD is associated with a 6.80 greater likelihood of on-time graduation than students in than the disability reference group (504).

Twelfth Grade

In the final model, none of the school-level predictors were significant. K-5 transitions (β_{12} = 2.47, odds ratio = 11.84, t = 2.60, p =.010), ESE services with general education peers (β_{12} = -1.49, odds ratio = .25, t = -2.52, p =.013), InD (β_{12} = -8.05, odds ratio = .00, t = -5.29, p <.001), and ASD (β_{12} = -7.01, odds ratio = .00, t = -4.6, p =<.001) were significant 12th grade individual-level predictors of on-time graduation. The significant positive relationship between

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kindergarten through fifth grade transitions and on-time graduation suggests that for every one unit increase in transitions, students are 6.80 times more likely to graduate on-time. The significant negative relationship between having a primary exceptionality of InD and graduating on-time and having a primary exceptionality of ASD and on-time graduation suggest that a primary InD or ASD label is associated with being less likely to graduate on time than the primary disability category reference group of 504. Finally, the significant negative relationship between time educated with general education peers and on-time graduation suggests that ever having been instructed less than 80% of times with general education peers is associated with a lower likelihood of on-time graduation.

Summary Grade Levels

Overall, many of the variables examined in this research were significantly correlated with on-time graduation. However, when other variables including demographic, behavioral, academic, disability-related, and school-level variables were held constant, few of the variables displayed robust relationships with on-time graduation over time. Having a primary exceptionality of InD or ASD was associated with a significantly lower likelihood of on-time graduation than for students with a 504 designation at all grade levels. Greater GPA scores were related to greater odds of on-time graduation at six of the seven grade levels examined. An increase in absences was related to a decreased chance of on-time graduation in four of the seven examined grade levels. For example, in seventh grade a student with no absences was twice as likely to graduate on-time as a student with 12 absences. A primary exceptionality of SLD was had a positive relationship with on-time graduation for three of the grade levels as compared to the 504 reference group. Qualification for free or reduced lunch price was significantly negatively related to on-time graduation only at the 6th grade level. Additionally, the number of

K-5 transitions had a significant positive relationship with on-time graduation; and having ever been served less than 80% of the week with general education peers had significant negative relationship with on-time graduation in 12th grade only.

CHAPTER 5: DISCUSSION

The purpose of this study was to investigate the factors that were hypothesized to contribute to whether a student graduates from high school on-time. In addition, this study examined how early in the students' educational careers these factors demonstrated influence on on-time graduation. This chapter begins with a review of the results of statistical analyses used to answer the research question, and includes the relationship between these results and current research. This chapter contains a discussion of implications for research and practice as well as limitations of the study. The chapter concludes with areas for future research.

Research Question

What is the relationship between student level variables (e.g., language proficiency, disability category, etc.) and school level variables (e.g., racial/ethnic composition, school grade, etc.) and on-time graduation for students with disabilities?

Individual-Level Demographic Variables

This study examined demographic variables including language proficiency, socio-economic status (SES), and race/ethnicity. Only SES was significantly correlated with on-time graduation for SWD. In the final multi-level regression model, qualification for free or reduced lunch price was significantly predictive in sixth grade of not graduating on-time. Although this finding only occurred for one of the grade levels studied, the finding is consistent in the literature that SES in both middle and high school are predictive of whether a student graduates (Alexander, Entwisle, & Horsey, 1997; Battin-Pearson, Newcomb, Abbott, Hill, Catalano, &

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Hawkins, 2000; Hernandez, 2011; Rumberger, 1995). SES was also found to be a significant

predictor of school completion for SWD (Zablocki & Krezmien, 2013).

Other research examining the relationship between additional individual-level

demographic variables (including race and language proficiency) and high school completion has

found correlations between background characteristics and the likelihood of school completion.

However, these characteristics frequently provided no unique predictive value as part of a

logistic regression model that included other salient predictors (Doren et al., 2014).

Individual-Level School and Behavioral Variables

This research examined academic and behavior variables including attendance, grade

point average (GPA), office discipline referrals (ODRs) and school transitions. Findings of the

current research focus on prediction of on-time graduation for SWD over time. Three other

longitudinal data sets have been utilized over the last decade to examine the risk factors for SWD

associated with high school graduation (Gwynne et al., 2009; Reschly and Christenson, 2006;

Zablocki & Krezmien, 2013). Using the National Longitudinal and Transitional Study 2

(NLTS2) data, Zablocki and Krezmien (2013) found that increased odds of dropping out were

associated with academic and behavioral variables including low academic achievement, grade

retention, school suspension, and emotional engagement. Similarly, the current study found

higher academic achievement in the form of GPA to be predictive of on-time graduation.

However, behavior incidents (as measured by ODRs) and engagement as a school-level variable

(as measured by the student Gallup Poll) were not significant predictors with other variables held

constant in a multi-level regression model. Differences in findings may be due to how variables

were defined and measured. Zablocki and Krezmien (2013) defined school suspension as a

dichotomous variable indicating whether the student had ever been suspended or expelled based

on parent report; and the current study defined behavior incidents using the number of ODRs. Also, Zablocki and Krezmien (2013) defined emotional engagement as an individual student variable based on student responses to six items about enjoying school and getting along with teachers and peers. The current research used the Gallup Student Poll results. In addition, Zablocki and Krezmien (2013) held some different individual student variables constant (e.g., gender, grade retention) in the final regression models; and the current research added school-level variables using a multi-level regression model.

Gwynne et al. (2009) used data from the Consortium on Chicago School Research and found that academic and behavioral variables including course failures, absences, and grades were significant predictors of school completion for SWD. Absences during the ninth grade year were the largest predictor of dropout. The current study results concur with these findings in that attendance (as measured by percentage of absences) was a significant predictor of on-time graduation not only at ninth grade, but also sixth through eighth grades; and GPA was a significant predictor in all grades except 12th grade.

Reschly and Christenson (2006) examined data from the National Educational Longitudinal Study for students identified by their parents as having a learning disability or serious emotional disturbance and average-achieving peers from eighth grade to twelfth grade. Although effect sizes were small, significant predictors of dropout for SWD in this study included absences, behavior, and retention. The current study also found that absences were a significant predictor of the lack of on-time graduation. However, behavior incidents were not significant predictors in the current study. Difference may be due to definitions of SWD and variables within the two studies. Participants in the study by Reschly and Christenson (2006) were identified by their parents as having a learning disability or serious emotional disturbance,

while student data for students with an Individual Education Program or a 504 were used for the current study. In addition, Reschly and Christenson (2006) used dropout as an outcome variable rather than on-time graduation as in the current study. Students who do not graduate on-time did not necessarily dropout. These students may even graduate at a later date.

In addition to attendance, GPA, and ODRs discussed previously in relation to other research for SWD, school transitions were examined in the current study at elementary (kindergarten-fifth), middle (sixth-eighth), and high school (ninth-12th) grades. The number of transitions in elementary school was positively correlated at one grade level (12th) with on-time graduation indicating an increase in the number of transitions was associated with increased odds of on-time graduation. This finding is not supported by previous research. Several studies have linked changing schools even once for any reason other than promotion to the next grade with increased risk for not graduating from high school (Kaufman, Bradbury, & Owings, 1992; Gleason & Dynarski, 2002; Rumberger, 1995). With respect to SWD in particular, Kortering, Haring, and Klockars (1992) found the number of school transitions was significantly higher for students with learning disabilities who dropped out of school than for students with disabilities who graduated.

There is more than one possible explanation for elementary transitions being positively associated with on-time graduation in this study. First, the elementary transitions variable had more missing data than other variables in the study with 11% missing. Missing data is due to lack of availability of this data for students who did not attend the targeted school district in elementary school. Also, another statistical explanation may be related to the relationship among the elementary, middle, and high school transition variables. There was a near zero (-.003) correlation between elementary transitions and on-time graduation; but, with other variables held

constant, including transitions at other grade levels, number of elementary transitions was a significant predictor of on-time graduation. Elementary transitions and high school transitions were significantly correlated at ninth, 11th, and 12th grades. Additionally, elementary transitions and middle school transitions were significantly correlated in seventh grade only. Another possible explanation could be the transitions initiated by schools for students with disabilities to programs located at other schools. Perhaps an increase in the number of transitions in elementary school to find the best placement for students resulted in better outcomes for students.

Off-Track Status Variable

The number of times a student was off-track did not significantly predict on-time graduation for students with disabilities in the current study. However, two of the variables that are used frequently to determine if a student is off-track for graduation were significant predictors of on-time graduation in the current study (i.e., GPA and attendance). Previous research has demonstrated the predictive power of being off-track to school non-completion (Allensworth & Easton, 2005; 2007; Johnson & Semmelroth, 2010). In addition, Gwynne et al. (2009) found that on-track status in 9th grade was a significant predictor of school completion for SWD. The number of semesters off-track has been found to significantly predict off-track status at the end of 10th grade (Brundage, 2013), but has not been studied in relation to on-time graduation.

Differences between the current study and other research in terms of on- and off- track status being a predictor of school completion may be due to the variable in the current study being defined as the number of times off-track rather than off-track at the most recent semester or ever having been off-track. The number of off-track semesters variable has a skewed

distribution; and using an ordinal scale rather than treating the number of off-track semesters as a continuous variable may yield different results.

Another reason for the differences in the predictive power of off-track status within an EWS could be differences in participant populations. Most of the research has been done with students with and without disabilities grouped together (Allensworth & Easton, 2005; 2007; Johnson & Semmelroth, 2010). Additionally, the study that examined the use of EWS off-track status as a predictor of high school graduation for SWD included only data from students with learning disabilities, mild cognitive disabilities, and emotional disturbances (Gwynne et al., 2009). Students with physical/sensory disabilities, speech and language disabilities, Autism Spectrum Disorder, and 504 were not included in the analyses. The question of whether current EWS systems are predictive of on-time graduation for SWD remains only partially answered.

Disability Variables

This research examined disability-specific variables including disability category, ever being served less than 80% of the time with general education peers, and years of Exceptional Student Education (ESE) services. Having a primary exceptionality of InD or ASD was associated with a significantly lower likelihood of on-time graduation than for students with a 504 designation at all grade levels. While a primary exceptionality of SLD was associated with a significantly higher likelihood of on-time graduation than for students with a 504 designation at three of the grade levels examined. Additionally, at 12th grade, ever having been instructed less than 80% of time with peers was associated with a lower likelihood of on-time graduation.

Research indicates that having a disability significantly predicts high school noncompletion and that graduation rates differ among disability categories (Zablocki & Krezmien, 2013). However, much of this research has found that students with an emotional and

behavioral label graduate at lower rates than other disability categories (Smith, Manuel, Stokes, 2012; Wagner, 1991; Zablocki & Krezmien, 2013) as opposed to the current study that indicates primary exceptionalities of ASD or InD are predictive of not graduating on-time. Zablocki and Krezmien (2013) found that students with an emotional behavior disability were more likely to dropout than students with a learning disabled label. Students with low incidence disabilities including autism spectrum disorder and mental retardation were less likely to dropout than students with learning disabilities. However, predictive power was not significant when grades, suspension history, grade retentions, and emotional engagement were included in the logistic regression analysis (Zablocki & Krezmien, 2013).

The current research found EBD to be negatively correlated with on-time graduation; but, when other demographic, academic, behavioral, and school-level variables were held constant having a primary exceptionality label of EBD did not significantly predict whether a student would graduate on-time. Instead, ASD and InD were the only primary exceptionalities that were significantly related to on-time graduation in the multi-level regression model for grades six through 12.

Most research about the differences among disability categories related to graduation rates focuses on dropout rather than on-time graduation as measured by the Federal Uniform Graduation Rate criteria as an outcome variable (Zablocki and Krezmien, 2013; Wagner, 1991). Schifter (2011) used the NTLS-2 data to examine the length of time it takes for students with disabilities to graduate from high school. Schifter (2011) found that 72.4% of students with disabilities graduated within eight years. However, among the lowest graduation rates were students with ASD and InD. Within eight years of entry into high school, 32.6% of students with

InD and 43.6% of students with ASD did not graduate. The estimated median time to graduate for students with InD was 5.78 years and for students with ASD was 6.46 years (Schifter, 2011).

These data indicate that students with low incidence disabilities such as ASD and InD frequently do not graduate from high school. However, when they do graduate it often takes more than four years of high school. The current research examined on-time graduation so any students who graduated more than four years after entering high school were grouped with students who did not complete high school. Questions remain regarding the utility of disability category as a predictor of graduation. Specifically, what disability categories are the most reliable predictors of graduation? and are the predictors of graduation in four years the same as the predictors for graduating in five, six, or seven years?

School-Level Variables

In this study, all school-level variables were significantly correlated with on-time graduation at least one grade level. However, when individual-level variables including demographic, behavioral, academic, and disability-related variables were held constant within a multi-level regression model, no significant relationships with on-time graduation were found. This is similar to research using a larger set of the same population used for this study (not only SWD) that found only one school level variable (school grade) at only one time pint (ninth grade) to have a significant relationship with off-track status within a multi-level regression model. However, other research has found significant relationships between school-level variables and school completion (Kotok, Ikoma, & Bodovski, 2016; South, Haynie, & Bose, 2007; Wood et al., 2017). These studies were with general populations of students rather than solely SWD.

Overall, four individual-level variables were consistent across several grade levels in predicting on-time graduation: primary disability categories of InD and ASD, GPA, and attendance. The primary disability categories of InD and ASD were both negatively correlated with on-time graduation and indicate a decreased likelihood of on-time graduation compared to the reference group of the primary disability category of 504. Across all grades studies except 12th, an increase in GPA corresponded to increased odds of graduating on-time. An increase in the number of absences at grades six through nine was associated with decreased odds of on-time graduation. For example, in seventh grade a student with no absences was twice as likely to graduate on-time as a student with 12 absences.

Implications for Research to Practice

Results of the current study indicating that GPA and attendance are significant predictors of on-time graduation for SWD justifies the use of those variables as part of an EWS to predict graduation for the SWD population. GPA was a significant predictor of on-time graduation throughout both middle school and high school grades in the current study. GPA frequently is used only at the high school level as part EWS. Results from this study suggest that middle school non-cumulative (calculated semester by semester without inclusion of previous semesters grades) GPA is a strong predictor of on-time graduation. Similarly, Brundage (2013) used a larger group from the same population that included students with and without disabilities, and found that non-cumulative middle school GPA predicted off-track status in 10th grade. At least in the target school district, middle school GPA is not a readily available statistic and may require changes to current practices to add this variable as an indicator to EWS.

Although more research needs to be done to determine the specific variables that could be added to refine the use of EWS for SWD, differential use of EWS for students with disabilities

may be merited. The current research indicates that disability type and time instructed with general education peers might add to the prediction power of an EWS for SWD. An EWS with added variables for the SWD population would allow schools to better pinpoint the students most in need of services related to increasing on-time graduation. Results of this study indicate that additional support services in specific disability programs that serve the disability categories of ASD and InD might be warranted as well.

Because several predictors of on-time graduation in this study were consistent across grade levels beginning from sixth grade, it makes sense to intervene at the earliest possible time point to alter the trajectory of student success for students with and without disabilities. Balfanz, Herzog and MacIver (2007) reported that students at-risk for dropout are identifiable before they enter high school. The researchers used indicators from middle school (course failures, attendance, poor behavior grades/discipline) to identify and intervene with the most at-risk students for not graduating on-time (Balfanz, Herzog, & MacIver, 2007). Supports provided to at-risk students focused on increasing effective and engaging instruction aimed at addressing academic and social-emotional needs. The researchers found that students who spent sixth through eighth grade with this support were 55% more likely to graduate on-time when compared with control students (Balfanz, Herzog, & MacIver, 2007). Wilkins and Huckabee (2014) synthesized research focused on interventions to improve rates of high school completion for SWD and found successful interventions at both middle and high school including mentoring, academic supports, participation in school activities, and family outreach. In addition, the researchers reported on several interventions targeted specifically for skills related to the SWD population including social skills, self-determination skills, and vocational skills. Schools and school districts should use EWS data at least starting in sixth grade to identify the students most

in need of additional intervention to create multi-tiered systems of support for all at-risk students. Moving forward these supports could be differentiated for SWD according to disability-specific variables indicating which students have higher levels of risk for not graduating on-time.

Limitations

The correlational design of this research prevents inference of causal relationships. This study examined relationships among variables and possible predictors of on-time graduation, not the factors that cause a student to graduate. In addition, the study is limited by the population of participants. The study utilizes only available data from students in one large Florida school district. The models developed based on findings from this population and data set may have limited generalizability to other settings and school districts. Thirdly, although individual data is based on 692 participants, school-level data in this study is based on only fifteen middle schools and thirteen high schools. This number of schools may limit the variability of factors and thus the statistical power to determine significance of school-level variables. Lastly, this research utilizes archived data from cumulative records. The accuracy of the data used is dependent on how accurately data were entered into the district computer system. To decrease the likelihood of error in the data set, ranges, variances, and distributions of variables were examined for likely error. Questionable was referred to the Pasco County Office for Accountability, Research, and Measurement to evaluate for accuracy.

Areas for Future Research

There are several areas of future research suggested by the results of the current study including additional variables for inclusion, data from additional grade levels, and examination of the predictors of graduation at later time points. Among additional variables suggested for inclusion in a prediction model for on-time graduation for SWD is off-track status measured at

any earlier time point in a student's career and off-track status in the prior semester. Off-track status was only examined in the current study by number of off-track semesters and treated as a continuous variable. Off-track status could be defined differently as ever off-track or off-track during the current school year; and the current definition could be treated as a categorical variable to limit outliers. Two of the variables that frequently determine if a student is off-track for graduation were significant predictors of on-time graduation for SWD in this study, and past research has shown a strong relationship between off-track status and lack of graduation, it is important to conduct additional research to confirm whether current EWS systems are accurate predictors of on-time graduation for SWD.

The inclusion of retention data would improve the current study. For the current study, reliable data on retention was not available. Numerous studies have demonstrated that grade retention is correlated with lack of school completion (Alexander, Entwisle, & Kabbani, 2000; Bridgeland, Dilulio, & Burke Morrison, 2008; Carpenter & Ramirez, 2007; Gleason & Dynarski, 2002; Rumberger & Larson, 1998). Additionally, studies have found an association between grade retention and dropout for SWD in particular (Reschly and Christenson, 2006; Zablocki & Krezmien, 2013). It is important to determine the relationship between grade retention and on-time graduation for SWD when other readily available powerful predictors are held constant. This information would provide schools with more information about the trajectory for SWD who have been retained. If grade retention significantly adds to the predictive accuracy of an EWS model for general populations and SWD, stakeholders will need to consider this variable's inclusion in EWS systems.

How student engagement, hope and mental health relate to on-time graduation is an area that requires further research for students with and without disabilities. The addition of variables

related to student engagement, hope, and mental health may serve to further refine EWS in general and specifically for SWD. This type of research has been advocated by other researchers (Brundage, 2013; Dynarski & Gleason, 1998). The current research examined engagement and hope as measured by the Gallup Student Poll only with data from twelfth grade. In the past, this type of data has not been readily available to school districts making including these types of variables in EWS cumbersome, and thus less worthy of research into their utility as predictors. However, as more schools and school districts utilize mental health screening tools and use of tools like the Gallup Student Poll become more widespread, the feasibility of using this type of data as part of an EWS system improves. As of 2015, 3300 schools from 550 school districts utilize the Gallup Student Poll (Gallup, 2017). However, data from this tool is only reported aggregated at the school level and not tied to individual students. The current research only examined data from the Gallup Student Poll for the first year of implementation in one school district. Future research should include student engagement and hope from the Gallup Student Poll as a school-level variable at different grade levels to determine the predictive power at earlier time points for on-time graduation. In addition, utility of mental health screening tools should be examined as student-level variables to determine the relationship with on-time graduation for students with and without disabilities.

Other possible predictor variables to include in future research include interactions. For example, because students with primary exceptionalities of ASD and InD are often served in more restrictive environments, future research should examine the relationship between low incidence disabilities such as ASD and InD and time educated with general education peers as predictors of on-time graduation. Is there an interaction between these variables that predicts on-time graduation? Other possible interactions should be selected based on past research to

determine if interactions among variables predicts on-time graduation better than individual predictor variables.

Another area for future research is using predictors to target at-risk students earlier (i.e., prior to middle school) for the general population and for SWD specifically. The use of EWS predictors at the elementary level would provide schools with information to better intervene with the most at-risk students and change student trajectories even before the middle school years. The use of EWS at the elementary and even pre-kindergarten level would provide schools with data to identify the most at-risk students for very early prevention and increase the likelihood of success in increasing on-time graduation. In addition, very early intervention may not need to be as intensive to be successful and could be less costly for individual schools and school districts as well.

This study investigates the relationship between individual and school-level predictors of on-time graduation from sixth through twelfth grade for SWD. The current research yielded several consistent significant relationships between individual-level variables and on-time graduation across grades. The individual level predictors of: GPA, primary disability categories of ASD and InD, and sixth through ninth grade attendance were consistent predictors. Additionally, sixth grade SES, whether ever served less than 80% of the week with general education peers in twelfth grade, and elementary transitions in twelfth grade were significantly related to on-time graduation. Further exploration of these variables would provide better understanding of each of the variables as predictors for SWD. Extension of this research to other SWD populations and different service models would provide insight into the use of these and other variables as part of EWS for SWD. Additional research in differentiating the level of risk

among students with disabilities could inform the needed multi-tiered systems of support to improve rates of on-time graduation.

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